

**MONTGOMERY TOWNSHIP  
BOARD OF SUPERVISORS**

1001 STUMP ROAD  
MONTGOMERYVILLE, PA 18936-9605  
Telephone: 215-393-6900 • Fax: 215-855-6656  
[www.montgomerytwp.org](http://www.montgomerytwp.org)

**ROBERT J. BIRCH**  
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**LAWRENCE J. GREGAN**  
TOWNSHIP MANAGER

May 9, 2016

Mr. Richard K. Breitenstein  
Compliance Specialist  
Water Management  
Pennsylvania Department of Environmental Protection  
2 East Main Street  
Norristown, PA 19401

RE: Montgomery Township  
MS4 Annual Report Year 12-13- 2014-2016

Dear Mr. Breitenstein:

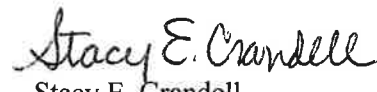
On behalf of Montgomery Township, please find enclosed our MS4 Annual Report Form for Year 12-13. If you have any questions concerning this submission, please do not hesitate to contact me. As requested, enclosed is the following information supporting Montgomery Township's 2014-2016 MS4 Annual Permit reporting requirements:

1. MS4 Annual Report form for Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s) - Reporting Period- March 16, 2014 through March 15, 2016.
2. Certification Statement, signed by the Director of Planning and Zoning.
3. Post-Construction Stormwater Management BMP Year 12-13 Project Listing.
4. Communication Materials with Stormwater Information for the Public

If you have any further questions, please feel free to contact me.

Sincerely:

  
Bruce S. Shoupe  
Director of Planning & Zoning

  
Stacy E. Crandell  
Assistant to the Township Manager

CC: Township Engineer  
Public Works Director



## MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) ANNUAL/PROGRESS REPORT

For the Reporting Period: March 16, 2014 to March 15, 2016

☐ Annual Report    ☒ Progress Report  
☐ New Permittee    ☒ Renewal Permittee

Due Date: May 13, 2016

### GENERAL INFORMATION

Permittee Name:	Montgomery Township	NPDES Permit No.:	PA130016
Mailing Address:	1001 Stump Road	Effective Date:	03-16-2013
City, State, Zip:	Montgomeryville, PA 18936	Expiration Date:	03-15-2018
MS4 Contact Person:	Bruce Shoupe	Renewal Due Date:	09-15-2017
Title:	Director of Planning & Zoning	Admin. Extended?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Phone:	215-393-6900	Municipality:	Montgomery
Email:	bshoupe@montgomerytp.org	County:	Montgomery
Co-Permittees (if applicable): n/a			

### WATER QUALITY INFORMATION

Are there any discharges to waters within the Chesapeake Bay Watershed?    ☐ Yes    ☒ No

Identify all surface waters that receive stormwater discharges from storm sewers within the MS4 urbanized area and provide the requested information (see instructions).

Receiving Water Name	Ch. 93 Class.	Impaired?	Cause(s)	TMDL?	WLA?
Little Neshaminy	WWF	Yes	Nutrients, Siltation	Yes	Yes
Wissahickon	TSF	Yes	Siltation, Urban Runoff	Yes	Yes
Neshaminy Creek	WWF	Yes	Siltation, Urban Runoff	Yes	Yes

Identify any Wasteload Allocations (WLAs) identified in TMDLs for the MS4, if applicable. Identify the pollutant(s) and mass load(s):

Little Neshaminy- 696,505 - Nutrients, Siltation

West Branch Neshaminy Creek- 177,769- Siltation, Urban Runoff

Wissahickon- 85,306- Siltation, Urban Runoff

This information is referenced from the MS4 TMDL Strategy that was revised December 2015.

### GENERAL MINIMUM CONTROL MEASURE (MCM) INFORMATION

Have you completed all MCM activities required by the permit for this reporting period? ☒ Yes ☐ No

Provide current contact name and phone number information for the required MCMs (if same as page 1, leave blank):

MCM	Contact Name	Phone
#1 Public Education and Outreach on Storm Water Impacts	Bruce Shoupe	215-393-6900
#2 Public Involvement/Participation	Bruce Shoupe	215-393-6900
#3 Illicit Discharge Detection and Elimination (IDD&E)	Bruce Shoupe	215-393-6900
#4 Construction Site Storm Water Runoff Control	Bruce Shoupe	215-393-6900
#5 Post-Construction Storm Water Management in New Development and Redevelopment	Bruce Shoupe	215-393-6900
#6 Pollution Prevention / Good Housekeeping	Bruce Shoupe	215-393-6900

### MCM #1 – PUBLIC EDUCATION AND OUTREACH ON STORM WATER IMPACTS

#### BMP #1: Develop, implement and maintain a written Public Education and Outreach Program

**Measurable Goal:** For new permittees a Public Education and Outreach Program (PEOP) shall be developed and implemented during the first year of permit coverage and shall be re-evaluated each permit year thereafter and revised as needed. For renewal permittees, the existing PEOP shall be reviewed and revised as necessary. The permittee's PEOP shall be designed to achieve measurable improvements in the target audience's understanding of the causes and impacts of stormwater pollution and the steps they can take to prevent it.

- For new permittees only, attach the written PEOP or a summary thereof to the first report submitted to DEP.
- If you are not a new permittee, did you complete and submit your written PEOP to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**
- Date of last evaluation of or revision to the PEOP: **02/01/2016**
- What were the plans and goals for public education and outreach for the reporting period?

The Township has reviewed their public education plan throughout MS4 year 12 and 13. The Township has implemented ways to make sure that new homeowners are given the welcome packets. The Fire Department delivers the welcome packets to the new homeowners.

- Did the MS4 achieve its goal(s) for the PEOP during the reporting period? ☒ Yes ☐ No

Explain the rationale for your answer:

The Township's Shade Tree Commission during its annual Arbor Day, distributed various information concerning environmental subjects. During the Arbor Day event the Township gave away 450 free trees to residents and other environmental information handouts.

Local businesses were provided with educational information through the website and through meetings of the Township's Business Development Partnership, which meets the 3rd Tuesday of the month at 12:30PM. The Township's Business Development Partnership is represented by 11 different businesses within Montgomery Township. The discussions included an exchange of ideas concerning numerous topics affecting the community and our environment including ways to manage stormwater and what procedures need to be followed by businesses.

The Township's website provides general stormwater information, a Kids Corner along with links to the PA DEP and US EPA. The Township owns and maintains 61 stormwater detention basins, of which 44 have been allowed to naturalize and 31 are posted with a sign explaining the intent of this practice. In 2014, no basins were added. In

2015, 6 basins were added. The residents in each area are notified why the basin is being naturalized before the process starts. The Township will investigate in the future if a cost effective solution is available for it's website software to try and determine the number of visitors to each section. Presently the software can only track downloaded material.

6. Identify specific plans and goals for public education and outreach for the upcoming year:

The Environmental Advisory Committee is continuing to work to provide tips and information for the Township's e-newsletter and will place the information on their webpage.

The Township is continuing to provide stormwater management tips and information via all of the communication vehicles. The Township is investigating placing videos on the website and the cable channel. If feasible, the Township will start to find digital content to place on the website and the cable channel and promote the content via the e-newsletter.

**BMP #2: Develop and maintain lists of target audience groups present within the areas served by your MS4**

**Measurable Goal:** For new permittees, the lists shall be developed within the first year of coverage under the permit and reviewed and updated as necessary every year thereafter. For renewal permittees, the lists shall continue to be reviewed and updated annually.

1. For new permittees only, attach your target audience list(s) to the first report submitted to DEP.
2. If you are not a new permittee, did you complete and submit your target audience list to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**
3. Date of last review or revision to target audience list(s): **02-01-2016**

**BMP #3: Annually publish at least one educational item on your Stormwater Management Program**

**Measurable Goal:** For new permittees, stormwater educational and informational items shall be produced and published in print and/or on the Internet within the first year of permit coverage. In subsequent years (and for renewal permittees), the list of items published and the content in these items shall be reviewed, updated, and maintained annually. Your publications shall contain stormwater educational information that addresses one or more of the 6 MCMs.

1. For new permittees only, attach your published stormwater educational or informational materials to the first report submitted to DEP.
2. If you are not a new permittee, did you complete and submit your published stormwater educational or informational materials to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**
3. Do you have a municipal newsletter? ☒ Yes ☐ No  
If Yes, how often was it published during the reporting period and what MS4-related material did it contain?  
**3**
4. Do you have a municipal website? ☒ Yes ☐ No (URL: **www.montgomerytwp.org**)  
If Yes, what MS4-related material does it contain?  
**The Township's website provides general stormwater information, a Kids Corner along with links to the PA DEP and US EPA.**
5. Describe any other method(s) used during the reporting period to provide information on stormwater to the public:  
**Handouts from the Wissahickon Watershed Association were made available to the public.**
6. Date of most recent review and/or update to published stormwater educational materials: **02/01/2016**

7. Identify specific plans for the publication of stormwater materials for the upcoming year:

The Township is exploring putting videos on the Township's website and cable channel so the Township could have videos that give tips on stormwater management. In addition, with our residents and businesses communicating with us through electronic means, the Township will continue to explore other ways of continuing to send out stormwater information to the public.

**BMP #4: Distribute stormwater educational materials to the target audiences**

**Measurable Goal:** All permittees shall select and utilize at least two distribution methods in each permit year. These are in addition to the newsletter and website provisions of BMP #3.

Identify the two additional methods of distributing stormwater educational materials during the previous year (e.g., displays, posters, signs, pamphlets, booklets, brochures, radio, local cable TV, newspaper articles, other advertisements, bill stuffers, posters, presentations, conferences, meetings, fact sheets, giveaways, or storm drain stenciling).

The Township will continue to advertise stormwater related materials and training and providing it to the public via the Township's various communication vehicles. The Township has information on all of the communication vehicles including the cable channel, newsletters (electronic and hand copies), website, and through brochures or information that is supplied to the Township (rain garden workshop, rain barrel sale through County, etc.).

The Township also looks to host different environmental friendly workshops in the Community and Recreation Center.

## MCM #2 – PUBLIC INVOLVEMENT/PARTICIPATION

### BMP #1: Develop, implement and maintain a written Public Involvement and Participation Program (PIPP)

**Measurable Goal:** A new permittee's PIPP shall be developed and implemented during the first year of coverage under this General Permit. All permittees shall re-evaluate the PIPP each permit year and revise as needed. Your PIPP shall include, but not be limited to:

- a. Opportunities for the public to participate in the decision-making processes associated with the development, implementation, and update of programs and activities related to this General Permit.
- b. Methods of routine communication to groups such as watershed associations, environmental advisory committees, and other environmental organizations that operate within proximity to the permittee's regulated small MS4s or their receiving waters.
- c. Making your periodic reports available to the public on your website, at your municipal offices, or by US Mail upon request.

1. For new permittees only, attach your written PIPP or a summary thereof to the first report submitted to DEP.
2. If you are not a new permittee, did you complete and submit your written PIPP or summary to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**

3. Date of last review and/or update to the PIPP: **02/01/2016**

4. Explain how your PIPP addresses items a, b and c of the Measurable Goal:

The Township's Shade Tree Commission and Environmental Advisory Committee, during its Arbor Day/Earth Day event, distributed various information concerning environmental subjects. As part of the Arbor Day event, the Township gave away 450 free trees to residents.

Businesses were provided with educational information through the website and the Township's Business Development Partnership (BDP). The Business Development Partnership is a committee comprised of Montgomery Township business managers and owners. Each month on 3rd Tuesday at 12:30PM, the members of the BDP meet to discuss and analyze important matters that may affect the business community. This advisory committee makes recommendations to the Board of Supervisors and Township staff regarding community business activity and economic development.

The Township's website provides general stormwater information, along with links to the PA DEP and US EPA. The Township provides E-News information to about 2,000 subscribers monthly, information is included in the Township's E-News (<http://www.montgomerytp.org/departments/division.php?fDD=2-118>) on various environmental information. The Township reviewed their public information and participation plan during MS4 year 12 & 13 and updated information that was necessary. The previously general plan submitted to DEP remains current and valid.

### BMP #2: Prior to adoption of any ordinance (municipal permittees) or SOP (non-municipal permittees) required by the permit, provide adequate public notice and opportunities for public review, input, and feedback.

**Measurable Goal:** Advertise any proposed MS4 Stormwater Management Ordinance or SOP, provide opportunities for public comment, evaluate any public input and feedback, and document the comments received and the municipality's response.

1. Was an MS4-related ordinance or SOP developed during the reporting period? ☒ Yes ☐ No
2. If Yes, describe how you advertised the draft ordinance and how you provided opportunities for public review, input and feedback:

**It was advertised in the local newspaper. A copy of the ordinance was provided in the lobby and it was posted on the website prior to the Board of Supervisors Meeting.**

3. If an ordinance or SOP was enacted/developed or amended during the reporting period, provide the following information:

Ordinance No. / SOP Name	Date of Public Notice	Date of Public Hearing	Date Enacted
14-278	04/14/2014	05/12/2014	05/12/2014

15-291	12/14/2015	01/04/2016	01/04/2016
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**BMP #3: Regularly solicit public involvement and participation from the target audience groups. This should include an effort to solicit public reporting of suspected illicit discharges. Assist the public in their efforts to help implement your SWMP. Conduct public meetings to discuss the on-going implementation of your SWMP.**

**Measurable Goals:** Conduct at least one public meeting per year to solicit public involvement and participation from target audience groups. The public should be given reasonable notice through the usual outlets a reasonable period in advance of each meeting. During the meetings, you should present a summary of your progress, activities, and accomplishments with implementation of your SWMP, and you should provide opportunities for the public to provide feedback and input. Your presentation can be made at specific MS4 meetings or during any other public meeting. Under this MCM, you should document and report instances of cooperation and participation in your activities; presentations you made to local watershed organizations and conservation organizations; and similar instances of participation or coordination with organizations in your community. You also should document and report activities in which members of the public assisted or participated in your meetings and in the implementation of your SWMP, including education activities or organized implementation efforts such as cleanups, monitoring, storm drain stenciling, or others.

1. Date of the public meeting(s): **12/14/2015, 01/04/2016**
2. How were meeting(s) advertised to the public? **In the local newspaper, on the website, and cable channel**
3. Indicate where the meeting(s) were held and the number of attendees:  
**12/14/2015 - held at Township Building and 15 people were in attendance and 01/04/2016- held at the Township's Community and Recreation Center and 30 people were in attendance.**
4. What types of MS4-related activities did you solicit public involvement and participation for?  
**The Township was gathering information about amending the stormwater management code.**
5. What MS4-related activities did the public participate in?  
**No feedback from the public was received.**

**MCM #3 – ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDD&E)**

**BMP #1: You shall develop and implement a written program for the detection, elimination, and prevention of illicit discharges into your regulated MS4s. Your program shall include dry weather field screening of outfalls for non-stormwater flows, and sampling of dry weather discharges for selected chemical and biological parameters. Test results shall be used as indicators of possible discharge sources.**

**Measurable Goal:** For new permittees, the IDD&E program shall be developed during the first year of coverage under this General Permit and shall be implemented and evaluated each year thereafter. For renewal permittees, the existing IDD&E program shall continue to be implemented and evaluated annually. Records shall be kept of all outfall inspections, flows observed, results of field screening and testing, and other follow-up investigation and corrective action work performed under this program.

1. For new permittees only, attach your written IDD&E program to the first report.
2. If you are not a new permittee, did you complete and submit your written IDD&E program to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**
3. Date of last review and/or update to IDD&E program: **02/01/2016**

**BMP #2: Develop and maintain a map of your regulated small MS4. The map must also show the location of all outfalls and the locations and names of all surface waters of the Commonwealth (e.g., creek, stream, pond, lake, basin, swale, channel) that receive discharges from those outfalls.**

**Measurable Goals:** For new permittees, develop the map(s) of your regulated small municipal separate storm sewer systems and the information on all outfalls from your regulated small MS4 by the end of the fourth (4th) year of permit coverage. For renewal permittees, the existing map(s) of your regulated small MS4 shall be updated and maintained as necessary during each year of coverage under the permit.

1. Have you completed a map(s) of all outfalls and receiving waters of your storm sewer system? ☒ Yes ☐ No



2. For new permittees only, attach the completed map to the 4<sup>th</sup> year Annual Report.
3. Date of last update or revision to map(s): **June 2010**
4. Total number of discharge points in your storm sewer system that:  
Discharge directly to surface waters (outfalls): **168**  
Discharge to storm sewers owned by others: **0**
5. Total number of outfalls that are mapped at this time: **168**

**BMP #3: In conjunction with the map(s) created under BMP #2 (either on the same map or on a different map), new permittees shall show, and renewal permittees shall update, the entire storm sewer collection system, including roads, inlets, piping, swales, catch basins, channels, basins, and any other features of the permittee's storm sewer system including municipal boundaries and/or watershed boundaries.**

**Measurable Goals:** For new permittees, develop the map(s) by the end of the fourth (4<sup>th</sup>) year of coverage under the permit and update and maintain the map(s) as necessary each year of permit coverage thereafter. For renewal permittees, update and maintain the map(s) as necessary during each year of permit coverage.

1. Have you completed a map(s) that includes roads, inlets, piping, swales, catch basins, channels, basins, municipal boundaries and watershed boundaries? ☒ Yes ☐ No
2. If Yes, is the map(s) on the same map(s) as for outfalls and receiving waters? ☒ Yes ☐ No
3. For new permittees only, attach the completed map to the 4<sup>th</sup> year Annual Report.
4. If you are not a new permittee, did you complete and submit your map to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06-02-2014**
5. Date of last update or revision to map: **June 2010**

**BMP #4: Following the IDD&E program created pursuant to BMP #1, the permittee shall conduct outfall field screening, identify the source of any illicit discharges, and remove or correct any illicit discharges using procedures developed under BMP #1.**

*For all permittees, outfall inspections need to be prioritized according to the perceived chance of illicit discharges within the outfall's contributing drainage area. Observations of each outfall shall be recorded each time an outfall is screened, regardless of the presence of dry weather flow. Proper quality assurance and quality control procedures shall be followed when collecting, transporting or analyzing water samples. All outfall inspection information shall be recorded on the Outfall Reconnaissance Inventory/Sample Collection field sheet excerpted from the Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (CWP, October 2004). Adequate written documentation shall be maintained to justify a determination that an outfall flow is not illicit. If an outfall flow is illicit, the actions taken to identify and eliminate the illicit flow also shall be documented.*

*The results of outfall inspections and actions taken to remove or correct illicit discharges shall be summarized in periodic reports.*

1. For new permittees only, were at least 40% of all outfalls screened during dry weather? ☐ Yes ☐ No  
  
If Yes for #1, indicate the number screened and the percent of all outfalls it represents. If No for #1, indicate reason(s) why this was not completed:  
  
Are you on pace to screen all outfalls twice during the permit term? ☐ Yes ☐ No
2. For renewal permittees, indicate the percent of outfalls screened during the reporting period: **0%**  
  
Are you on pace to screen all outfalls once during the permit term? ☒ Yes ☐ No

3. For all permittees, indicate the percent of outfalls screened that revealed dry weather flows: %
4. Did any dry weather flows reveal color, turbidity, sheen, odor, floating or submerged solids? ☐ Yes ☐ No
5. If Yes for #4, attach all sample results to this report with a map identifying the sample location. Explain the corrective action(s) taken in the attachment.

6. Do you use the "Outfall Reconnaissance Inventory / Sample Collection Field Sheet" provided in the permit?  
☒ Yes ☐ No  
If No, attach a copy of your monitoring form.

**BMP #5: Enact a stormwater management ordinance (municipal entities) or develop an SOP (non-municipal entities) to implement and enforce a stormwater management program that includes prohibition of non-stormwater discharges to the regulated small MS4.**

***Measurable Goal:** Within the first year of coverage under the permit, new permittees shall enact and implement an ordinance from an Act 167 Plan approved by the Department in 2005 or later, the MS4 Stormwater Management Ordinance; or an ordinance that satisfies all applicable requirements in a completed and signed MS4 Stormwater Management Ordinance Checklist. (For non-municipal permittees, new permittees shall develop and implement a Standard Operating Procedure (SOP) within the first year of coverage).*

*Renewal permittees must continue to maintain, update, implement, and enforce a Stormwater Management Ordinance that satisfies all applicable requirements. (For non-municipal permittees, the SOP satisfies this requirement. If no existing SOP exists, it should be developed during the first year of coverage).*

***Measurable Goal:** New permittees shall submit a letter signed by a municipal official, municipal engineer, or the municipal solicitor as an attachment to their first year report certifying the enactment of an ordinance that meets all applicable requirements of this permit. Renewal permittees shall update their existing ordinance, if necessary, and submit documentation of completion to the Department. (For non-municipal permittees, submit the SOP to the first report).*

1. Do you have an ordinance (municipal) or SOP or other mechanism (non-municipal) that prohibits non-stormwater discharges? ☒ Yes ☐ No  
If Yes, indicate the date of the ordinance or SOP: **January 4, 2016 #15-291 (attached)**
2. For new permittees only, attach an ordinance (or SOP) and letter from an official, engineer or solicitor that prohibits non-stormwater discharges to the first report submitted to DEP.
3. If you are not a new permittee, did you complete and submit your ordinance (or SOP) and letter from an official, engineer or solicitor that prohibits non-stormwater discharges to DEP? ☒ Yes ☐ No
4. Were there any violations of the ordinance during the reporting period? ☐ Yes ☒ No  
If Yes, describe what enforcement actions were taken for each violation:

**BMP #6: Provide educational outreach to public employees, business owners and employees, property owners, the general public and elected officials (i.e., target audiences) about the program to detect and eliminate illicit discharges.**

***Measurable Goals:** During each year of permit coverage, appropriate educational information concerning illicit discharges shall be distributed to the target audiences using methods outlined under MCM #1. If not already established, set up and promote a stormwater pollution reporting mechanism (e.g., a complaint line with message recording) by the end of the first year of permit coverage for the public to use to notify you of illicit discharges, illegal dumping or outfall pollution. Respond to all complaints in a timely and appropriate manner. Document all responses, include the action taken, the time required to take the action, whether the complaint was resolved successfully.*

1. Was IDD&E-related information distributed to public employees, businesses, and the general public during the reporting period? ☒ Yes ☐ No

If Yes, what was distributed? At preconstruction meetings, all builders and developers are provided environmental information. In addition, the Planning Department provides a homeowners guide to stormwater management to all residents who are applying for permits for home projects. In addition, the Township website has various information on stormwater management.

2. Is there a well-publicized method for employees, businesses and the public to report stormwater pollution incidents?  
☒ Yes ☐ No
3. Do you maintain documentation of all responses, action taken, and the time required to take action? ☒ Yes ☐ No

#### MCM #4 – CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

Are you relying on PA's statewide program for stormwater associated with construction activities to satisfy this MCM?  
☒ Yes ☐ No (If No, complete all remaining questions for this MCM; if Yes, skip to MCM #5).

**BMP #1: Develop your program consisting of all procedures necessary to comply with the requirements of this MCM. Your program shall provide for construction stormwater permitting, construction inspection, and enforcement of installation and maintenance of the necessary E&S control measures. Your program shall describe clearly how your program will be coordinated with DEP's NPDES Construction Stormwater Permitting program.**

**Measurable Goals:** For new permittees, the written program for this MCM shall be developed during the first year of permit coverage; nevertheless, you are responsible for implementation of this MCM during entire term of this permit, including the time you are developing your program.

For all permittees, your program shall be reviewed and updated during each year of permit coverage. The purpose of the written program is to establish clear roles and responsibilities for the implementation of the MCM #4 requirements. An agreement between the permittee, the CCD, and any other resources to be used by the permittee that clearly defines roles for each entity is recommended. If an agreement is made, you shall place and keep a written copy in your file, consistent with the Retention of Records requirements in this Permit. Please note that in accordance with Section A.2.h in Part A of the Authorization to Discharge, as the permittee you are responsible to ensure that implementation of all requirements under this Permit are fulfilled.

- For new permittees only, attach the written stormwater associated with construction activities program to the first report submitted to DEP.
- If you are not a new permittee, did you complete and submit your written stormwater associated with construction activities program to DEP? ☐ Yes ☐ No  
If Yes, provide the latest submission date:
- Date of last update or revision to the stormwater associated with construction activities program:

**BMP #2: The permittee shall enact, implement, and enforce an ordinance to require the implementation of erosion and sediment control BMPs, as well as sanctions to ensure compliance.**

**Measurable Goal:** Within the first year of coverage under the permit, new permittees shall enact and implement an ordinance that meets all applicable requirements of this permit. (Non-municipal permittees shall develop and implement an SOP).

**Measurable Goal:** Permittees shall submit a letter signed by a municipal official, municipal engineer or the municipal solicitor as an attachment to their first periodic report certifying the enactment and implementation of a stormwater management ordinance that meets all requirements of this permit.

- For new permittees only, attach an ordinance (or SOP) and letter from an official, engineer or solicitor that addresses stormwater associated with construction activities to the first report submitted to DEP.
- If you are not a new permittee, did you complete and submit your ordinance (or SOP) and letter from an official, engineer or solicitor that addresses stormwater associated with construction activities to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: See MCM#5 BMP#4

**BMP #3: Develop and implement requirements for construction site operators to control waste at the construction site that may cause adverse impacts to water quality. While sediment is the most common pollutant of concern for MCM #4, there are other types of pollutants that also can be a concern and the intent of this BMP is to address these other types of pollutants, such as, but not limited to, discarded building materials, washout from concrete trucks, chemicals, litter, and sanitary waste.**

**Measurable Goal:** New permittees shall establish requirements to address this BMP by the end of the first year of permit coverage. Renewal permittees shall continue to implement existing requirements and update as necessary. This could be implemented by written municipal ordinance/code provisions, by standard notes on the site plans, by any other written format that accomplishes the objectives of this BMP, or by any combination of these measures. The goal of this BMP shall be communicated to construction site operators during pre-construction meetings. This BMP shall be implemented during each year of the MS4 permit. Permittees must prepare and maintain records of site inspections, including dates and results and you must maintain these records in accordance with the Retention of Records requirements in this Permit.

1. Identify the mechanism(s) in place to regulate construction site operators and wastes produced at construction sites:
2. During the reporting period what has been the results of implementing the mechanism(s) described above?

**BMP #4: Develop and implement procedures for the receipt and consideration of public inquiries, concerns, and information submitted by the public (to the permittee) regarding local construction activities. The permittee shall demonstrate acknowledgement and consideration of the information submitted, whether submitted verbally or in writing.**

**Measurable Goal:** Permittees shall establish and implement a tracking system to keep a record of any submitted public information as well as your response, actions, and results. This BMP shall be implemented during each year of coverage under this General Permit and information should be submitted with the each periodic report.

Describe the tracking system established for documenting public information concerning local construction activities and describe responses taken during the reporting period:

#### **MCM #5 – POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT**

Are you relying on PA's statewide program for MCM #5 BMPs #1 - #3? ☒ Yes ☐ No

(If No, complete all remaining questions for this MCM; if Yes, skip to BMP #4)

**BMP #1: Develop a written procedure that describes how the permittee shall address all required components of this MCM. Guidance can be found in the Pennsylvania Stormwater Best Management Practices Manual.**

**Measurable Goal:** The written procedure shall be developed by the end of the first year of permit coverage and be reviewed and updated every permit year thereafter, as needed. The intent of BMP #1 is for the permittee to describe how the listed tasks will be accomplished.

1. For new permittees only, attach your written procedure for post-construction management to the first report.
2. If you are not a new permittee, did you complete and submit your written procedure for post-construction management to DEP? ☐ Yes ☐ No

If Yes, provide the latest submission date:

3. Date of last review or update of post-construction management procedure:

**BMP #2: Require the implementation of a combination of structural and/or non-structural BMPs that are appropriate to the local community, that minimize water quality impacts, and that are designed to maintain pre-development runoff conditions. This requirement can be met by ensuring that the selected BMPs comply with the municipal Stormwater Management Ordinance that meets the requirements of the permit.**

**Measurable Goal:** All qualifying development or redevelopment projects shall be reviewed to ensure that their post-construction stormwater management plans and selected BMPs conform to the applicable requirements. A tracking system (e.g., database, spreadsheet, or written list) shall be maintained to record qualifying projects and their associated BMPs. In your records, you shall note if there are no qualifying projects in a calendar year.

1. Number of development or redevelopment projects in urbanized area during reporting period:
2. Describe the tracking system in place:
3. Describe the structural and/or non-structural BMPs that were required for these projects:

**BMP #3: Ensure that controls are installed that shall prevent or minimize water quality impacts.**

**Measurable Goal:** All qualifying development or redevelopment projects shall be inspected during the construction phase to ensure proper installation of the approved structural PCSM BMPs. A tracking system (e.g., database, spreadsheet, or written list) shall be implemented to track the inspections conducted and to track the results of the inspections (e.g., BMPs were, or were not, installed properly). Permittees not relying on DEP's statewide QLP to satisfy requirements under this BMP shall summarize construction inspections and results in periodic reports. See BMP #6 for requirements related to post-construction inspection and tracking of PCSM BMPs to ensure that the operation and maintenance plan is being implemented.

If there were development or redevelopment projects during the reporting period, attach documentation of inspections of PCSM BMPs to this report.

**BMP #4: The permittee shall enact, implement, and enforce an ordinance (municipal) or SOP or other regulatory mechanism (non-municipal) to address post-construction stormwater runoff from new development and redevelopment projects, as well as sanctions and penalties associated with non-compliance, to the extent allowable under State or local law.**

**Measurable Goal:** Within the first year of coverage under this permit, new permittees shall enact and implement a stormwater management ordinance (municipal) or SOP (non-municipal) that meets the requirements of this General Permit.

**Measurable Goal:** All permittees shall submit a letter signed by a municipal official, municipal engineer or the municipal solicitor as an attachment to their first periodic report certifying the enactment of a stormwater management ordinance that meets the requirements of this General Permit.

1. Do you have an ordinance (or SOP) to address post-construction stormwater runoff from new and redevelopment projects and does it include sanctions? ☒ Yes ☐ No  
If Yes, indicate the date of the ordinance or SOP: **15-291 (email January 11, 2016 attached)**  
For new permittees only, attach a copy of the ordinance or SOP.
2. If you are not a new permittee, has the ordinance (or SOP) been submitted to DEP with a letter from an official, engineer or solicitor that certifies the enactment of an ordinance or SOP for PCSM activities? ☒ Yes ☐ No
3. Do you have authority to take enforcement action for failure to properly operate and maintain stormwater practices/facilities?  
☒ Yes ☐ No

**BMP #5: Develop and implement measures to encourage and expand the use of Low Impact Development (LID) in new and redevelopment. Measures also should be included to encourage retrofitting LID into existing development. DEP's Pennsylvania Stormwater Best Management Practices Manual provides guidance on implementing LID practices.**

**Measurable Goal:** *In your inventory of development and redevelopment projects authorized for construction since March 10, 2003, that discharge stormwater to your regulated MS4s, indicate which projects incorporated LID practices and for each project list and track the BMPs that were used.*

**Measurable Goal:** *Enact ordinances consistent with LID practices and repeal sections of ordinances that conflict with LID practices. Progress with enacting and updating your ordinances to enable the use of LID practices shall be summarized in the periodic reports.*

1. Identify ordinances enacted or updated during the reporting period to ensure consistency with LID practices:  
15-291

**BMP 6: Ensure adequate operation and maintenance of all post-construction stormwater management BMPs installed at all qualifying development or redevelopment projects (including those owned or operated by the permittee).**

**Measurable Goal:** *Within the first year of coverage under this permit, new permittees shall develop and implement a written inspection program to ensure that stormwater BMPs are properly operated and maintained. The program shall include sanctions and penalties for non-compliance. All permittees shall review and update the inspection program annually and shall continue to implement this BMP.*

**Measurable Goal:** *An inventory of PCSM BMPs shall be developed by permittees and shall be continually updated during the term of coverage under the permit as development projects are reviewed, approved, and constructed. This inventory shall include all PCSM BMPs installed since March 10, 2003 that discharge directly or indirectly to your regulated small MS4s. The inventory also should include PCSM BMPs discharging to the regulated small MS4 system that may cause or contribute to violation of water quality standard. The inventory shall include:*

- *all PCSM BMPs that were installed to meet requirements in NPDES Permits for Stormwater Discharges Associated with Construction Activities approved since March 10, 2003;*
- *the exact location of the PCSM BMP (e.g., street address);*
- *information (e.g., name, address, phone number(s)) for BMP owner and entity responsible for BMP Operation and Maintenance (O&M), if different from BMP owner;*
- *the type of BMP and the year it was installed;*
- *maintenance required for the BMP type according to the Pennsylvania Stormwater BMP Manual or other manuals and resources;*
- *the actual inspection/maintenance activities for each BMP;*
- *an assessment by the permittee if proper operation and maintenance occurred during the year and if not, what actions the permittee has taken, or shall take, to address compliance with O&M requirements.*

1. For new permittees only, attach the written inspection program to ensure that stormwater BMPs are properly operated and maintained.

2. If you are not a new permittee, did you complete and submit your written inspection program to ensure that stormwater BMPs are properly operated and maintained to DEP? ☒ Yes ☐ No

If Yes, provide the latest submission date: **06/02/2014**

3. How do you ensure that stormwater BMPs are properly operated and maintained? Explain if you rely on means other than municipal inspections to ensure adequate O&M (consistent with your stormwater ordinance).

**The requirements of the Ordinance are enforced as the need arises (i.e. Building Permit Applications, U&O Applications, Land Development Applications, complaints, etc.).**

**For privately owned Post-Construction Storm Water Management (PCSWM) BMPs, developers, property owners, and, where applicable, homeowner associations are required to provide for long-term operation and maintenance of PCSWM BMPs as part of the land development approval process. In the event these facilities are not operated and maintained in accordance with Township Ordinance and the conditions of land development approval, the Township intervenes to have the necessary modifications or maintenance completed. Failing storm water facilities are identified through Township observations and information provided by residents.**

**No post-construction storm water management issues were observed or brought to the Township's attention during the report period.**

4. Date that inspection program was last reviewed or updated: **02/01/2016**
5. Total number of sites with PCSM BMPs installed as of the date of this report: **27**
6. Total number of sites inspected during this reporting period: **27**
7. Number of sites found to have PCSM BMP deficiencies: **0**
8. Number of enforcement actions taken during this reporting period: **0**



## MCM #6 – POLLUTION PREVENTION / GOOD HOUSEKEEPING

**BMP #1:** Identify and document all facilities and activities that are owned or operated by the permittee and have the potential for generating stormwater runoff to the regulated small MS4. This includes activities conducted by contractors for the permittee. Activities may include the following: street sweeping; snow removal/deicing; inlet/outfall cleaning; lawn/grounds care; general storm sewer system inspections and maintenance/repairs; park and open space maintenance; municipal building maintenance; new construction and land disturbances; right-of-way maintenance; vehicle operation, fueling, washing and maintenance; and material transfer operations, including leaf/yard debris pickup and disposal procedures. Facilities can include streets; roads; highways; parking lots and other large paved surfaces; maintenance and storage yards; waste transfer stations; parks; fleet or maintenance shops; wastewater treatment plants; stormwater conveyances (open and closed pipe); riparian buffers; and stormwater storage or treatment units (e.g., basins, infiltration/filtering structures, constructed wetlands, etc.).

**Measurable Goal:** By the end of the first year of permit coverage, new permittees shall identify and document all types of municipal operations, facilities and activities and land uses that may contribute to stormwater runoff within areas of municipal operations that discharge to the regulated small MS4. Renewal permittees should have completed this list during the previous permit term. For all permittees, this information shall be reviewed and updated each year of permit coverage, as needed. Part of this effort shall include maintaining a basic inventory of various municipal operations and facilities.

1. Have you identified all facilities and activities owned and operated by the permittee that have the potential to generate stormwater runoff into the MS4? ☒ Yes ☐ No
2. When was the inventory last reviewed? **02/01/2016**
3. When was it last updated? **02/01/2016**
4. How many new facilities and/or activities were added to this inventory during this reporting period? **1 (Community Center)**

**BMP #2:** Develop, implement and maintain a written operation and maintenance (O&M) program for all municipal operations and facilities that could contribute to the discharge of pollutants from the regulated small MS4s, as identified under BMP #1. This program (or programs) shall address municipally owned stormwater collection or conveyance systems, but could include other areas (as identified under BMP #1). The O&M program(s) should stress pollution prevention and good housekeeping measures, contain site-specific information, and address the following areas:

- Management practices, policies, procedures, etc. shall be developed and implemented to reduce or prevent the discharge of pollutants to your regulated small MS4s. You should consider eliminating maintenance-area discharges from floor drains and other drains if they have the potential to discharge to storm sewers.
- Maintenance activities, maintenance schedules, and inspection procedures to reduce the potential for pollutants to reach your regulated small MS4s. You also should review your procedures for maintaining your stormwater BMPs.
- Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, and salt / sand (anti-skid) storage locations and snow disposal areas.
- Procedures for the proper disposal of waste removed from your regulated small MS4s and your municipal operations, including dredge spoil, accumulated sediments, trash, household hazardous waste, used motor oil, and other debris.

**Measurable Goal:** During the first year of permit coverage, new permittees shall develop and implement a written O&M program that complies with BMPs #1 and #2. Renewal permittees shall continue to implement their existing program. All permittees shall review the O&M program annually, edit as necessary, and continue to implement during every year of permit coverage.

1. For new permittees only, attach the written O&M program to the first Annual Report.
2. If you are not a new permittee, did you complete and submit your written O&M program to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06/02/2014 (attached)**
3. Date of last review or update to O&M program: **02/01/2016**



**BMP #3:** Develop and implement an employee training program that addresses appropriate topics to further the goal of preventing or reducing the discharge of pollutants from municipal operations to your regulated small MS4s. The program may be developed and implemented using guidance and training materials that are available from federal, state or local agencies, or other organizations. Any municipal employee or contractor shall receive training. This could include public works staff, building / zoning / code enforcement staff, engineering staff (on-site and contracted), administrative staff, elected officials, police and fire responders, volunteers, and contracted personnel. Training topics should include operation, inspection, maintenance and repair activities associated with any of the municipal operations / facilities identified under BMP #1. Training should cover all relevant parts of the permittee's overall stormwater management program that could affect municipal operations, such as illicit discharge detection and elimination, construction sites, and ordinance requirements.

**Measurable Goal:** During the first year of permit coverage, new permittees shall develop and implement a training program that identifies the training topics that will be covered, and what training methods and materials will be used. Renewal permittees shall continue to operate under their existing program. All permittees shall review the training program annually, edit it as necessary, and continue to implement it during every year of permit coverage.

**Measurable Goal:** Your employee training shall occur at least annually (i.e., during each permit coverage year) and shall be fully documented in writing and reported in your periodic reports. Documentation shall include the date(s) of the training, the names of attendees, the topics covered, and the training presenter(s).

1. For new permittees only, attach the written training program to the first Annual Report.
2. If you are not a new permittee, did you complete and submit your written training program to DEP? ☒ Yes ☐ No  
If Yes, provide the latest submission date: **06/02/2014**
3. Date of last review or update to training program: **03/15/2016**
4. Identify the date(s) of employee training, the names of attendees, the topics covered, and the training presenters:  
**7/16/2014- Maintaining Compliance with Minimum Control Measures in NPDES MS4 Permits- Stacey Rymkiewicz, Stacy Crandell, Greg Reiff, Glenn Heberlig, Kevin Costello- training provided by PSATS**  
**3/11/2015- Municipal Stormwater Workshop- Bruce Shoupe, Stacy Crandell- training provided by Watershed Alliance of SE PA.**  
**3/9/2016- MS4 Stormwater/ Good Housekeeping Workshop- Stacy Crandell, Kevin Costello- training provided by Watershed Alliance of SE PA.**

### BEST MANAGEMENT PRACTICES (BMPs)

Provide an assessment of the appropriateness of the BMPs implemented to date, and identify any steps that will be taken to address deficiencies in the BMPs or make changes to BMPs or other aspects of the SWMP developed by the permittee.

**Please see attached charts of BMP's implemented to date. (27 Private Post Construction Stormwater Management BMPs and 60 Public BMPs of which 50 have been placed into the Township's Basin Naturalization Program).**

#### MS4 TMDL Plan

#### Chesapeake Bay Pollutant Reduction Plan (CBPRP)

Is the permittee required to develop an MS4 TMDL Plan?

☐ Yes ☐ No

Is the permittee required to develop a CBPRP?

☐ Yes ☒ No

What is the status of the TMDL Design Details (if applicable)?

- ☒ Under Development (Due Date: **TBD**)  
☐ Submitted to DEP (Submission Date: )  
☐ Approved by DEP (Approval Date: )

What is the status of the CBPRP (if applicable)?

- ☐ Under Development (Due Date: )  
☐ Submitted to DEP (Submission Date: )  
☐ Approved by DEP (Approval Date: )

For permittees with DEP-approved MS4 TMDL Plans and/or CBPRPs, describe progress with implementing BMPs and other activities identified in those plans:

**TMDL Strategy under review by PA DEP.**

For permittees with DEP-approved MS4 TMDL Plans and/or CBPRPs, complete the section below. Identify the required pollutant reductions (for those with MS4 TMDL Plans) or pollutant reductions committed to by the permittee (for those with CBPRPs) and the cumulative reductions achieved through implementing the BMPs, as of the end of the reporting period:

n/a

## BMP INVENTORY

List all new structural BMPs installed and ongoing non-structural BMPs implemented in the urbanized area during the reporting period that are being used toward achieving load reductions in the permittee's MS4 TMDL Plan and/or CBPRP. Provide a name or description for each BMP, the area, in square feet (sf) that drains to each BMP (drainage area (DA)) (if applicable), the location of the BMP (latitude and longitude), the name of the water body that receives discharges from the BMP (if applicable), the date the BMP was installed or implemented, and whether the BMP was completed pursuant to an NPDES permit for stormwater associated with construction activities or other NPDES permit (check box if done under an NPDES permit).

BMP Name / Description	DA (sf)	Latitude	Longitude	Receiving Waters	Date Installed or Implemented	NPDES Permit?
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 27"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 22"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 22"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 22"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 22"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 38"</div></div>	<div><div></div><div>0° 1' 20"</div></div>			<input type="checkbox"/>
		<div><div></div><div>0° 3' 39"</div></div>	<div><div></div><div>0° 1' 10"</div></div>			<input type="checkbox"/>

**TOWNSHIP  
POST-CONSTRUCTION STORMWATER MANAGEMENT BMP  
YEAR 12-13 PROJECT LIST  
MCM #5 – 16B**

PROJECT NUMBER	PROJECT NAME	RESPONSIBLE PARTY	BMP LIST	YEAR INSTALLED	O & M AGREEMENT	INSPECTION PERFORMED
LDS-627	Montgomery Walk	Cutler	Water Quality BMP	2008 – Under Construction	Developers Agreement	During Construction
LDS-629	Steever Manor	Steever Manor	Naturalized basin	2007 – Under Construction	Developers Agreement	During Construction
LDS-630	Firefox 1 – Klein	Klein Co.	Naturalized basin	2015	Developers Agreement	During Construction
LDS-631	Citibank – North Wales and Rt 309	Selective Development	Rain garden	2008	Developers Agreement	During Construction
LDS-632	Bell Run Plaza Office	Rhee Brothers	Underground detention	Pending Construction		
LDS-633	Montgomery Office Park	Developer	Naturalized basin	Project Abandoned		
LDS-637	Vacchiano 3-lot subdivision	Vacchiano Development	Seepage areas	Pending construction		
LDS-638	Montgomery Square Methodist Church – 11/07	Montgomery Square Methodist Church	Naturalized basin/infiltration swale	2010	Developers Agreement	During construction
LDS-639	Select Properties – Crystal Rd & Maple – Firefox 2	Heckler	Time extended detention basins, rain gardens inlet hydrodynamic devices (hoods)	2015	Developers Agreement	During Construction
LDS-640	Woodmere Estates – 5/08	Wayne Rosen	Rain gardens & naturalized basin	Project Abandoned		

**TOWNSHIP**  
**POST-CONSTRUCTION STORMWATER MANAGEMENT BMP**  
**YEAR 12-13 PROJECT LIST**  
MCM #5 – 16B

PROJECT NUMBER	PROJECT NAME	RESPONSIBLE PARTY	BMP LIST	YEAR INSTALLED	O & M AGREEMENT	INSPECTION PERFORMED
LDS-643	Kidallas Court	HOA	Naturalized basin	2010	YES	During Construction
LDS-644	Keystone Community Fellowship Church – 7/08	Keystone Community Fellowship Church	Wetlands basin, infiltration trench	2008	Developers Agreement	During Construction
LDS-648	General Hancock Townhouse – 2009	Heckler		2010	Yes	During Construction
LDS-601A	Taco Bell	Taco Bell	Underground Detention	2010	Yes	During Construction
LDS-651	Montgomery Pointe	HOA	none	2009	Yes	During Construction
LDS-652	Bertucci's Restaurant	Bertucci's	Underground detention/ rain garden	2010	Yes	During Construction
LDS-653	Montgomery Knoll/Preserve	Cutler Development	Naturalized Basin	2011	Yes	During Construction
LDS-654	Montgomery Chase	HOA	Naturalized basin	2013	Yes	During Construction
LDS-655	McDonalds – Montgomery Commons	Corporate Store	Underground Basin	2011	Yes	During Construction
LDS-656	Flynn/Derck	Unknown	Seepage area	2015	Yes	During Construction

**TOWNSHIP  
POST-CONSTRUCTION STORMWATER MANAGEMENT BMP  
YEAR 12-13 PROJECT LIST**

MCM #5 – 16B

PROJECT NUMBER	PROJECT NAME	RESPONSIBLE PARTY	BMP LIST	YEAR INSTALLED	O & M AGREEMENT	INSPECTION PERFORMED
LDS-657	Keystone Homebrew	Unknown	Underground Detention	2013	Yes	During Construction
LDS-658	Hawthorne Court	Trefoil Development		Pending Construction		
LDS-659	Wireco Worldgroup	Wireco	Remove low flow channel	Project abandoned		
LDS-660	Wegmans	Simon Properties	Rain Gardens, stormwater basin expansion	2012	Yes	During Construction
LDS-661	Patient First	Patient First	Detention Basin	2013	Yes	During Construction
LDS-664	Maple Brook Estates	Olean Homes	Detention Basin, Underground Detention, Rain Gardens	2014	Yes	Under Construction
LDS-666	Giant To Go	Giant To Go	Detention basin Rain Gardens	Project abandoned		
LDS-667	Goodwin 3-Lot Subdivision	Private Property	Underground Seepage Pit	2014	Yes	Under Construction
LDS-668	Chick-fil-a	Chick-fil-a	Detention Basin, Rain Gardens	2015	Yes	During Construction

**TOWNSHIP  
POST-CONSTRUCTION STORMWATER MANAGEMENT BMP  
YEAR 12-13 PROJECT LIST  
MCM #5 – 16B**

PROJECT NUMBER	PROJECT NAME	RESPONSIBLE PARTY	BMP LIST	YEAR INSTALLED	O & M AGREEMENT	INSPECTION PERFORMED
LDS-670	Montgomery Twp Community Center	Montgomery Township	Detention Basin, Rain Gardens	2015	Township Owned	During Construction
LDS-671	127 Stevers Mill Rd	Private Property	Underground Seepage Pit	2014	Yes	During Construction
LDS-672	General Hancock Pad #4 – Quaker Steak and Lube	General Hancock Partnership	Detention Basin, Underground Detention, Rain Gardens	Project Abandoned		
LDS-673	BJS Warehouse	Somerville Montgomery		2015	Yes	During Construction
LDS-674	MTMSA Influent Flow Equalization System	MTMSA	Existing Detention basin	2015	Sewer Authority Owned	During Construction
LDS-676	Sprint Store			2015	Yes	During Construction
LDS-677	Narayan Guest House	Todi Foundation		Pending	Yes	During Construction
LDS-678	1023 Lansdale Ave	Private Property	Seepage pit	2016	Yes	During Construction
LDS-679	Parkview Development	Private Property		Pending		

**TOWNSHIP**  
**POST-CONSTRUCTION STORMWATER MANAGEMENT BMP**  
**YEAR 12-13 PROJECT LIST**

MCM #5 – 16B

LDS-680	1701 N. Line St – 2-lot Subdivision	Private Property	Seepage Pit	Pending		
LDS-681	1390 Welsh Road	Nappen Property	Existing detention basin Rain Garden	Pending		
LDS-682	BJS Fueling Station	Wilkinson Development	Detention Basin Rain Garden	2015	Yes	During Construction
LDS-683	Wilson Lot Line Adjustment	Private Property	None required			
LDS-684	Mark's Jewelers	DJJZ Enterprises LP	Underground detention basin	Pending	Yes	During Construction



# Consider Approval of acceptance of stormwater basins into the Basin Naturalization Program

	BASIN	MOW? As of OCT 2012	ASSESSMENT COMPLETED	NATURALIZED PROGRAM (BOS)	DVIT INSP DATE	DVIT RECOMMENDATIONS	SIGN INSTALLED AT BASIN
1	Andrew Lane	NO	MAY 2011	2011	4/30/10	Basins 1 and 2 - Once basin grows in, existing chain link fence may be left in place or removed	YES
2	Douglas Road	NO	MAY 2011	2011	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.	YES
3	Pauline Circle	YES			3/18/16	OK to allow basin to naturalize. Existing split rail fence not required for risk management purposes.	
4	Veronica Lane	YES	OCT 2015	2016	3/18/16	OK to allow basin to naturalize. Maintain existing split rail fence due to berm slope and proximity of exposed culvert to sidewalk.	
5	Bethlehem Pike	YES	OCT 2015	2016	3/18/16	OK to allow basin to naturalize. Existing chain link fence not required for risk management purposes.	
6	Tree Line Drive	YES	FALL 2013	2013	7/31/13	OK to allow basin to grow out. Once vegetated, existing chain link fence may be left in place or removed.	
7	Pioneer Drive	NO	FALL 2012	2012	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.	YES
8	Walden Lane	OPEN SPACE				OK to allow basin to grow out. Once vegetated, existing chain link fence may be left in place or removed.	
9	Torey Circle	YES	FALL 2013	2013	7/31/13	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
10	Addison Lane	YES	FALL 2013	2013	7/31/13	OK to allow basin to grow out. Once vegetated, existing chain link fence may be left in place or removed.	YES
11	Forest Trail	NO	MAY 2011	2011	7/31/13	OK to allow basin to naturalize. Existing chain link fence not required for risk management purposes.	
12	Heather Knoll	YES			3/18/16		
13	Thornbury	YES	MAY 2011	2013	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.	NO
14	Gwynmere	NO	FALL 2012	2012	4/30/10	Due to proximity of sidewalk to edge of basin and steep embankment slope in areas (1:1 H/V), retain and maintain the existing chain link fence to prevent potential falls.	YES
15	Stone Ridge	NO	MAY 2011	2013	7/31/13	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
16	Stone Ridge	YES	OCT 2014	2015	11/25/14	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
17	Horseshoe Lane	YES	FALL 2013	2013	7/31/13	OK to allow basin to grow out. Maintain existing split rail fencing.	

## Consider Approval of acceptance of stormwater basins into the Basin Naturalization Program

18	West Gate (Longleaf & Preston Drs)	YES	OCT 2015	2016	3/18/16	Ok to allow basing to naturalize. Maintain existing chain link fence due to berm slope and proximity of culvert to sidewalk.
19	West Gate	YES	FALL 2013	2013	7/31/13	Ok to allow basin to grow out. Maintain existing chain link fencing.
20	The Ridings	YES			3/18/16	Ok to allow basing to naturalize. Maintain existing chain link fence due to berm slope and proximity of two exposed culverts to sidewalk.
21	Montgomery Hill	NO	FALL 2012	2012	7/31/13	Ok to allow basin to grow out. Maintain existing split rail fencing.
22	Winners Circle - Pimlico	NO	MAY 2011	2011	7/31/13	Ok to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.
23	Winners Circle - Ascot	YES				
24	Summer Ridge	YES	OCT 2014	2015	11/25/14	Ok to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.
25	Summer Ridge	YES	OCT 2015	2016	3/18/16	Ok to allow basin to naturalize. Existing split rail fence not required for risk management purposes.
26	Summer Ridge	YES				
27	Heather Lea	YES	OCT 2015	2016	3/18/16	Ok to allow basin to naturalize. Maintain existing split rail fence due to berm slope and proximity of exposed culvert to sidewalk.
28	Gift Circle (RavenHollow)	YES	FALL 2013	2013	7/31/13	Ok to allow basin to grow out. Maintain existing split rail fencing.
29	Gwynwood Pond	NO	FALL 2012	2012	7/31/13	Ok to allow basin to grow out. Maintain existing split rail fencing.
30	Tall Gables	NO	FALL 2012	2012	7/31/13	Ok to allow basing to grow out. Currently unfenced.
31	Lea Drive					
32	Heather Ridge	NO	MAY 2011	2011	7/31/13	Ok to allow basin to grow out. Maintain existing chain link fencing.
33	Autumn Woods Park	NO	FALL 2012	2012	8/27/10	No risk management concerns.
34	Cambridge Knoll A	YES	OCT 2015	2016	3/18/16	Ok to allow basin to naturalize. Maintain existing split rail fence due to berm slope and proximity of exposed culvert to sidewalk.
35	Knapp Farm - Avondale	NO	MAY 2011	2013	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.
36	Knapp Farm - Dekalb & Knapp pond	NO	MAY 2011	2013	4/30/10	Wet pond has steep banks and does not appear to have a safety bench. Maintain current split rail fence to deter access by pre-school aged children.
37	Witchwood Park	NO	FALL 2012	2012		
38	The Orchard	NO	FALL 2012	2012	8/27/10	No risk management concerns.

# Consider Approval of acceptance of stormwater basins into the Basin Naturalization Program

39	Canterbury	NO	MAY 2011	2013	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.	???
40	Spring Valley Park	NO	MAY 2011	2013	4/30/10	Once basin grows in, existing chain link fence may be left in place or removed.	YES
41	Spring Valley Park	NO	MAY 2011	2013	4/30/10	Wet pond is currently densely vegetated around its entire perimeter. Existing split rail fence may be left in place or removed.	YES
42	Township Building	NO	MAY 2011	2013	7/31/13	OK to allow basin to grow out. Currently unfenced.	
43	Springville Farm	YES	OCT 2014	2015	11/25/14	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
44	Zehr Tract	YES	MAY 2011	CANNOT NATURALIZE	8/27/10	No risk management concerns.	
45	Mallard Pond	NO	FALL 2012	2012	7/31/13	OK to allow basin to grow out. Once vegetated, existing chain link fence may be left in place or removed.	YES
46	Mallard Pond	YES			3/18/16	OK to allow basin to naturalize. Existing chain link fence not required for risk management purposes.	
47	Montgomery Lea	YES			3/18/16	OK to allow basin to naturalize. Maintain back section of existing split rail fence to appease residents. Balance of existing split rail fence no required for risk management purposes.	
48	Montgomery Lea	NO	FALL 2012	2012	7/31/13	OK to allow basin to grow out. Once vegetated, existing chain link fence may be left in place or removed.	YES
49A	Estates of Montgomery	YES	OCT 2014	2015	11/25/14	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
49B	Estates of Montgomery	YES	OCT 2014	2015	11/25/14	OK to allow basin to grow out. Maintain existing split rail fencing.	
50	Estates of Windlestrae - Davis Dr	YES	FALL 2013	2013	7/31/13		
51	Estates of Windlestrae - Davis Dr	NO	FALL 2012	2012	8/27/10	No risk management concerns.	
52	Montgomery Crossing	NO	FALL 2012	2012	8/27/10	on road bridge over creek with welded fencing to create a	YES
53	Montgomery Crossing	WOODED ARE	FALL 2012	2012	8/27/10	Recommend installing a child-resistant fencing on both sides of the bridge over the creek near Regency Drive and Drake Lane.	YES
54	Montgomery Crossing	WOODED ARE	FALL 2012	2012	8/27/10		YES
55	Montgomery Crossing	WOODED ARE	FALL 2012	2012	8/27/10	Once basin grows in, existing chain link fence may be left in place or removed.	YES
56	Gwynedd Lea	NO	MAY 2011	2013	4/30/10	No risk management concerns.	
57	Whistlestop Park (Hatfield)	YES	MAY 2011	CANNOT NATURALIZE	8/27/10	No risk management concerns.	N/A
58	Tall Gables	YES			8/27/10	No risk management concerns.	

**Consider Approval of acceptance of stormwater basins into the Basin Naturalization Program**

59	Montgomery Hollow	NO	MAY 2011	2011	7/31/13	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	YES
60	Montgomery Hollow	NO	MAY 2011	2011	7/31/13	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	YES
61	Autumn Grove	NO			7/31/13		
62	Magdalena Lane	YES	OCT 2014	2015	11/25/14	OK to allow basin to grow out. Once vegetated, existing split rail fence may be left in place or removed.	
63	Bedford Lane	YES			3/18/16	OK to allow basin to naturalize. Maintain existing chain link fence due to berm slope and proximity of exposed culvert to sidewalk.	
64	Community Center A						
	Community Center B						
	Community Center C						

<b>TOTAL # BASINS ENTERED INTO NATURALIZATION PROGRAM</b>	<b>50</b>
<b># BASINS REQUESTING TO BE ADDED</b>	

## OTHER REQUIRED REPORT ELEMENTS

Identify the progress towards achieving the statutory requirements of reducing the discharge of pollutants to the Maximum Extent Practicable (MEP) and complying with water quality standards.

**Montgomery Township is committed to the improvement of water quality in the Township to the maximum extent practicable by utilizing many existing assets. For instance, the stormwater management ordinance is reviewed and updated to ensure all new developments are designed to improve water runoff as well as underground water recharge. The Township has an active maintenance crew that cleans inlets as well as utilizes streetsweeping to remove pollution, and actively seeks public involvement to improve the Township through educational outreach and participation in Township policies.**

Provide a summary of stormwater activities planned during the next reporting cycle (not identified previously in this report):

**Montgomery Township will continue to provide the following stormwater activities remove debris from inlets, replace stormwater pipes if needed and street sweeping.**

Provide a summary of notices, intergovernmental agreements and other relevant documents if the permittee is relying on another governmental entity to satisfy any of its permit obligations

n/a

### CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

Bruce Shoupe, Director of Planning & Zoning

Name of Responsible Official

215-393-6900

Telephone No.



Signature

5/9/2016

Date

## Bruce S. Shoupe

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**From:** Larry Gregan  
**Sent:** Monday, January 11, 2016 2:10 PM  
**To:** Burke, David (daburke@pa.gov)  
**Cc:** Shaw, Drew; James P. Dougherty P. E. (jdougherty@gilmore-assoc.com); Bruce S. Shoupe  
**Subject:** Stormwater Management Plan for Wissahickon Creek Watershed

David,

Please be advised that on Monday, January 4, 2016, the Montgomery Township Board of Supervisors adopted Ordinance 15-291 amending provisions of Chapter 206 of the Township's Code entitled "The Montgomery Township Stormwater Management Ordinance" to implement the requirements of the Wissahickon Creek Watershed Act 167 Plan. Please don't hesitate to call or write if you need any additional information.

Larry

Lawrence J. Gregan, Township Manager  
Montgomery Township  
1001 Stump Road  
Montgomeryville, PA 18936  
Work # -215-393-6907  
Fax # - 215-855-6656  
Email - [lgregan@montgomerytwp.org](mailto:lgregan@montgomerytwp.org)



**MONTGOMERY TOWNSHIP**  
Montgomery County, Pennsylvania

ORDINANCE #15-291

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AN ORDINANCE AMENDING CHAPTER 206 OF THE TOWNSHIP'S CODE,  
ENTITLED "THE MONTGOMERY TOWNSHIP STORMWATER MANAGEMENT  
ORDINANCE", MAKING PROVISIONS TO IMPLEMENT THE REQUIREMENTS OF  
THE WISSAHICKON CREEK WATERSHED ACT 167 PLAN.

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**MONTGOMERY TOWNSHIP**  
Montgomery County, Pennsylvania

ORDINANCE #15-291

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AN ORDINANCE AMENDING CHAPTER 206 OF THE TOWNSHIP'S CODE, ENTITLED "THE MONTGOMERY TOWNSHIP STORMWATER MANAGEMENT ORDINANCE", MAKING PROVISIONS TO IMPLEMENT THE REQUIREMENTS OF THE WISSAHICKON CREEK WATERSHED ACT 167 PLAN.

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**NOW, THEREFORE,** it is hereby **ENACTED** and **ORDAINED** by the Montgomery Township Board of Supervisors as follows:

**SECTION 1.**      **Montgomery Township Stormwater Management Ordinance Amendment.**

Chapter 206 of the Montgomery Township Code, entitled "The Montgomery Township Stormwater Management Ordinance"/, shall be amended to implement the requirements of the Wissahickon Creek Watershed Act 167 Plan and shall read as follows:

**CHAPTER 206**

Stormwater Management Ordinance

**ARTICLE I**

GENERAL PROVISIONS

**§206-1. Short Title.**

This Ordinance shall be known and may be cited as the "Montgomery Township Stormwater Management Ordinance."

**§206-2. Statement of Findings**

The Board of Supervisors finds that:

- A. Inadequate management of accelerated stormwater runoff resulting from development and redevelopment throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction

efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.

- B. Inadequate planning and management of stormwater runoff resulting from land development and redevelopment throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns, accelerating stream flows (which increase scour and erosion of streambeds and streambanks, thereby elevating sedimentation), destroying aquatic habitat, and elevating aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals, and pathogens.
- C. A comprehensive program of stormwater management (SWM), including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety, welfare, and the protection of the people of the Township and all the people of the Commonwealth, their resources, and the environment.
- D. Stormwater is an important water resource by providing groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.
- E. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.
- F. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
- G. Impacts from stormwater runoff can be minimized by using project designs that maintain the natural hydrologic regime and sustain high water quality, groundwater recharge, stream baseflow, and aquatic ecosystems.
- H. Nonstormwater discharges to municipal separate storm sewer systems can contribute to pollution of waters of the Commonwealth.

### **§206-3. Purpose**

The purpose of this Ordinance is to promote the public health, safety, and welfare within the Township by maintaining the natural hydrologic regime and by minimizing the harms and maximizing the benefits described in Section 206-2, through provisions designed to:

- A. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of this Commonwealth.
- B. Minimize increases in stormwater volume and control peak flows.
- C. Minimize impervious surfaces.
- D. Provide review procedures and performance standards for stormwater planning and management.
- E. Preserve the natural drainage systems as much as possible.
- F. Manage stormwater impacts close to the runoff source, requiring a minimum of structures and relying on natural processes.

- G. Focus on infiltration of stormwater to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- H. Preserve and restore the flood-carrying capacity of streams.
- I. Prevent scour and erosion of streambanks and stream beds.
- J. Provide standards to meet National Pollution Discharge Elimination System (NPDES) permit requirements.
- K. Address certain requirements of the Municipal Separate Stormwater Sewer System (MS4) NPDES Phase II Stormwater Regulations.
- L. Provide for proper operation and maintenance of all stormwater management facilities and Best Management Practices (BMPs) that are implemented in the Township.
- M. Implement the requirements of the Neshaminy Creek Watershed Act 167 Stormwater Management Plan (includes Little Neshaminy Creek Watershed).
- N. Implement the requirements of the Wissahickon Creek Watershed Act 167 Plan.

#### **§206-4. Statutory Authority**

The Township is empowered to regulate land use activities that affect runoff, surface, and groundwater quality and quantity by the authority of:

- A. Pennsylvania Municipalities Planning Code, Act 247, as amended.
- B. Second Class Township Code (Act 69 of 1933, P.L. 103; 53 P.S. § 65101, as amended).

#### **§206-5. Applicability/Regulated Activities**

All regulated activities and all activities that may affect stormwater runoff, including Land Development and Earth Disturbance Activity, are subject to regulation by this Ordinance.

Regulated activities include, but are not limited to;

1. Land development,
2. Subdivisions,
3. Prohibited or polluted discharges,
4. Alteration of the natural hydrologic regime,
5. Construction or reconstruction of, or addition of new impervious or semi-pervious surfaces (i.e., driveways, parking lots, roads, etc.), except for reconstruction of roads where there is no increase in impervious surface,
6. Construction of new buildings or additions to existing buildings,
7. Redevelopment,
8. Diversion piping or encroachments in any natural or man-made channel, and
9. Nonstructural and structural stormwater management Best Management Practices (BMPs) or appurtenances thereto.

10. Earth disturbance activities of equal to or greater than 1,000 square feet.

11. Any of the above regulated activities which were approved more than five (5) years prior to the effective date of this Ordinance and resubmitted for municipal approval.

## **§206-6. Exemptions**

A. Table 206-6.1 summarizes the exemptions from certain requirements in this Ordinance. "Proposed Impervious Surface" in Tables 206-6.1 includes new, additional, or replacement impervious surface/cover. "Repaving" existing surfaces without reconstruction (see Section 206-10) does not constitute replacement.

**Table 206-6.1: Exemption Thresholds**

Ordinance Article or Section	Type of Project	< 5,000 sq. ft. Disturbed Area and Proposed Impervious Surface			≥ 5,000 sq. ft. Disturbed Area
		0 to 1,000 sq. ft.	>1,000 to <5,000 sq. ft.	≥5,000 sq. ft.	
Article IV SWM Site Plan Requirements	All Development	Exempt	Not Exempt (except residential activity)	Not Exempt	Not Exempt
Appendix F Non-Engineered Small Project Site Plan	Only Residential Development Applicable	Exempt	Not Exempt	Not Applicable	Not Applicable
Section 206-14 Volume Control Requirements	All Development	Not Applicable	Not Exempt	Not Exempt	Not Exempt
Section 206-15 Peak Rate Control Requirements	All Development	Exempt	Exempt	Not Exempt	Not Exempt
Section 206-16 Nonstructural Project Design Requirements	All Development	Exempt	Not Exempt	Not Exempt	Not Exempt
Section 206-17 Stream Bank Erosion Requirements	All Development	Exempt	Not Exempt	Not Exempt	Not Exempt
Section 206-13 Erosion and Sediment Pollution Control Requirements	See Table 206-6.2				

Article V Inspections	All Development	Exempt	Not Exempt	Not Exempt	Not Exempt
Article VII Maintenance Responsibilities	All Development	Exempt	Not Exempt	Not Exempt	Not Exempt

**Table 206-6.2: Erosion and Sediment Pollution Control Exemption Thresholds**

<b>Disturbed Area</b>	<b>Written E&amp;S Plan</b>	<b>E&amp;S Plan Review for Adequacy by MCCD</b>	<b>E&amp;S Plan Review for Adequacy by the Township</b>	<b>NPDES Permit</b>	<b>Written PCSM Plan Required</b>
0 – 1,000 sq. ft.	Not required unless in HQ or EV watershed, or is a condition of other State permit.	Exempt	Exempt	Exempt	Exempt
1,000 - 5,000 sq. ft.	Required by the Township	Exempt	Not Exempt	Exempt	Per Table 206-6.1
5,000 sq. ft. to < 1 acre	Required by the Township	Required by Township	Not Exempt	Exempt	Per Table 206-6.1
1 acre or greater	Required by MCCD	Required by MCCD	Not Exempt	Not Exempt	Per Table 206-6.1

- B. Agricultural activity is exempt from the peak rate control requirements and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code 102.
- C. Forest management and timber operations are exempt from the peak rate control requirements and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code 102.
- D. Any aspect of BMP maintenance to an existing SWM system made in accordance with plans and specifications approved by the Township is exempt.
- E. The use of land for gardening and/or landscaping for home consumption is exempt from the requirements of this ordinance.
- F. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Section 206-11.D through L.
- G. Infiltration Exemptions
  - (1) Depth to Limiting Zone - A minimum of two (2) feet of soil suitable for infiltration must exist between the invert of the infiltration BMP and the top of the nearest

limiting zone. Otherwise, the Volume Control requirement shall not be applied to the development site, and the entire volume must be treated.

#### H. Hotspots

- (1) Stormwater Hotspots – Appendix D contains a list of types of hotspots that may be recognized by the Township. If a site is a potential hotspot, it has important implications for how stormwater is managed. First and foremost, untreated stormwater runoff from hotspots concentrated into a collection system, shall not be recharged into groundwater where it may contaminate water supplies. Therefore, the Volume Control requirement shall NOT be applied to development sites that lie within a hotspot (the entire volume must still be treated). Second, a greater level of stormwater treatment shall be applied at hotspot sites to prevent pollutant washoff after construction. The Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.
- (2) Rate of Infiltration - When infiltration is not feasible due to poor infiltration rates or hotspot, the water quality volume must be treated by an approved SMP.

#### I. Additional Exemption Criteria:

- (1) Exemption Responsibilities – An exemption shall not relieve the Applicant from implementing such measures as are necessary to protect public health, safety, and property.
- (2) Drainage Problems – Where drainage problems are documented or known to exist downstream of or is expected from the proposed activity, the Township may deny exemptions.
- (3) Exemptions are limited to specific portions of this Ordinance.
- (4) HQ and EV Streams – The Township may deny exemptions in high quality (HQ) or exceptional value (EV) waters and Source Water Protection Areas (SWPA).
- (5) For a development taking place in stages, the entire development plan must be used in determining compliance with these exemption criteria. The starting point from which to consider tracts as “parent tracts” in which future subdivisions and respective impervious area computations are cumulatively considered shall be the date of the municipal adoption of the original Montgomery Township Stormwater Management Plan Ordinance [May 12, 2014].
  - (a) For example: If a property owner in Montgomery Township proposes a 300-square-foot shed after adoption of the municipal stormwater management ordinance, that property owner would be exempt from site plan and peak rate control requirements. If, at a later date, the property owner proposes to construct a garage and driveway adding an additional 1,300 square feet of impervious surface, the applicant would be required to submit a SWM Site Plan or Small Project SWM Site Plan (or if applicable a Fee-In-Lieu Of Alternative for Small Projects) in accordance with Article IV demonstrating the stormwater control requirements for the total impervious surface of 1,600 square feet.

- J. The Township may deny or revoke any exemption pursuant to this Section at any time for any project that the Township believes may pose a threat to public health, safety, property or the environment.

### **§206-7. Compatibility with Other Ordinance or Legal Requirements**

Approvals issued pursuant to this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance.

### **§206-8. Change of Appendices**

The Appendices listed below are incorporated herein by reference, as amended:

- (1) Appendix A – Stormwater Management Design Criteria
- (2) Appendix B – Low Impact Development Practices
- (3) Appendix C – Disconnected Impervious Area
- (4) Appendix D – Hot Spots
- (5) Appendix E – West Nile Virus Guidance
- (6) Appendix F – Small Project Stormwater Management Site Plan
- (7) Appendix G – Nonstructural Project Design Checklist
- (8) Appendix H – Riparian Buffer Trail Guidelines
- (9) Appendix I – References

## **ARTICLE II DEFINITIONS**

### **§206-9. Interpretation**

For the purposes of this Ordinance, certain terms and words used herein shall be interpreted as follows:

- A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
- B. The word “includes” or “including” shall not limit the term to the specific example, but is intended to extend its meaning to all other instances of like kind and character.
- C. The word “person” includes an individual, firm, association, organization, partnership, trust, company, corporation, unit of government, or any other similar entity.
- D. The words “shall” and “must” are mandatory; the words “may” and “should” are permissive.
- E. The words “used” or “occupied” include the words “intended, designed, maintained, or arranged to be used, occupied or maintained.”

## **§206-10. Definitions**

**Accelerated Erosion** – The removal of the surface of the land through the combined action of man's activity and the natural processes of a rate greater than would occur because of the natural process alone.

**Agricultural Activity** – Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

**Alteration** – As applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also the changing of surface conditions by causing the surface to be more or less impervious as the result of changing the land cover including the water, vegetation and bare soil.

**Annual Exceedance Probability** – See Return Period.

**Applicant** – A person who has filed an application for approval to engage in any Regulated Activity defined in Section 206-5.

**As-built Drawings** – Engineering or site drawings maintained by the Contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These documents, or a copy of same, are turned over to the Qualified Professional at the completion of the project.

**Average Recurrence Interval** – See Return Period.

**Bankfull** – The channel at the top-of-bank, or point from where water begins to overflow onto a floodplain.

**Base Flow** – Portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct runoff or from water diversions, reservoir releases, piped discharges, or other human activities.

**Best Management Practices (BMP)** – Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from regulated activities, to meet state water quality requirements, to promote groundwater recharge, and to otherwise meet the purposes of this Ordinance. Stormwater BMPs are commonly grouped into one of two broad categories or measures: "structural" or "nonstructural." In this Ordinance, nonstructural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with stormwater runoff whereas structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat stormwater runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices, from large-scale retention ponds and constructed wetlands, to small-scale underground treatment systems, infiltration facilities, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, riparian or forested buffers, sand filters, detention basins, and manufactured devices. Structural stormwater BMPs are permanent appurtenances to the project site.



**Bioretention** – A stormwater retention area that utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

**Buffer** – The area of land immediately adjacent to any stream, measured perpendicular to and horizontally from the top-of-bank on both sides of a stream (see Top-of-bank).

**Channel** – An open drainage feature through which stormwater flows. Channels include, but shall not be limited to, natural and man-made watercourses, swales, streams, ditches, canals, and pipes that convey continuously or periodically flowing water.

**Cistern** – An underground reservoir or tank for storing rainwater.

**Conservation District** – The Montgomery County Conservation District (MCCD).

**Culvert** – A structure with its appurtenant works, which carries water under or through an embankment or fill.

**Curve Number** – Value used in the Soil Cover Complex Method. It is a measure of the percentage of precipitation which is expected to run off from the watershed and is a function of the soil, vegetative cover, and tillage method.

**Dam** – A man-made barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid. A dam may include a refuse bank, fill or structure for highway, railroad or other purposes which impounds or may impound water or another fluid or semifluid.

**Department** – The Pennsylvania Department of Environmental Protection (PADEP).

**Design Professional (Qualified)** – A Pennsylvania Registered Professional Engineer, Registered Landscape Architect or Registered Professional Land Surveyor trained to develop stormwater management plans.

**Design Storm** – The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24-hours), used in the design and evaluation of stormwater management systems. See Return Period.

**Detention Basin** – An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely soon after a rainfall event and become dry until the next rainfall event.

**Detention Volume** – The volume of runoff that is captured and released into the Waters of the Commonwealth at a controlled rate.

**Developer** – Any landowner, agent of such landowner or tenant with the permission of such landowner who makes or causes to be made a subdivision of land or a land development or who seeks to undertake any regulated earth disturbance activity.

**Development** – Any human-induced change to improved or unimproved real estate, whether public or private, including but not limited to land development, construction, installation, or expansion of a building or other structure, land division, street construction, drilling, and site alteration such as embankments, dredging, grubbing, grading, paving, parking or storage facilities, excavation, filling, stockpiling, or clearing. As used in this ordinance, development encompasses both new development and redevelopment.

**Development Site** – The specific tract or parcel of land where any regulated activity set forth in 206-5 is planned, conducted or maintained.

**Diffused Drainage Discharge** – Drainage discharge that is not confined to a single point location or channel, including sheet flow or shallow concentrated flow.

**Discharge** – 1. (verb) To release water from a project, site, aquifer, drainage basin or other point of interest (verb); 2. (noun) The rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second. See also Peak Discharge.

**Discharge Point** – The point of discharge for a stormwater facility.

**Disconnected Impervious Area (DIA)** – An impervious or impermeable surface that is disconnected from any stormwater drainage or conveyance system and is redirected or directed to a pervious area, which allows for infiltration, filtration, and increased time of concentration as specified in Appendix C, Disconnected Impervious Area.

**Disturbed Areas** – Unstabilized land area where an earth disturbance activity is occurring or has occurred.

**Ditch** – A man-made waterway constructed for irrigation or stormwater conveyance purposes.

**Drainage Conveyance Facility** – A stormwater management facility designed to transport stormwater runoff that includes channels, swales, pipes, conduits, culverts, and storm sewers.

**Drainage Easement** – A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

**Drainage Permit** – A permit issued by the Township after the SWM Site Plan has been approved.

**Earth Disturbance Activity** – A construction or other human activity that disturbs the surface of land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

**Emergency Spillway** – A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

**Encroachment** – A structure or activity that changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water.

**Existing Resources and Site Analysis Map** – A base map which identifies fundamental environmental site information including floodplains, wetlands, topography, vegetative site features, natural areas, prime agricultural land and areas supportive of endangered species.

**Erosion** – The process by which the surface of the land, including water/stream channels, is worn away by water, wind, or chemical action.

**Erosion and Sediment Control Plan** – A site-specific plan identifying BMPs to minimize accelerated erosion and sedimentation. For agricultural plowing or tilling activities, the Erosion and Sediment Control Plan is that portion of a conservation plan identifying BMPs to minimize accelerated erosion and sedimentation.

**Exceptional Value Waters** – Surface waters of high quality which satisfy Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(b) (relating to antidegradation).

**Existing Conditions** – The initial condition of a project site prior to the proposed alteration.

**Existing Recharge Area** – Undisturbed surface area or depression where stormwater collects and a portion of which infiltrates and replenishes the groundwater.

**Flood** – A temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers, and other waters of the Commonwealth.

**Floodplain** – Any land area susceptible to inundation by water from any natural source or as delineated by applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary Map as being a special flood hazard area. That area defined in the Township Zoning Ordinance as the Floodplain Conservation District; the floodplain definition contained therein is made part of this chapter by reference.

**Floodway** – The channel of a watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on Flood Insurance Rate Maps (FIRMs) and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends fifty (50) feet from the top-of-bank on each side of the stream.

**Forest Management/Timber Operations** – Planning and associated activities necessary for the management of forestland. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, and reforestation.

**Freeboard** – A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, swale, or diversion berm. The space is required as a safety margin in a pond or basin.

**Grade** – 1. (noun) A slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein. 2. (verb) To finish the surface of a roadbed, the top of an embankment, or the bottom of excavation.

**Groundwater** – Water beneath the earth's surface that supplies wells and springs, and is often between saturated soil and rock.

**Groundwater Recharge** – The replenishment of existing natural underground water supplies from rain or overland flow.

**HEC-HMS** – The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS). This model was used to model the Neshaminy Creek watershed during the Act 167 Plan development and was the basis for the Standards and Criteria of this Ordinance.

**High Quality Waters** – Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards, § 93.4b(a).

**Hot spot** – An area where land use or activity generates highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. Typical pollutant loadings in stormwater may be found in Chapter 8 Section 6 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*. More information concerning hot spots may be found in Section 206-6.

**Hydrograph** – A graph representing the discharge of water versus time for a selected point in the drainage system.

**Hydrologic Regime** – The hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage, and groundwater supplies under natural conditions.

**Hydrologic Soil Group** – A classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

**Impervious Material** – Any materials that do not permit the natural absorption and permeation by soils of rain or other surface water, to include but not be limited to all concrete, asphalt, and similar paving products, earthen materials (brick, stone), chemical treatment of soils or artificial ground covers as may be used in the construction of roads, walks, driveways, parking areas, patios and recreation facilities.

**Impervious Surface** – A surface that prevents the infiltration of water into the ground. Impervious surfaces include, but are not limited to, streets, sidewalks, pavement roofs, or driveway areas. Any surface areas designed to be gravel or crushed stone shall be regarded as impervious surfaces.

**Impoundment** – A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

**Infill development** – Development that occurs on smaller parcels that remain undeveloped but are within or very close proximity to urban or densely developed areas. Infill development usually relies on existing infrastructure and does not require an extension of water, sewer or other public utilities.

**Infiltration** – Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

**Infiltration Structures** – A structure designed to direct runoff into the underground water (e.g., French drains, seepage pits, or seepage trenches).

**Initial Abstraction (I<sub>a</sub>)** – The value used to calculate the volume or peak rate of runoff in the soil cover complex method. It represents the depth of rain retained on vegetation plus the depth of rain stored on the soil surface plus the depth of rain infiltrated prior to the start of runoff.

**Inlet** – The upstream end of any structure through which water may flow.

**Intermittent Stream** – A stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation or groundwater discharge.

**Karst** – A type of topography or landscape characterized by surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

**Land Development** – Any of the following activities:

- a) The improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving:
  - (1) A group of two or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure, or
  - (2) The division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features;
- b) A subdivision of land;
- c) Development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

**Limiting Zone** – A soil horizon or condition in the soil profile or underlying a stratum that includes one of the following:

- a) A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.
- b) A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with sufficient fine soil to fill the voids between the fragments.
- c) A rock formation, other stratum, or soil condition that is so slowly permeable that it effectively limits downward passage of water.

**Lot** – A designated parcel, tract or area of land established by a plat or otherwise as permitted by law and to be used, developed or built upon as a unit.

**Low Impact Development (LID) Practices** – Practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities.

**Main Stem (Main Channel)** – Any stream segment or other runoff conveyance used as a reach in the applicable watershed hydrologic model.

**Manning Equation (Manning Formula)** – A method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. “Open channels” may include closed conduits so long as the flow is not under pressure.

**MCCD** – The Montgomery County Conservation District.

**Municipality** – Montgomery Township, Montgomery County, Pennsylvania.

**Natural Hydrologic Regime** (see Hydrologic Regime).

**Neshaminy Creek Watershed Act 167 Stormwater Management Plan** – The watershed plan for managing those land use activities that will influence stormwater

runoff quality and quantity and that would impact the Neshaminy Creek watershed adopted by Bucks and Montgomery Counties as required by the Act of October 4, 1978, P.L. 864 (Act 167).

**Nonpoint Source Pollution** – Pollution that enters a water body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

**Nonstormwater Discharges** – Water flowing in stormwater collection facilities, such as pipes or swales, which is not the result of a rainfall event or snowmelt.

**NPDES** – National Pollutant Discharge Elimination System, the federal government's system for issuance of permits under the Clean Water Act, which is delegated to PADEP in Pennsylvania.

**NRCS** – Natural Resource Conservation Service (previously Soil Conservation Service).

**Outfall** – “Point source” as described in 40 CFR § 122.2 at the point where the Township's storm sewer system discharges to surface Waters of the Commonwealth.

**Outlet** – Points of water disposal to a stream, river, lake, tidewater or artificial drain.

**PADEP** – The Pennsylvania Department of Environmental Protection.

**Parent Tract** – The parcel of land from which a land development or subdivision originates, determined from the date of Township adoption of this ordinance.

**Peak Discharge** – The maximum rate of stormwater runoff from a specific storm event.

**Penn State Runoff Model (PSRM)** – The computer-based hydrologic model developed at the Pennsylvania State University.

**Perennial Stream** – A stream which contains water at all times except during extreme drought.

**Pipe** – A culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.

**Planning Commission** – The planning commission of Montgomery Township.

**Point Source** – Any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code § 92.1.

**Post Construction** – Period after construction during which disturbed areas are stabilized, stormwater controls are in place and functioning and all proposed improvements in the approved land development plan are completed.

**Predevelopment** – (see Existing Condition)

**Pretreatment** – Techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily designed to meet the volume requirements of Section 206-14. For example, any inlets draining to an infiltrating system should be sumped and trapped to prevent the system from becoming clogged with excess sediment.

**Pervious Surface** – A surface that allows the infiltration of water into the ground.

**Project Site** – The specific area of land where any Regulated Activities in the Township are planned, conducted or maintained.

**Qualified Professional** - Any person licensed by the Pennsylvania Department of State or otherwise qualified by law to perform the work required by the Ordinance.

**Rational Method** - A rainfall-runoff relation used to estimate peak flow.

**Recharge** - The replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.

**Record Drawings** - Original documents revised to suit the as-built conditions and subsequently provided by the Engineer to the Client. The Engineer reviews the Contractor's as-built drawings against his/her own records for completeness, then either turns these over to the Client or transfers the information to a set of reproducible, in both cases for the Client's permanent records. Record drawings are not the same as record plans submitted for recording with the County in accordance with the PA Municipalities Planning Code (Act 247).

**Redevelopment** - Any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than 50 percent of the street width including shoulders is removed and re-paved.

**Regulated Activities** - Any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

**Regulated Earth Disturbance Activity** - Activity involving earth disturbance subject to regulation under 25 Pa. Code 92, 25 Pa. Code 102, or the Clean Streams Law.

**Release Rate** - The percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.

**Repaving** - Replacement of the impervious surface that does not involve reconstruction of an existing paved (impervious) surface.

**Replacement Paving** - Reconstruction of and full replacement of an existing paved (impervious) surface.

**Retention Basin** - A structure in which stormwater is stored and not released during the storm event. Retention basins are designed for infiltration purposes, and do not have an outlet. The retention basin must infiltrate stored water in 4 days or less.

**Retention Volume/Removed Runoff** - The volume of runoff that is captured and not released directly into the surface Waters of the Commonwealth during or after a storm event.

**Return Period (or Average Recurrence Interval)** - The average interval, in years, within which a storm event of a given or greater magnitude can be expected to recur. The reciprocal of the return period is the annual exceedance probability of the storm event, that is, the probability that the storm event is equaled or exceeded in any one year period. For example, the 25-year return period rainfall would be expected to recur on the average of once every twenty-five (25) years, or conversely would have a 1/25 or four percent (4%) chance of occurrence or exceedance in any given year.

**Road Maintenance** – Earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.

**Roof Drains** – A drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.

**Runoff** – Any part of precipitation, as well as any other flow contributions, that flows over the land surface.

**SALDO** – Subdivision and Land Development Ordinance.

**Sediment** - Soils or other materials transported by water, air or gravity as a product of erosion.

**Sediment Pollution** – The placement, discharge or any other introduction of sediment into the Waters of the Commonwealth.

**Sedimentation** – The process by which mineral or organic matter is accumulated or deposited by the movement of water, air or gravity. Once this matter is deposited (or remains suspended), it is usually referred to as "sediment."

**Seepage Pit/Seepage Trench** – An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the underground water. More information on Seepage Pits may be found in the PA BMP Manual, December 2006, Chapter 6, Section 4.

**Separate Storm Sewer System** – A conveyance or system of conveyances (including roads with drainage systems, Township streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.

**Shallow Concentrated Flow** – Stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.

**Sheet Flow** – A flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.

**Soil Cover Complex Method** – A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).

**Source Water Protection Areas (SWPA)** – The zone through which contaminants, if present, are likely to migrate and reach a drinking water well or surface water intake.

**Special Protection Subwatersheds** – Watersheds that have been designated in Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards as exceptional value (EV) or high quality (HQ) waters.

**Spillway** – A conveyance that is used to pass the peak discharge of the maximum design storm that is controlled by the stormwater facility.

**State Water Quality Requirements** – The regulatory requirements to protect, maintain, reclaim, and restore water quality under Title 25 of the Pennsylvania Code and the Clean Streams Law.

**Storm Frequency** – The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years. See "Return Period".



**Storm Sewer** – A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

**Stormwater** – The surface runoff generated by precipitation reaching the ground surface.

**Stormwater Management Best Management Practices** – Is abbreviated as **BMPs** or **SWM BMPs** throughout this Ordinance.

**Stormwater Management Facility** – Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff quality, rate or quantity. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.

**Stormwater Management Plan** – The watershed plan or plans for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the watershed adopted Montgomery County as required by the Act of October 4, 1978, P.L. 864 (Act 167).

**Stormwater SWM Site Plan** – The plan prepared by the Applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this ordinance.

**Stream** – A flow of water in a natural channel or bed, as a brook, rivulet, or a small river.

**Stream Buffer** – The land area adjacent to each side of a stream, essential to maintaining water quality. (See Buffer)

**Stream Enclosure** – A bridge, culvert, or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of the Commonwealth.

**Streambank Erosion** – The widening, deepening, or headward cutting of channels and waterways, caused by stormwater runoff or bankfull flows.

**Subarea (Subwatershed)** – The smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

**Subdivision** – The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels, or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership, or building or lot development, provided the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwelling, shall be exempted. Refer to Land Development

**Surface Waters of the Commonwealth** – Any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface waters, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.

**Swale** – A low lying stretch of land that gathers or carries surface water runoff.

**SWM Site Plan** – The documentation of the stormwater management system to be used for a given development site, the contents of which are established in Section 206-22.

**Timber Operations** – See Forest Management.

**Time-of-Concentration (Tc)** – The time required for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

**Top-of-Bank** – Highest point of elevation in a stream channel cross-section at which a rising water level just begins to flow out of the channel and over the floodplain.

**Township** – Montgomery Township, Montgomery County, Pennsylvania.

**Township Engineer** – A professional engineer licensed as such in the Commonwealth of Pennsylvania, duly appointed as the engineer for Montgomery Township.

**Vegetated swale** – A natural or man-made waterway, usually broad and shallow, covered with erosion-resistant grasses, used to convey surface water.

**Vernal Pool** – Seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall.

**Watercourse** – A channel or conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

**Waters of the Commonwealth** – Any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.

**Watershed** – Region or area drained by a river, watercourse, or other body of water, whether natural or artificial.

**Wet Basin** – Pond for urban runoff management that is designed to detain urban runoff and always contains water.

**Wetland** – Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, fens, and similar areas.

**Wissahickon Creek Act 167 Plan** – The watershed plan for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the Wissahickon Creek watershed adopted by Philadelphia and Montgomery Counties as required by the Act of October 4, 1978, P.L. 864 (Act 167).

## **ARTICLE III**

### **STORMWATER MANAGEMENT**

#### **§206-11. General Requirements**

- A. Applicants proposing Regulated Activities in Township that do not fall under the exemption criteria shown in Section 206-6 shall submit a Stormwater Management

(SWM) Site Plan consistent with the Watershed SWM Plan to the Township for review. The SWM criteria of this Ordinance shall apply to the total proposed development even if development is to take place in stages. Preparation and implementation of an approved SWM Site Plan is required. No Regulated Activities shall commence until the Township issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.

- B. SWM Site Plans approved by the Township, in accordance with Article IV, shall be on-site throughout the duration of the Regulated Activity.
- C. The Township may, after consultation with the Department of Environmental Protection (PADEP), approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including but not limited to the Clean Streams Law.
- D. For all regulated earth disturbance activities, Erosion and Sediment (E&S) Control Best Management Practices (BMPs) shall be designed, implemented, operated, and maintained during the Regulated Earth Disturbance Activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual, No. 363-2134-008 (April 15, 2000), as amended and updated.
- E. For all Regulated Activities, implementation of the volume controls in Section 206-14 is required.
- F. Impervious areas:
  - (1) The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.
  - (2) For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
  - (3) For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this Ordinance.
- G. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s) from the developer. Such stormwater flows shall be subject to the requirements of this Ordinance.
- H. All Regulated Activities shall include such measures as necessary to:
  - (1) Protect health, safety, and property;
  - (2) Meet the water quality goals of this Ordinance by implementing measures to:
    - (a) Minimize disturbance to floodplains, wetlands, and wooded areas.
    - (b) Create, maintain, repair or extend riparian buffers.
    - (c) Avoid erosive flow conditions in natural flow pathways.
    - (d) Minimize thermal impacts to waters of this Commonwealth.

- (e) Disconnect impervious surfaces (i.e. Disconnected Impervious Areas, DIAs) by directing runoff to pervious areas, wherever possible. See Appendix C for detail on DIAs.
- (3) To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices (e.g. protecting existing trees, reducing area of impervious surface, cluster development, and protecting open space) described in the *Pennsylvania Stormwater Best Management Practices Manual*, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006). See Appendix B for a summary description.
- I. Infiltration BMPs should be spread out, made as shallow as practicable, and located to maximize the use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.
- J. The design of all facilities over karst shall include an evaluation of measures to minimize the risk of adverse effects.
- K. Storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm.
- L. The design storms to be used in the analysis of peak rates of discharge are listed in Table A-1 (Appendix A).
- M. For all regulated activities, SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law, and the Storm Water Management Act.
- N. Various BMPs and their design standards are listed in the *Pennsylvania Stormwater Best Management Practices Manual* (PA BMP Manual).

## **§206-12. Permit Requirements by Other Governmental Entities**

Approvals issued and actions taken under this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulation or ordinance.

## **§206-13. Erosion and Sediment Pollution Control**

- A. Must comply with Title 25, Chapter 102 of the PA Code and any other applicable state, county and Township codes. PADEP requires an engineered post-construction SWM Plan with projects proposing earth disturbance greater than 1 acre.
- B. Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office or County Conservation District must be provided to the Township.
- C. Approval of earth disturbance activities is required by the Township per Table 206-6.2.
- D. Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed. They shall include the following:

- (1) Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity.
- (2) Infiltration BMPs shall not be constructed nor receive runoff until the entire drainage area contributory to the infiltration BMP has achieved final stabilization.

## **§206-14. Volume Control**

Volume controls will mitigate increased runoff impacts, protect stream channel morphology, maintain groundwater recharge, and contribute to water quality improvements. Stormwater runoff volume control methods are based on the net change in runoff volume for the two-year storm event.

Volume controls shall be implemented using the Design Storm Method in subsection A or the Simplified Method in subsection B below. For Regulated Activities equal to or less than one (1) acre, this Ordinance establishes no preference for either methodology; therefore, the applicant may select either methodology on the basis of economic considerations, the intrinsic limitations of the procedures associated with each methodology, and other factors. All regulated activities greater than one (1) acre must use the Design Storm Method.

A. **Design-Storm Method (CG-1 in the BMP Manual) (Any Regulated Activity):** This method requires detailed modeling based on site conditions. For modeling assumptions refer to Section 206-19.A.

- (1) Post-development total runoff should not be increased from pre-development total runoff for all storms equal to or less than the 2-year 24-hour duration precipitation.
- (2) The following applies in order to estimate the increased volume of runoff for the 2-year 24-hour duration precipitation event:

To calculate the runoff volume (cubic feet) for existing site conditions (pre-development) and for the proposed developed site conditions (post-development), it is recommended to use the soil cover complex method as shown on the following page. Table A-3 in Appendix A is available to guide a qualified professional and/or an applicant to calculate the stormwater runoff volume. The calculated volume shall be either reused, evapotranspired, or infiltrated through structural or nonstructural means.

*Soil Cover Complex Method:*

$$\text{Step 1: Runoff (in)} = Q = (P - 0.2S)^2 / (P + 0.8S)$$

where

P = 2-year Rainfall (in)

S = the potential maximum retention (including initial abstraction, Ia)

$$S = (1000 / CN) - 10$$

Step 2:        Runoff Volume (Cubic Feet) =  $Q \times \text{Area} \times 1/12$

where

$Q$  = Runoff (in)

Area = SWM Area (sq ft)

**B. Simplified Method (CG-2 in the BMP Manual) (Regulated activities less than or equal to 1 acre):**

- (1) Stormwater facilities shall capture the runoff volume from at least the first two inches (2") of runoff from all new impervious surfaces.

**Volume (cubic feet) = (2" runoff / 12 inches) \* impervious surface (sq ft)**

- (2) At least the first inch (1") of runoff volume from the new impervious surfaces shall be permanently removed from the runoff flow—i.e., it shall not be released into the surface waters of the Commonwealth. The calculated volume shall be either reused, evapotranspired or infiltrated through structural or nonstructural means.

**Volume (cubic feet) = (1" runoff / 12 inches) \* impervious surface (sq ft)**

- (3) Infiltration facilities should be designed to accommodate the first half inch (0.5") of the permanently removed runoff.
- (4) No more than one inch (1") of runoff volume from impervious surfaces shall be released from the site. The release time must be over 24 to 72 hours.

**C. Stormwater Control Measures:**

The applicant must demonstrate how the required volume is controlled through Stormwater Best Management Practices (BMPs) which shall provide the means necessary to capture, reuse, evaporate, transpire or infiltrate the total runoff volume.

- (1) If natural resources exist on the site and a SWM Site Plan submission is required for the regulated activity, the applicant shall determine and display the total acreage of protected area where no disturbance is proposed on the plan. The acreage of the protected area should be subtracted from the total site area and not included in the stormwater management site area acreage used in determining the volume controls.

**Stormwater Management Site Area =**

**{Total Site Area (for both pre and post development conditions) – Protected Area}**

Natural Resource Areas should be calculated based upon the Township's own natural resource protection ordinance. If no ordinance exists, see Table A-2 in Appendix A for guidance to assess the total protected area. For additional reference see Chapter 5 Section 5.4.1 of the PA BMP manual.

- (2) Calculate the volume controls provided through nonstructural BMPs. Table A-5 in Appendix A is recommended as guidance.
- (3) Volume controls provided through nonstructural BMPs should be subtracted from the required volume to determine the necessary structural BMPs.

$$\begin{array}{rcccl} \text{Required} & & \text{Nonstructural} & & \text{Structural} \\ \text{Volume} & & \text{Volume} & = & \text{Volume} \\ \text{Control (ft}^3\text{)} & - & \text{Control (ft}^3\text{)} & & \text{Requirement} \\ & & & & \text{(ft}^3\text{)} \end{array}$$

- (4) Calculate the volume controls provided through structural BMPs. Table A-6 in Appendix A is recommended as guidance. See PA BMP manual Chapter 6 for description of the BMPs.
- (5) Infiltration BMPs intended to receive runoff from developed areas shall be selected based on the suitability of soils and site conditions (see Table A-6 in Appendix A for a list of Infiltration BMPs). Infiltration BMPs shall be constructed on soils that have the following characteristics:
  - (a) A minimum soil depth of twenty-four inches (24") between the bottom of the infiltration BMPs and the top of bedrock or seasonally high water table.
  - (b) An infiltration rate sufficient to accept the additional stormwater load and dewater completely as determined by field tests. A minimum of 0.2 inches/hour (in/hr) should be utilized and for acceptable rates a safety factor of 50% should be applied for design purposes (e.g., for soil which measured 0.4 in/hr, the BMP design should use 0.2 in/hr to insure safe infiltration rates after construction).
  - (c) All open-air infiltration facilities shall be designed to completely infiltrate runoff volume within three (3) days (72 hours) from the start of the design storm.
  - (d) All subsurface and contained facilities such as capture-and-reuse systems must have storage available equivalent to the Water Volume Control amount within three (3) days (72 hours) from the end of the design storm.
  - (e) Pretreatment (See Appendix D) shall be provided prior to infiltration.
- (6) Soils – A soils evaluation of the project site shall be required to determine the suitability of infiltration facilities. All regulated activities are required to perform a detailed soils evaluation by a qualified design professional which at minimum address' soil permeability, depth to bedrock, and subgrade stability. The general process for designing the infiltration BMP shall be:
  - (a) Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of sub-grade stability; infiltration may not be ruled out without conducting these tests.
  - (b) Provide field tests such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the

appropriate hydraulic conductivity rate. Percolation tests are not recommended for design purposes.

- (c) Design the infiltration structure based on field determined capacity at the level of the proposed infiltration surface and based on the safety factor of 50%.
- (d) If on-lot infiltration structures are proposed, it must be demonstrated to the Township that the soils are conducive to infiltrate on the lots identified.
- (e) An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the Township.

## **§206-15. Stormwater Peak Rate Control and Management Districts**

- A. District Boundaries – For the purposes of this Chapter the Township is divided in Stormwater Management Districts as listed in Table 206-15.1. The boundaries of the Stormwater Management Districts are shown on official maps attached to and made part of this Chapter, which shall be designated “Stormwater Management District Map.” The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the SWM Site Plan.
- B. General – Proposed conditions rates of runoff from any Regulated Activity shall not exceed the peak release rates of runoff from existing conditions for the design storms specified on the Stormwater Management District Watershed Map and in this section of the Ordinance.
- C. Standards for managing runoff from each subarea in the Watershed for the 2-, 5-, 10-, 25-, 50-, and 100-year design storms are shown in Table 206-15.1. Development sites located in each of the management districts must control proposed development conditions runoff rates to existing conditions runoff rates for the design storms in accordance with Table 206-15.1 on the following page.

**Table 206-15.1: Peak Rate Runoff Control Standards by Stormwater Management Districts**

<b>District</b>	<b>Design Storm Postdevelopment (Proposed Conditions)</b>	<b>Design Storm Predevelopment (Existing Conditions)</b>
Neshaminy A	2-year	1-year
	5-year	5-year
	10-year	10-year
	25-year	25-year
	50-year	50-year
	100-year	100-year
Neshaminy B	2-year	1-year
	5-year	2-year
	10-year	5-year



	25- year	10-year
	50-year	25-year
	100-year	50-year
Neshaminy C	2-year	2-year
	5-year	5-year
	10-year	10-year
	25- year	25- year
	50-year	50-year
	100-year	100-year
Wissahickon	2-year	1-year
	5-year	5-year
	10-year	2-year[JPD1]
	25- year	25- year
	50-year	10-year[JPD2]
	100-year	100-year

NOTE:

The Neshaminy Creek Watershed includes the Little Neshaminy Creek.

- D. Sites Located in More Than One District – For a proposed development site located within two or more stormwater management district category subareas, the peak discharge rate from any subarea shall meet the Management District Criteria for the district in which the discharge is located.
- E. Off-Site Areas – When calculating the allowable peak runoff rates, developers do not have to account for runoff draining into the subject development site from an off-site area. On-site drainage facilities shall be designed to safely convey off-site flows through the development site.
- F. Site Areas – The stormwater management site area is the only area subject to the management district criteria. Non-impacted areas or non-regulated activities bypassing the stormwater management facilities would not be subject to the management district criteria.
- G. Alternate Criteria for Redevelopment Sites – For redevelopment sites, one of the following minimum design parameters shall be accomplished, whichever is most appropriate for the given site conditions as determined by the Township:
- (1) Meet the full requirements specified by Table 206-15.1 and Sections 206-20
  - or
  - (2) Reduce the total impervious surface on the site by at least twenty (20) percent based upon a comparison of existing impervious surface to proposed impervious surface.

## **§206-16. Nonstructural Project Design to Minimize Stormwater Impacts**

A. The design of all regulated activities should include the following to minimize stormwater impacts:

- (1) The Applicant should find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces, and the degradation of waters of the Commonwealth and must maintain as much as possible the natural hydrologic regime of the site.
- (2) An alternative is practicable if it is available and capable of implementation after taking into consideration existing technology and logistics in light of overall project purposes and other municipal requirements.
- (3) See Appendix G for a Nonstructural Project Design Checklist.

## **§206-17. Stream Bank Erosion Requirements (Channel Protection)**

A. If a perennial or intermittent stream passes through the site, the Applicant shall create a riparian buffer extending a minimum of ten (10) feet to either side of the top-of-bank of the channel. The buffer area shall be established and maintained in an undisturbed state. This buffer area may be maintained as a meadow with minimal mowing of the grassed area, or as a forested buffer, being planted with appropriate native vegetation (refer to Appendix B of the BMP Manual for plant lists). If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of this Ordinance, the existing buffer shall be maintained. This does not include lakes or wetlands.

B. Applicants shall adhere to the following Stream Bank Erosion/Channel Protection Requirements:

- (1) In addition to the control of water quality volume (in order to minimize the impact of stormwater runoff on downstream stream bank erosion), the primary requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour storm event to the existing conditions 1-year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure or a sand filter) so that the proposed conditions 1-year, 24-hour storm event takes a minimum of twenty-four (24) hours to drain from the facility from a point when the maximum volume of water from the 1-year, 24-hour storm event is captured (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water volume control orifice is at the invert of the facility).
- (2) The minimum orifice size in the outlet structure to the BMP shall be three (3) inches in diameter, where possible, and a trash rack shall be installed to prevent clogging. On sites with small drainage areas contributing to this BMP that do not provide enough runoff volume to allow a 24-hour attenuation with the 3-inch orifice, the calculations shall be submitted showing this condition. Orifice sizes less than three (3) inches can be utilized, provided that the design will prevent clogging of the intake. It is recommended that the design, to accommodate maintenance, include a replaceables and or porous media filter cartridge.

## §206-18. Reserved

(1)

## §206-19. Calculation Methodology

A. The following criteria shall be used for runoff calculations:

(1) For development sites not considered redevelopment, the ground cover used to determine the existing conditions runoff volume and flow rate shall be as follows:

(a) Wooded sites shall use a ground cover of "woods in good condition." A site is classified as wooded if a continuous canopy of trees exists over a  $\frac{1}{4}$  acre.

(b) The undeveloped portion of the site including agriculture, bare earth, and fallow ground shall be considered as "meadow in good condition," unless the natural ground cover generates a lower curve number (CN) or Rational "c" value (i.e., woods) as listed in Tables A-4 or A-7 in Appendix A.

(2) For development and redevelopment sites, the ground cover used to determine the existing conditions runoff volume and flow rate for the developed portion of the site shall be based upon actual land cover conditions. If the developed site contains impervious surfaces, 20 percent of the impervious surface area shall be considered meadow in the model for existing conditions.

B. Stormwater runoff peak discharges from all development sites with a drainage area equal to or greater than 2 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 206-19.1 summarizes acceptable computation methods. The method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. The Township may allow the use of the Rational Method ( $Q=CIA$ ) to estimate peak discharges from drainage areas that contain less than 2 acres.

$Q$  = Peak flow rate, cubic feet per second (CFS)

$C$  = Runoff coefficient, dependent on land use/cover

$I$  = Design rainfall intensity, inches per hour

$A$  = Drainage Area, acres.

C. All calculations consistent with this ordinance using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms according to Table A-1 in Appendix A. If a hydrologic computer model such as PSRM or HEC-1 / HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours.

**Table 206-19.1: Acceptable Computation Methodologies For Stormwater Management Plans**

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55	USDA NRCS	Applicable for land

(or commercial computer package based on TR-55)		development plans within limitations described in TR-55.
HEC-1 / HEC-HMS	U.S. Army Corps of Engineers	Applicable where use of full hydrology computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of full hydrology computer model is desirable or necessary; simpler than TR-20 or HEC-1.
Rational Method (or commercial computer package based on the Rational Method)	Emil Kuichling (1889)	For sites less than 2 acres, or as approved by the Township and/or Township Engineer. Not acceptable when a full hydrograph is required.
Other Methods	Varies	Other computation methodologies approved by the Township and/or Township Engineer

- D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from Table A-1 in Appendix A. Times-of-concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of *Urban Hydrology for Small Watersheds*, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times-of-concentration for channel and pipe flow shall be computed using Manning's equation.
- E. Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be based on Table A-4 in Appendix A.
- F. Runoff coefficients (C) for both existing and proposed conditions for use in the Rational Method shall be consistent with Table A-7 in Appendix A.
- G. Runoff from proposed sites graded to the subsoil will not have the same runoff conditions as the site under existing conditions because of soil compaction, even after top-soiling or seeding. The proposed condition "CN" or "C" shall increase by 5% to better reflect proposed soil conditions.
- H. The Manning equation is preferred for one-dimensional, gradually-varied, open channel flow. In other cases, appropriate, applicable methods should be applied, however, early coordination with the Township is necessary.
- I. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Ordinance using the generally accepted hydraulic analysis technique or method of the Township.
- J. The design of any stormwater detention facilities intended to meet the performance standards of this Ordinance shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication Method. For drainage areas greater than 2 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of any generally accepted full hydrograph approximation technique that shall

use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.

## **§206-20. Other Requirements**

### **A. Hot Spots**

- (1) The use of infiltration BMPs is prohibited on hot spot land use areas. Examples of hot spots are listed in Appendix D.
- (2) Stormwater runoff from hot spot land uses shall be pretreated. In no case may the same BMP be employed consecutively to meet this requirement. Guidance regarding acceptable methods of pre-treatment is located in Appendix D.

### **B. West Nile Guidance Requirements**

All wet basin designs shall incorporate biologic controls consistent with the West Nile Guidance found in Appendix E.

## **ARTICLE IV STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS**

## **§206-21. General Requirements**

For any of the activities regulated by this Ordinance, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, the commencement of any earth disturbance, or activity may not proceed until the Property Owner or Applicant or his/her agent has received written approval of a SWM Site Plan from the Township and an approval of an adequate Erosion and Sediment (E&S) Control Plan review from the Township or County Conservation District.

## **§206-22. SWM Site Plan Requirements**

The SWM Site Plan shall consist of a general description of the project, including calculations, maps, and plans. A note on the maps shall refer to the associated computations and E&S Control Plan by title and date. The cover sheet of the computations and E&S Control Plan shall refer to the associated maps by title and date. All SWM Site Plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat, and well organized; otherwise, the SWM Site Plan shall not be accepted for review and shall be returned to the Applicant.

The following items shall be included in the SWM Site Plan:

### **A. General**

- (1) General description of the project including plan contents described in Section 206-22.B.
- (2) General description of proposed SWM techniques to be used for SWM facilities.
- (3) Complete hydrologic and hydraulic computations for all SWM facilities.

- (4) All reviews and letters of adequacy from the Conservation District for the Erosion & Sedimentation Plan as required by Township, county or state regulations.
- (5) A general description of proposed nonpoint source pollution controls.
- (6) The SWM Site Plan Application and completed fee schedule form and associated fee *for all regulated activities not already paying pay fees by under the SALDO regulations.*
- (7) The SWM Site Plan Checklist
- (8) Appropriate sections from the Township's Subdivision and Land Development Ordinance, and other applicable local ordinances, shall be followed in preparing the SWM Site Plan.

B. Plans: SWM Site Plan shall provide the following information;

- (1) The overall stormwater management concept for the project.
- (2) A determination of natural site conditions and stormwater management needs. This shall include, but not be limited to:
  - (a) Site Features:
    - [1] The location of the project relative to highways, Township boundaries or other identifiable landmarks.
    - [2] The locations of all existing and proposed utilities, sanitary sewers, and water lines on site and to within fifty (50) feet of property lines.
    - [3] Proposed structures, roads, paved areas, and buildings.
    - [4] The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.
    - [5] Plan and profile drawings of all SWM BMP's, including drainage structures, pipes, open channels, and swales. At a minimum this should include pre- and post-drainage area maps, an overall post construction stormwater management plan, stormwater details sheets, and landscape plans (if proposing bio-retention facilities, low impact development, bioretention, or vegetative basins).
    - [6] The locations and minimum setback distances of existing and proposed on-lot wastewater facilities and water supply wells.
    - [7] The location of all erosion and sediment control facilities.
    - [8] The location of proposed septic tank infiltration areas and wells in cases where groundwater recharge measures such as seepage pits, beds or trenches are proposed.
  - (b) Natural Site Conditions:
    - [1] An Existing Resource and Site Analysis Map (ERSAM) showing environmentally sensitive areas including, but not limited to;
      - steep slopes,
      - ponds,
      - lakes,

- streams,
- wetlands,
- hydric soils,
- hydrologic soil groups A and B,
- vernal pools,
- stream buffers,
- open channels,
- existing recharge areas, and
- floodplains.

The area of each of these sensitive areas shall be calculated and should be consistent with the runoff volume calculation Section 206-14.C.1.

- [2] A detailed site evaluation for projects proposed in areas of frequent flooding, karst topography, and other environmentally sensitive areas, such as brownfields and source water protection areas.
  - [3] Existing and proposed contour lines (2 ft).
  - [4] The total extent of the drainage area upstream from the site and all down gradient receiving channels, swales and waters to which stormwater runoff or drainage will be discharged.
- (c) Stormwater runoff design computations and documentation as specified in this Ordinance, or as otherwise necessary to demonstrate that the maximum practicable measures have been taken to meet the requirements of this Ordinance, including the recommendations and general requirements in Section 206-11.
  - (d) The effect of the project (in terms of runoff volumes, water quality, and peak flows) on surrounding properties and aquatic features and on any existing stormwater conveyance system that may be affected by the project.
- (3) The format of the Plan shall include the following;
- (a) The expected project time schedule.
  - (b) The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.
  - (c) The date of submission.
  - (d) A graphic and written scale of one (1) inch equals no more than fifty (50) feet; for tracts of twenty (20) acres or more, the scale shall be one (1) inch equals no more than one hundred (100) feet.
  - (e) A north arrow.
  - (f) An access easement around all stormwater management facilities is required that would provide ingress to and egress from a public right-of-way. The size of the easement shall commensurate with the maintenance and access requirements determined in the design of the BMP.

- (g) A key map showing all existing man-made features beyond the property boundary that would be affected by the project.
  - (h) A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities. All facilities shall meet the performance standards and design criteria specified in this ordinance.
  - (i) The following signature block for the Design Engineer: "I, (Design Engineer), on this date (date of signature), hereby certify that the SWM Site Plan meets all design standards and criteria of Montgomery Township Stormwater Management Ordinance or Plan."
  - (j) A statement, signed by the Applicant, acknowledging that any revision to the approved SWM Site Plan must be approved by the Township and that a revised E&S Plan must be submitted to the Conservation District.
- (4) 7. Limits of earth disturbance, including the type and amount of impervious area that is proposed.
  - (5) A soil erosion and sediment control plan, where applicable, as prepared for and submitted to the approval authority.
  - (6) The SWM Site Plan shall include an Operations & Maintenance (O&M) Plan for all existing and proposed physical stormwater management facilities, as well as schedules and costs for O&M activities. This plan shall address long-term ownership and responsibilities for O&M.

## **§206-23. Plan Submission**

The Township requires submission of a complete SWM Site Plan, as specified in this Ordinance.

- A. Proof of application or documentation of required permit(s) or approvals for the programs listed below shall be part of the plan:
  - (1) NPDES Permit for Stormwater Discharges from Construction Activities.
  - (2) Any other permit under applicable state or federal regulations.
- B. The SWM Site Plan shall be submitted to the following agencies. Refer to the Township Application for the number of copies.
  - (1) the Township accompanied by the requisite Township review fee.
  - (2) the County Conservation District.
  - (3) the Township Engineer (where applicable).
- C. When the SWM Site Plan is associated with a subdivision and/or land development; the submission requirements of the Township Subdivision and Land Development Ordinance shall be followed.
- D. Any submissions to the agencies listed above that are found to be incomplete shall not be accepted for review and shall be returned to the Applicant with a notification in writing of the specific manner in which the submission is incomplete.
- E. Additional copies shall be submitted as requested by the Township, MCCD or PADEP.



## **§206-24. Small Project Stormwater Management Site Plan**

A. Residential projects proposing less than or equal to 5,000 square feet of impervious surface and less than 1 acre of earth disturbance qualify as a small project. The requirements of a Small Project Stormwater Management Plan are presented in Appendix F.

B. Fee-In-Lieu Of Alternative for Small Projects:

(1) In order to address flooding and erosion problems found in the Township, applicants proposing a small project, as defined in the Montgomery Township Stormwater Management Ordinance, may pay a fee-in-lieu of stormwater conveyance/detention/storage facilities as an alternative to the construction of stormwater conveyance/detention/storage facilities, with the approval of the Board of Supervisors. When fees are offered by an applicant, the Township may, but shall not be required to, accept the fees, provided that the proposed stormwater solution meets the requirements in the Township Stormwater Management Ordinance.

(2) These fees shall be used to construct or make improvements to stormwater facilities that are either Township-owned or have a perpetual easement or deed restriction that would ensure access, and that are located in the Township within the same watershed as the project paying the fee. Additionally, such fees may be used for the acquisition of land and rights-of-way, engineering, legal and planning costs and all other costs, including debt service, related to the construction or improvement of necessary stormwater control facilities.

(a) Applicability

[1] In order to ensure that water quality protection and stormwater management is provided during and after the construction of the proposed activity, the FILO alternative shall be available where the following conditions apply:

(a) The proposed activity is located in a residential zoning district.

(b) The project site is located in a watershed for which an Act 167 stormwater management plan has been prepared by the county and approved by PADEP.

[2] In addition to the criteria in [1](a), the project site must meet at least one of the following two criteria:

(a) The project site is located in a subdivision that is served by storm sewers discharging to a stormwater basin or other stormwater management facility which infiltrates, evaporates or detains stormwater for a period of time prior to discharge, or

(b) The following conditions exist on the site, in the opinion of the Township Engineer:

(i) The surface conditions on the site will encourage overland sheet flow of stormwater, as opposed to concentrated flow, and

(ii) The project site is located at a sufficient distance from the receiving stream such that runoff from the project will be filtered by

vegetation and given opportunity to infiltrate as it flows across the land to the stream.

(b) Fees:

[1] Applicants shall pay the following fees-in-lieu of stormwater facilities:

- (a) Fees-in-lieu of stormwater detention/storage facilities on a single-family dwelling lot shall be based on the cubic feet of required storage capacity generated by the entire area of the proposed impervious surface, when that area is greater than 1,000 square feet and less than 5,000 square feet, in accordance with the Township Stormwater Management Ordinance. Such fee shall be established and updated periodically by resolution of the Board of Supervisors and shall be based on an average cost of providing stormwater control facilities per square foot of proposed impervious surface.
- (b) Fees collected by the Township shall be deposited in an interest-bearing account in a bank authorized to receive deposits of Township funds. Interest earned by the account shall be credited to that account and shall be used for the same purposes as money deposited in the account.
- (c) Fee-in-lieu payments shall be collected when the land development agreement is finalized or, if no land development agreement is required, before final permits are issued.

(c) Fee-in-lieu credit:

- [1] Each square foot of proposed impervious surface compensated by a fee-in-lieu payment shall be credited as the actual construction of this stormwater storage when sites are proposed for development in the future.

## **§206-25. Stormwater Management Site Plan Review**

- A. The Stormwater Management (SWM) Site Plan shall be reviewed by a Qualified Professional on behalf of the Township for consistency with the provisions of this Ordinance. After review, the Qualified Professional shall provide a written recommendation for the Township to approve or disapprove the SWM Site Plan. If it is recommended to disapprove the SWM Site Plan, the Qualified Professional shall state the reasons for the disapproval in writing. The Qualified Professional also may recommend approval of the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing. The SWM Site Plan review and recommendations shall be completed within the time allowed by the Municipalities Planning Code for reviewing subdivision plans.
- B. The Township will notify the applicant in writing within 45 days whether the SWM Site Plan is approved or disapproved. If the SWM Site Plan involves a Subdivision and Land Development Plan, the notification period is 90 days. If a longer notification period is provided by other statute, regulation, or ordinance, the applicant will be so notified by the Township. If the Township disapproves the SWM Site Plan, the Township shall cite the reasons for disapproval in writing.

## **§206-26. Modification of Plans**

A modification to a submitted SWM Site Plan that involves a change in SWM BMPs or techniques, or that involves the relocation or redesign of SWM BMPs, or that is necessary because soil or other conditions are not as stated on the SWM Site Plan as determined by the Township shall require a resubmission of the modified SWM Site Plan in accordance with this Article.

## **§206-27. Resubmission of Disapproved SWM Site Plans**

A disapproved SWM Site Plan may be resubmitted, with the revisions addressing the Township's concerns, to the Township in accordance with this Article. The applicable review fee must accompany a resubmission of a disapproved SWM Site Plan.

## **§206-28. Authorization to Construct and Term of Validity**

The Township's approval of an SWM Site Plan authorizes the regulated activities contained in the SWM Site Plan for a maximum term of validity of 5 years following the date of approval. The Township may specify a term of validity shorter than 5 years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the Township signs the approval for an SWM Site Plan. If an approved SWM Site Plan is not completed according to Section 206-29 within the term of validity, the Township may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Township shall be resubmitted in accordance with Section 206-27.

# **ARTICLE V INSPECTIONS**

## **§206-29. Inspections**

- A. The Township shall inspect all phases of the installation of the Best Management Practices (BMPs) and/or stormwater management (SWM) facilities as deemed appropriate by the Township.
- B. During any stage of the work, if the Township determines that the BMPs and/or stormwater management facilities are not being installed in accordance with the approved SWM Site Plan, the Township shall revoke any existing permits or other approvals and issue a cease and desist order until a revised SWM Site Plan is submitted and approved, as specified in this Ordinance and until the deficiencies are corrected.
- C. A final inspection of all BMPs and/or stormwater management facilities may be conducted by the Township to confirm compliance with the approved SWM Site Plan prior to the issuance of any Occupancy Permit.
- D. The applicant and/or developer shall be responsible for providing as-built plans of all SWM BMPs included in the approved SWM Site Plan. The as-built plans and an explanation of any discrepancies, which were reviewed and received approval by the Township, shall be submitted to the Township.

- E. The as-built submission shall include a certification of completion signed by a Qualified Professional verifying that all SWM BMPs have been constructed according to the approved plans and specifications. If any Qualified Professionals contributed to the construction plans, they must sign and seal the completion certificate.
- F. Final plans based upon the Record Drawings must be submitted to the Township for the project to be eligible for the issuance of a Certificate of Occupancy.

## **ARTICLE VI**

### **FEEES AND EXPENSES**

#### **§206-30. Stormwater Management Site Plan Review and Inspection Fee**

Fees shall be established by the Township to cover plan review and construction inspection costs incurred by the Township. All fees shall be paid by the Applicant at the time of SWM Site Plan submission. A review and inspection fee schedule shall be established by Township resolution. The Township shall periodically update the review and inspection fee schedule to ensure that review costs are adequately reimbursed.

#### **§206-31. Expenses Covered by Fees**

The fees required by this Ordinance (unless otherwise waived by the Township) shall, at a minimum, cover:

- A. Township Administrative costs.
- B. Township legal costs.
- C. Township engineering costs
- D. The review of the Stormwater (SWM) Site Plan by the Township.
- E. The review of As-built Drawings.
- F. The site inspections.
- G. The inspection of SWM facilities and drainage improvements during construction.
- H. The final inspection at the completion of the construction of the SWM facilities and drainage improvements presented in the SWM Site Plan.
- I. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

## **ARTICLE VII**

### **MAINTENANCE RESPONSIBILITIES**

#### **§206-32. Performance Guarantee**

- A. For subdivisions and land developments, the Applicant shall provide a financial guarantee to the Township for the timely installation and proper construction of all stormwater management (SWM) facilities as:

- (1) Required by the approved SWM Site Plan equal to or greater than the full construction cost of the required controls; or
  - (2) The amount and method of payment provided for in the subdivision and land development ordinance.
- B. For other regulated activities, the Township shall require a financial guarantee from the Applicant.

**§206-33. Responsibilities for Operations and Maintenance of Stormwater Facilities and BMPs**

- A. The owner of any land upon which stormwater facilities and BMPs will be placed, constructed, or implemented, as described in the stormwater facility and BMP Operations and Maintenance (O&M) plan, shall record the following documents in the Office of the Recorder of Deeds for Montgomery County, within ninety (90) days of approval of the stormwater facility and BMP O&M plan by the Township:

- (1) The O&M plan, or a summary thereof,
- (2) O&M agreements under Section 206-35, and
- (3) Easements under Section 206-36.

The developer or builder shall immediately notify the Township Secretary of the book and page wherein said documents are recorded and shall supply a copy of the recorded documents. If such information is not received within 100 days of the approval of the stormwater facility and BMP O&M plan by the Township, the stormwater facilities and BMP O&M plan shall not be considered an approved plan for the purpose of this article.

- B. The Township may suspend or revoke any approvals granted for the project site upon discovery of failure on the part of the owner to comply with this section.

- C. The following items shall be included in the Stormwater Facility and BMP O&M Plan:

- (1) Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Montgomery County, and shall be submitted on 24-inch x 36-inch sheets. The contents of the maps(s) shall include, but not be limited to:

- (a) Clear identification of the location and nature of stormwater facilities and BMPs.
- (b) The location of the project site relative to highways, Township boundaries or other identifiable landmarks.
- (c) Existing and final contours at intervals of two (2) feet, or others as appropriate.
- (d) Existing streams, lakes, ponds, or other bodies of water within the project site area.
- (e) Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved.

- (f) The locations of all existing and proposed utilities, sanitary sewers, and water lines on site and within 50 feet of property lines of the project site.
- (g) Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.
- (h) Proposed final structures, roads, paved areas, and buildings, and
- (i) A twenty (20)-foot-wide access easement around all stormwater facilities and BMPs that would provide ingress to and egress from a public right-of-way.
- (2) A description of how each stormwater facility and BMP will be operated and maintained, and the identity and contact information associated with the person(s) responsible for O&M.
- (3) The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan, and
- (4) A statement, signed by the facility owner, acknowledging that the stormwater facilities and BMPs are fixtures that can be altered or removed only after approval by the Township.
- D. The Stormwater Facility and BMP O&M Plan for the project site shall establish responsibilities for the continuing O&M of all stormwater facilities and BMPs, as follows:
  - (1) If a plan includes structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the Township, stormwater facilities and BMPs may also be offered for dedication to and maintained by the Township.
  - (2) If a plan includes O&M by single ownership, or if sewers and other public improvements are to be privately owned and maintained, the O&M of stormwater facilities and BMPs shall be the responsibility of the owner or private management entity.
- E. The Township shall make the final determination on the continuing O&M responsibilities. The Township reserves the right to accept or reject the O&M responsibility for any or all of the stormwater facilities and BMPs.
- F. Facilities, areas, or structures used as BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.
- G. The O&M Plan shall be recorded as a restrictive deed covenant that runs with the land.
- H. The Township may take enforcement actions against an owner for any failure to satisfy the provisions of this Article and this Ordinance.

#### **§206-34. Township Review of Stormwater Facilities and BMP Operations and Maintenance Plan**

- A. The Township shall review the Stormwater Facilities and BMP O&M Plan for consistency with the purposes and requirements of this ordinance, and any permits issued by PADEP.

- B. The Township shall notify the Applicant in writing whether the Stormwater Facility and BMP O&M Plan is approved.
- C. The Township shall require a "Record Drawing" of all stormwater facilities and BMPs.

#### **§206-35. Operations and Maintenance Agreement for Privately Owned Stormwater Facilities and BMPs**

- A. The owner shall sign an O&M agreement with the Township covering all stormwater facilities and BMPs that are to be privately owned. The O&M agreement shall be transferred with transfer of ownership. The agreement shall be subject to the review and approval of the Township.
- B. Other items may be included in the O&M agreement where determined necessary to guarantee the satisfactory O&M of all stormwater controls and BMPs. The O&M agreement shall be subject to the review and approval of the Township.
- C. The owner is responsible for the O&M of the SWM BMPs. If the owner fails to adhere to the O&M Agreement, the Township may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

#### **§206-36. Stormwater Management Easements**

- A. The owner must obtain all necessary real estate rights to install, operate, and maintain all stormwater facilities in the SWM Site Plan.
- B. The owner must provide the Township easements, or other appropriate real estate rights, to perform inspections and maintenance for the preservation of stormwater runoff conveyance, infiltration, and detention areas.

### **ARTICLE VIII PROHIBITIONS**

#### **§206-37. Prohibited Discharges**

- A. Any drain or conveyance, whether on the surface or subsurface, that allows any non-stormwater discharge, including sewage, process wastewater, and wash water to enter the waters of the Commonwealth is prohibited.
- B. No person shall allow, or cause to allow, discharges into surface waters of this Commonwealth which are not composed entirely of stormwater, except (1) as provided in Subsection C below, and (2) discharges allowed under a state or federal permit.
- C. The following discharges are authorized unless they are determined to be significant contributors to pollution to the waters of the Commonwealth:
  - (1) Discharges from firefighting activities,

- (2) Potable water sources including water line flushing,
  - (3) Irrigation drainage,
  - (4) Air conditioning condensate,
  - (5) Springs,
  - (6) Water from crawl space pumps,
  - (7) Flows from riparian habitats and wetlands,
  - (8) Uncontaminated water from foundations or from footing drains,
  - (9) Lawn watering,
  - (10) De-chlorinated swimming pool discharges (per Department of Environmental Protection (PADEP) requirements),
  - (11) Uncontaminated groundwater,
  - (12) Water from individual residential car washing, and/or
  - (13) Routine external building wash down (which does not use detergents or other compounds)
- D. In the event that the Township or PADEP determines that any of the discharges identified in Subsection C significantly contribute to pollution of the waters of this Commonwealth, the Township or PADEP will notify the responsible person(s) to cease the discharge.

#### **§206-38. Roof Drains**

- A. Roof Drains and sump pumps shall not be connected to sanitary sewers.
- B. Roof drains and sump pumps may be connected to streets, storm sewers or roadside ditches only when permitted by the Township.
- C. Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs to the maximum extent practicable.

#### **§206-39. Alteration of Stormwater Management BMPs**

- A. No person shall modify, remove, fill, landscape, or alter any Stormwater Management (SWM) Best Management Practices (BMPs), facilities, areas, or structures unless it is part of an approved maintenance program and written approval of the Township has been obtained.
- B. No person shall place any structure, fill, landscaping, or vegetation into a stormwater facility or BMP or within a drainage easement which would limit or alter the functioning of the stormwater facility or BMP without the written approval of the Township.

### **ARTICLE VIV**

#### **ENFORCEMENT AND PENALTIES**



#### **§206-40. Right-of-Entry**

- A. Upon presentation of proper credentials, duly authorized Township representatives may enter at reasonable times upon any property within the Township to inspect the implementation, condition, or operation and maintenance of the stormwater facilities or Best Management Practices (BMPs) in regard to any aspect governed by this Ordinance.
- B. Landowners with stormwater facilities and BMPs on their property shall allow persons working on behalf of the Township ready access to all parts of the premises for the purposes of determining compliance with this Ordinance.
- C. Persons working on behalf of the Township shall have the right to temporarily locate on any stormwater facility or BMP in the Township such devices as are necessary to conduct monitoring and/or sampling of the discharges from such stormwater facilities or BMP.

#### **§206-41. Inspection**

Stormwater Management (SWM) Best Management Practices (BMPs) should be inspected for proper operation by the landowner, or the owner's designee (including the Township for dedicated and owned facilities), according to the following list of minimum frequencies:

- 1. Annually for the first 5 years,
- 2. Once every 3 years thereafter,
- 3. During or immediately after the cessation of a 10-year or greater storm, and/or
- 4. As specified in the Operations and Maintenance (O&M) agreement.

#### **§206-42. Enforcement**

All inspections regarding compliance with the Stormwater Management (SWM) Site Plan and this Ordinance shall be the responsibility of the Township.

- A. Public nuisance.
  - (1) The violation of any provision of this section is hereby deemed a public nuisance.
  - (2) Each day that a violation continues shall constitute a separate violation.
- B. Whenever the Township finds that a person has violated a prohibition or failed to meet a requirement of this Ordinance, the Township may order compliance by written notice to the responsible person. Such notice may, without limitation, require the following remedies:
  - (1) Performance of monitoring, analyses, and reporting;
  - (2) Elimination of prohibited connections or discharges;
  - (3) Cessation of any violating discharges, practices, or operations;
  - (4) Abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
  - (5) Payment of a fine to cover administrative and remediation costs;

- (6) Implementation of stormwater facilities and Best Management Practices (BMPs); and
- (7) Operation and Maintenance (O&M) of stormwater facilities and BMPs.
- C. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violations(s). Said notice may further advise that, if applicable, should the violator fail to take the required action within the established deadline, the work will be done by the Township and the expense may be charged to the violator.
- D. Failure to comply within the time specified may subject a violator to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all other remedies available in law or equity.

#### **§206-43. Suspension and Revocation of Permits and Approvals**

- A. Any building, land development, or other permit or approval issued by the Township may be suspended or revoked, in whole or in part, by the Township for:
  - (1) Noncompliance with or failure to implement any provision of the permit;
  - (2) A violation of any provision of this ordinance; or
  - (3) The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, pollution or which endangers the life, health, or property of others.
- B. Any permit or authorization issued or approved based on false, misleading, or erroneous information provided by an applicant is void without the necessity of any proceedings for revocation. Any work undertaken or use established pursuant to such permit or other authorization is unlawful. No action may be taken by a board, agency, or employee of the Township purporting to validate such a violation.
- C. A suspended permit may be reinstated by the Township when:
  - (1) The Township has inspected and approved the corrections to the stormwater facilities and BMPs or the elimination of the hazard or nuisance, and;
  - (2) The Township is satisfied that all applicable violations in this Ordinance have been corrected.
- D. Any permit or approval that has been revoked by the Township cannot be reinstated. The Applicant may apply for a new permit under the procedures outlined of this Ordinance.

#### **§206-44. Penalties**

- A. Any person violating the provisions of this Ordinance shall be subject to penalties that may range from liens against the property to fines for each violation, recoverable with costs. Each day that the violation continues shall constitute a separate offense and the applicable fines are cumulative.
- B. In addition, the Township may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this ordinance. Any court of competent jurisdiction shall have the right to issue

restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

### **§206-45. Appeals**

- A. Any person aggrieved by any action of the Township or its designee, under this Ordinance, may appeal to the appropriate judicial or administrative body accordingly to applicable Pennsylvania law.

[APPENDICIES ATTACHED]

### **SECTION 2. Repeal and Ratification.**

All ordinances or parts of ordinances inconsistent herewith or in conflict with any of the specific terms enacted hereby, to the extent of said inconsistencies or conflicts, are hereby specifically repealed. Any other terms and provisions of the ordinances of the Township that are unaffected by this Ordinance are hereby reaffirmed and ratified.

### **SECTION 3. Severability.**


Should any section, paragraph, sentence, clause, or phrase in this Ordinance be declared unconstitutional or invalid for any reason, the remainder of the Ordinance shall not be affected thereby and shall remain in full force and effect, and for this reason the provisions of this Ordinance shall be severable.

### **SECTION 4. Effective Date.**

This Ordinance shall become effective five (5) days after enactment.

ORDAINED AND ENACTED this 4<sup>th</sup> day of January 2016, by the Montgomery Township Board of Supervisors.

**MONTGOMERY TOWNSHIP  
BOARD OF SUPERVISORS**

  
JOSEPH P. WALSH, Chairperson

[Seal]

Attested by:

  
LAWRENCE J. GROGAN  
Township Manager/Secretary

## **APPENDICES**

## **APPENDIX A:     STORMWATER MANAGEMENT DESIGN CRITERIA**

### **TABLE A-1**

#### **DESIGN STORM RAINFALL AMOUNT**

Source: NOAA Atlas 14 website, Doylestown Gage (36-2221)  
[http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html).

### **TABLE A-2**

#### **NATURAL RESOURCE PROTECTION STORMWATER MANAGEMENT CONTROLS**

Source: PA BMP Manual Chapter 8, pg 33

### **TABLE A-3**

#### **GUIDANCE TO CALCULATE THE 2-YEAR, 24-HOUR VOLUME INCREASE FROM PRE-DEVELOPMENT TO POST-DEVELOPMENT CONDITIONS**

Source: PA BMP Manual Chapter 8, pg 37

### **TABLE A-4**

#### **RUNOFF CURVE NUMBERS**

Source: NRCS (SCS) TR-55

### **TABLE A-5**

#### **VOLUME CONTROL CALCULATION GUIDANCE FOR NONSTRUCTURAL BMPS**

Source: PA BMP Manual Chapter 8, pg 34

### **TABLE A-6**

#### **VOLUME CONTROL CALCULATION GUIDANCE FOR STRUCTURAL BMPS**

Source: PA BMP Manual Chapter 8, pg 38

### **TABLE A-7**

#### **RATIONAL RUNOFF COEFFICIENTS**

Source: New Jersey Department of Transportation, Technical Manual for Stream Encroachment, August, 1984

### **TABLE A-8**

#### **MANNING ROUGHNESS COEFFICIENTS**

**TABLE A-1**

**DESIGN STORM RAINFALL**

**DEPTH (INCHES)**

Frequency		Rainfall Depth (P) (inch)
Return Period	Annual Exceedence Probability	
1	1.0	2.71
2	0.5	3.26
5	0.2	4.11
10	0.1	4.8
25	0.04	5.82
50	0.02	6.68
100	0.01	7.61

Reference: 90% Confidence Interval Precipitation Frequency Estimates – Partial Duration (inches), NOAA National Weather Service Hydrometeorological Design Studies Center Atlas 14 Precipitation Frequency Data Server ([http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html)) for Doylestown Guage (36-2221), PA latitude 40°17'60"N longitude 75°7'59.88"W (40.3000, -75.1333). Last Revised April 9, 2014.

**INTENSITY (IN/HR)**

Duration	Average Recurrence Interval (years)						
	1	2	5	10	25	50	100
5-min	4.06	4.82	5.69	6.30	7.04	7.56	8.06
10-min	3.24	3.86	4.55	5.04	5.62	6.02	6.41
15-min	2.70	3.23	3.84	4.25	4.74	5.08	5.40
30-min	1.85	2.23	2.73	3.08	3.51	3.83	4.14
60-min	1.15	1.4	1.75	2.00	2.34	2.59	2.85
2-hr	0.69	0.84	1.05	1.21	1.43	1.60	1.78
3-hr	0.50	0.61	0.76	0.89	1.05	1.18	1.31
6-hr	0.31	0.38	0.48	0.55	0.66	0.75	0.85
12-hr	0.19	0.23	0.29	0.34	0.41	0.48	0.54
24-hr	0.11	0.14	0.17	0.20	0.24	0.28	0.32

Reference: 90% Confidence Interval Precipitation Frequency Estimates – Partial Duration (inches/hour), NOAA National Weather Service Hydrometeorological Design Studies Center Atlas 14 Precipitation Frequency Data Server ([http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html)) for Doylestown Guage (36-2221), PA latitude 40°17'60"N longitude 75°7'59.88"W (40.3000, -75.1333). Last Revised April 9, 2014.

**TABLE A-2: NATURAL RESOURCE PROTECTION  
STORMWATER MANAGEMENT CONTROLS**

<b>Existing Natural Sensitive Resource</b>	<b>Mapped in the ERSAM? Yes/No/n/a</b>	<b>Total Area (Ac.)</b>	<b>Area to be Protected (Ac.)</b>
Waterbodies			
Floodplains			
Riparian Areas / Buffers			
Wetlands			
Vernal Pools			
Woodlands			
Natural Drainage Ways			
Steep Slopes, 15%-25%			
Steep Slopes, over 25%			
Other:			
Other:			
<b>Total Existing:</b>			

**TABLE A-3: GUIDANCE TO CALCULATE THE 2-YEAR, 24-HOUR VOLUME INCREASE FROM PRE-DEVELOPMENT TO POST-DEVELOPMENT CONDITIONS**

Existing Conditions: Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft3)
Woodland								
Meadow								
Impervious								
Total:								

Developed Conditions: Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft3)
Total:								

2-year Volume Increase (ft3):



**TABLE A-4. Runoff Curve Numbers (from NRCS (SCS) TR-55)**

LAND USE DESCRIPTION	Hydrologic Condition	HYDROLOGIC SOIL GROUP			
		A	B	C	D
Open Space		68	79	86	89
Grass cover < 50%	Poor	49	69	79	84
Grass cover 50% to 75%	Fair	39	61	74	80
Grass cover > 75%	Good	30	58	71	78
Meadow					
Agricultural					
Pasture, grassland, or range – Continuous forage for grazing	Poor	68	79	86	89
Pasture, grassland, or range – Continuous forage for grazing.	Fair	49	69	79	84
Pasture, grassland, or range – Continuous forage for grazing	Good	39	61	74	80
Brush-weed-grass mixture with brush the major element.	Poor	48	67	77	83
Brush-weed-grass mixture with brush the major element.	Fair	35	56	70	77
Brush-weed-grass mixture with brush the major element.	Good	30	48	65	73
		77	86	91	94
Fallow Bare soil	-----	76	85	90	93
Crop residue cover (CR)	Poor	74	83	88	90
	Good				
Woods – grass combination (orchard or tree farm)		57	73	82	86
	Poor	43	65	76	82
	Fair	32	58	72	79
	Good				
Woods		45	66	77	83
	Poor	36	60	73	79
	Fair	30	55	70	77
	Good				
Commercial (85% Impervious)		92	94	95	
Industrial (72% Impervious)		88	91	93	
Institutional (50% Impervious)		82	88	90	
Residential districts by average lot size:					
	% Impervious				
1/8 acre or less *	65	77	85	90	92
(town houses)					
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Farmstead		59	74	82	86
Smooth Surfaces (Concrete, Asphalt, Gravel or Bare Compacted Soil)	98	98	98	98	
Water	98	98	98	98	
Mining/Newly Graded Areas (Pervious Areas Only)	77	86	91	94	

\* Includes Multi-Family Housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

**TABLE A-5: VOLUME CONTROL CALCULATION GUIDANCE FOR NONSTRUCTURAL BMPs**

**Type of Nonstructural BMP**

$$\text{AREA (sq ft)} * \text{Runoff Volume (in)} * 1/12 = \text{Volume Reduction (ft}^3\text{)}$$

**Use of Natural Drainage Feature**

*Utilize natural flow pathways* \_\_\_\_\_ sq ft \* 1/4" \* 1/12 = \_\_\_\_\_ cu ft

**Minimum Soil Compaction**

*Lawn* \_\_\_\_\_ sq ft \* 1/3" \* 1/12 = \_\_\_\_\_ cu ft  
*Meadow* \_\_\_\_\_ sq ft \* 1/3" \* 1/12 = \_\_\_\_\_ cu ft

**Protecting existing trees (not located in protected area)**

For trees within 20 feet of impervious cover:

*Tree Canopy* \_\_\_\_\_ sq ft \* 1" \* 1/12 = \_\_\_\_\_ cu ft

For trees within 20-100 feet of impervious cover:

*Tree Canopy* \_\_\_\_\_ sq ft \* 1/2" \* 1/12 = \_\_\_\_\_ cu ft

**Rooftop Disconnection**

For runoff directed to pervious and/or vegetative areas where infiltration occurs

*Roof Area* \_\_\_\_\_ sq ft \* 1/4" \* 1/12 = \_\_\_\_\_ cu ft

**Impervious Disconnection**

For runoff from impervious surfaces such as streets and concrete directed to pervious and/or vegetative areas where infiltration occurs

*Impervious Area* \_\_\_\_\_ sq ft \* 1/4" \* 1/12 = \_\_\_\_\_ cu ft

**Total Volume Reduction**

\_\_\_\_\_ cu ft

\* represents multiply

**TABLE A-6: VOLUME CONTROL CALCULATION GUIDANCE FOR STRUCTURAL BMPs**

$$\text{Required Volume Control (ft}^3\text{)} - \text{Nonstructural Volume Control (ft}^3\text{)} = \text{Structural Volume Requirement (ft}^3\text{)}$$

Table A-3
Table A-5

Type	Proposed Structural BMP	Section in BMP Manual	Area (sq ft)	Storage Volume (cu ft)
Infiltration and / or Evapotranspiration	Porous Pavement	6.4.1		
	Infiltration Basin	6.4.2		
	Infiltration Bed	6.4.3		
	Infiltration Trench	6.4.4		
	Rain Garden/Bioretention	6.4.5		
	Dry Well/Seepage Pit	6.4.6		
	Constructed Filter	6.4.7		
	Vegetative Swale	6.4.8		
	Vegetative Filter Strip	6.4.9		
	Infiltration Berm	6.4.10		
Evaporation and / or Reuse	Vegetative Roof	6.5.1		
	Capture and Re-use	6.5.2		
Runoff Quality	Constructed Wetlands	6.6.1		
	Wet Pond / Retention Basin	6.6.2		
	Dry Extended Detention Basin	6.6.3		
	Water Quality Filters	6.6.4		
Restoration	Riparian Buffer Restoration	6.7.1		
	Landscape Restoration / Reforestation	6.7.2		
	Soil Amendment	6.7.3		
Other	Level Spreader	6.8.1		
	Special Storage Areas	6.8.2		
	other			

**Total Volume Control from Structural BMPs:**

\_\_\_\_\_

**TABLE A-7: RATIONAL RUNOFF COEFFICIENTS**  
By Hydrologic Soil Group and Overland Slope

Storms less than 25-year												
Land Use	HSG A			HSG B			HSG C			HSG D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Residential												
1/8 acre lots	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
1/4 acre lots	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
1/3 acre lots	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
1/2 acre lots	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
1 acre lots	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Streets	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
Cultivated Land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
Open space, lawns	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
Parking, impervious	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87

Storms 25-year & over												
Land Use	HSG A			HSG B			HSG C			HSG D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Residential												
1/8 acre lots	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
1/4 acre lots	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
1/3 acre lots	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
1/2 acre lots	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.40
1 acre lots	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97
Cultivated Land	0.14	0.18	0.22	0.16	0.21	0.28	0.2	0.25	0.34	0.24	0.29	0.41
Pasture	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Open space, lawns	0.11	0.18	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking, impervious	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

Runoff Coefficients for general cover conditions (Residential, Industrial and Commercial) are applicable to drainage areas under 1 acre. For drainage areas 1 acre or more, a composite runoff coefficient shall be calculated.

Reference: Rauls, W.J., S.L. Wong and R.H., McCuen, 1981, "Comparison of Urban Flood Frequency Procedures," Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Beltsville, MD

**TABLE A-8. MANNING'S ROUGHNESS COEFFICIENTS**

DESCRIPTION	Manning's n-value
Smooth-wall Plastic Pipe	0.011
Concrete Pipe	0.012
Smooth-lined Corrugated Metal Pipe	0.012
Corrugated Plastic Pipe	0.024
Annular Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	0.024
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	0.027
75 mm × 25 mm (3 in × 1 in) Corrugations	0.025
125 mm × 25 mm (5 in × 1 in) Corrugations	0.033
150 mm × 50 mm (6 in × 2 in) Corrugations	
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	0.024
75 mm × 25 mm (3 in × 1 in), 125 mm × 25 mm (5 in × 1 in), or 150 mm × 50 mm (6 in × 2 in) Corrugations	
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	
a. Lower Coefficients*	0.014
450 mm (18 in) Diameter	0.016
600 mm (24 in) Diameter	0.019
900 mm (36 in) Diameter	0.020
1200 mm (48 in) Diameter	0.021
1500 mm (60 in) Diameter or larger	0.024
b. Higher Coefficients**	
Annular or Helically Corrugated Steel or Aluminum Alloy Pipe Arches or Other Non-Circular Metal Conduit (Plain or Polymer coated)	0.024
Vitrified Clay Pipe	0.012
Ductile Iron Pipe	0.013
Asphalt Pavement	0.015
Concrete Pavement	0.014
Grass Medians	0.050
Grass – Residential	0.30
Earth	0.020
Gravel	0.030
Rock	0.035
Cultivated Areas	0.030 - 0.050
Dense Brush	0.070 - 0.140
Heavy Timber (Little undergrowth)	0.100 - 0.150
Heavy Timber (w/underbrush)	0.40
Streams:	
a. Some Grass And Weeds (Little or no brush)	0.030 - 0.035
b. Dense Growth of Weeds	0.035 - 0.050
c. Some Weeds (Heavy brush on banks)	0.050 - 0.070

**Notes:**

\* Use the lower coefficient if any one of the following conditions apply:

- A storm pipe longer than 20 diameters, which directly or indirectly connects to an inlet or manhole, located in swales adjacent to shoulders in cut areas or depressed medians.
- A storm pipe which is specially designed to perform under pressure.

\*\*Use the higher coefficient if any one of the following conditions apply:

- A storm pipe which directly or indirectly connects to an inlet or manhole located in highway pavement sections or adjacent to curb or concrete median barrier.
- A storm pipe which is shorter than 20 diameters long.
- A storm pipe which is partly lined helically corrugated metal pipe.

## APPENDIX B: LOW IMPACT DEVELOPMENT (LID) PRACTICES

### ALTERNATIVE APPROACH FOR MANAGING STORMWATER RUNOFF

Natural hydrologic conditions can be altered radically by poorly planned development practices, such as introducing unnecessary impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize post-development runoff rates and volumes and will minimize needs for artificial conveyance and storage facilities. To simulate predevelopment hydrologic conditions, infiltration is often necessary to offset the loss of infiltration by the creation of impervious surfaces. Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all those features.

Sometimes regulations create obstacles for an applicant interested in implementing low impact development techniques on their site. A municipality should consider examining their ordinances and amending the sections which limit LID techniques. For example, a municipality could remove parking space minimums and establish parking space maximums to reduce the area of impervious surface required. Other allowable regulations to promote LID includes permitting curb cuts or wheel stops instead of requiring curbs and allowing sumped landscaping where the runoff can drain instead of requiring raised beds. These small changes to ordinances can remove the barriers which prevent applicants from pursuing LID practices.

The following describes various LID techniques:

1. **Protect Sensitive and Special Value Resources:** See Section 5.4 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.
  - a. **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern—streets and adjacent storm sewers are typically located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimizes the amount of grading on site.
  - b. **Protecting Natural Depression Storage Areas.** Depressional storage areas either have no surface outlet or drain very slowly following a storm event. They can be commonly seen as

ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.

2. **Reduce Impervious Coverage:** See Section 5.7 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.
  - a. **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways, and other features producing impervious surfaces should be evaluated to minimize impacts of runoff.
  - b. **Disconnecting Impervious Surfaces (DIA's):** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development. (See Appendix D for additional description)
  - c. **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets which ultimately could lower maintenance.
  - d. **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
  - e. **Reducing Building Setbacks.** Reducing building setbacks reduces impervious cover associated with driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.
1. **Disconnect/Distribute/Decentralize:** See Section 5.8 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.
  - a. **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.
  - b. **Reducing the Use of Storm Sewers.** By reducing use of storm sewers for draining streets, parking lots, and back yards, the potential for accelerating runoff from the development can be

greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a "reasonable" time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.

2. **Cluster and Concentrate:** See Section 5.5 of the *Pennsylvania Stormwater Best Management Practices Manual*, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006). Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings occurs with street length, which also will reduce costs of the development. Cluster development "clusters" the construction activity onto less sensitive areas without substantially affecting the gross density of development.

In summary, a careful consideration of the existing topography and implementation of a combination of the above mentioned techniques may avoid construction of costly stormwater control measures. Benefits include reduced potential of downstream flooding, water quality improvement of receiving streams/water bodies and enhancement of aesthetics and reduction of development costs. Other benefits include more stable baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.



## APPENDIX C: DISCONNECTED IMPERVIOUS AREA (DIA)

### ROOFTOP DISCONNECTION

When rooftop downspouts are directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the rooftop may qualify as completely or partially DIA and a portion of the impervious rooftop area may be excluded from the calculation of total impervious area.

A rooftop is considered to be completely or partially disconnected if it meets the requirements listed below:

- The contributing area of a rooftop to each disconnected discharge is 500 square feet or less, and
- The soil, in proximity of the roof water discharge area, is not designated as hydrologic soil group "D" or equivalent, and
- The overland flow path from roof water discharge area has a positive slope of 5% or less.

For designs that meet these requirements, the portion of the roof that may be considered disconnected depends on the length of the overland path as designated in Table C.1.

**Table C.1: Partial Rooftop Disconnection**

Length of Pervious Flow Path *	Roof Area Treated as Disconnected
(ft)	(% of contributing area)
0 – 14	0
15 – 29	20
30 – 44	40
45 – 59	60
60 – 74	80
75 or more	100

\* Flow path cannot include impervious surfaces and must be at least 15 feet from any impervious surfaces.

If the discharge is concentrated at one or more discrete points, no more than 1,000 square feet may discharge to any one point. In addition, a gravel strip or other spreading device is required for concentrated discharges. For non-concentrated discharges along the edge of the pavement, this requirement is waived; however, there must be a provision for the establishment of vegetation along the pavement edge and temporary stabilization of the area until vegetation becomes stabilized.

### REFERENCE

Philadelphia Water Department. 2006. *Stormwater Management Guidance Manual*. Section 4.2.2: Integrated Site Design. Philadelphia, PA.

## APPENDIX D: HOT SPOTS

Hot spots are sites where the land use or activity produces a higher concentration of trace metals, hydrocarbons, or priority pollutants than normally found in urban runoff.

### 1. EXAMPLES OF STORMWATER HOT SPOTS

- vehicle salvage yards and recycling facilities
- vehicle fueling stations
- vehicle service and maintenance facilities
- vehicle and equipment cleaning facilities
- fleet storage areas (bus, truck, etc.)
- industrial sites (based on Standard Industrial Codes defined by the U.S. Department of Labor)
- marinas (service and maintenance)
- outdoor liquid container storage
- outdoor loading/unloading facilities
- public works storage areas
- facilities that generate or store hazardous materials
- commercial container nursery
- other land uses and activities as designated by an appropriate review authority

### 2. LAND USE AND ACTIVITIES NOT NORMALLY CONSIDERED HOT SPOTS

- residential streets and rural highways
- residential development
- institutional development
- office developments
- nonindustrial rooftops
- pervious areas, except golf courses and nurseries (which may need an Integrated Pest Management (IPM) Plan).

3. **LIST OF ACCEPTABLE BMPs for Hot Spot Treatment:** The following BMP's listed under the Best Management Practice column are BMPs appropriate for application on hot spot sites. BMPs which facilitate infiltration are prohibited by this ordinance. In many design manuals the BMPs with a \* designation are designed with infiltration, however it is possible to design these without infiltration.

The numbers listed under the Design Reference Number column correlate with the Reference Table which lists materials that can be used for design guidance.

Best Management Practice	Design Reference Number
Bioretention*	4, 5, 11, 16
Capture/Reuse	4, 14
Constructed Wetlands	4, 5, 8, 10, 16
Dry Extended Detention Ponds	4, 5, 8, 12, 18
Minimum Disturbance/ Minimum Maintenance Practices	1, 9

Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters* (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Buffers/Filter Strips	2, 3, 5, 11, 16, 17
Vegetated Roofs	4, 13
Vegetated Swales*	2, 3, 5, 11, 16, 17
Water Quality Inlets (Oil/Water Separators, Sediment Traps/Catch Basin Sumps, and Trash/Debris Collectors in Catch Basins)	4, 7, 15, 16, 19
Wet Detention Ponds	4, 5, 6, 8

**Reference Table**

Number	Design Reference Title
1	"Conservation Design For Stormwater Management – A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use", Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997
2	"A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone", Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	"Design of Roadside Channels with Flexible Linings", Federal Highway Administration, Chen, Y. H. and Cotton, G. K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean, Virginia, 1988.
4	"Draft Stormwater Best Management Practices Manual", Pennsylvania Department of Environmental Protection, January 2005.
5	"Evaluation and Management of Highway Runoff Water Quality", Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	"Evaporation Maps of the United States", U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	"Georgia Stormwater Manual", AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	"Hydraulic Design of Highway Culverts", Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	"Low Impact Development Design Strategies <i>An Integrated Design Approach</i> ", Prince Georges County, Maryland Department of Environmental Resources, June 1999.
10	"Maryland Stormwater Design Manual", Maryland Department of the Environment, Baltimore, Maryland, 2000.
11	"Pennsylvania Handbook of Best Management Practices for Developing Areas", Pennsylvania Department of Environmental Protection, 1998.
12	"Recommended Procedures for Act 167 Drainage Plan Design", LVPC, Revised 1997.
13	"Roof Gardens History, Design, and Construction", Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	"The Texas Manual on Rainwater Harvesting", Texas Water Development Board, Austin, Texas, Third Edition, 2005.
15	"VDOT Manual of Practice for Stormwater Management", Virginia

	Transportation Research Council, Charlottesville, Virginia, 2004.
16	"Virginia Stormwater Management Handbook", Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	"Water Resources Engineering", Mays, L. W., John Wiley & Sons, Inc., 2005.
18	"Urban Hydrology for Small Watersheds", Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	US EPA, Region 1 New England web site (as of August 2005) <a href="http://www.epa.gov/NE/assistance/ccitts/stormwater/techs/html">http://www.epa.gov/NE/assistance/ccitts/stormwater/techs/html</a> .

4. **RECOMMENDED PRE-TREATMENT METHODS FOR "HOT SPOT" LAND USES:** The following table recommends what is considered the best pre-treatment option for the listed land use. These methods are either a BMP or can be applied in conjunction with BMPs.

Hot Spot Land Use	Pre-treatment Method(s)
Vehicle Maintenance and Repair Facilities including Auto Parts Stores	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program
Vehicle Fueling Stations	-Water Quality Inlets -Spill Prevention and Response Program
Storage Areas for Public Works	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program -Diversion of Stormwater away from Potential Contamination Areas
Outdoor Storage of Liquids	-Spill Prevention and Response Program
Commercial Nursery Operations	-Vegetated Swales/Filter Strips -Constructed Wetlands -Stormwater Collection and Reuse
Salvage Yards and Recycling Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Fleet Storage Yards and Vehicle Cleaning Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Facilities that Store or Generate Regulated Substances*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Marinas*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Certain Industrial Uses (listed under NPDES)*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

\*Regulated under the NPDES Stormwater Program

## APPENDIX E: WEST NILE VIRUS GUIDANCE

(This source is from the Monroe County, PA Conservation District, who researched the potential of West Nile Virus problems from BMPs due to a number of calls they were receiving.)

### Monroe County Conservation District Guidance: Stormwater Management and West Nile Virus

**Source: Brodhead McMichaels Creeks Watershed Act 167 Stormwater Management Ordinance Final Draft  
2/23/04**

The Monroe County Conservation District recognizes the need to address the problem of nonpoint source pollution impacts caused by runoff from impervious surfaces. The new stormwater policy being integrated into Act 167 Stormwater Management regulations by the PA Department of Environmental Protection (PADEP) will make nonpoint pollution controls an important component of all future plans and updates to existing plans. In addition, to meet post-construction anti-degradation standards under the state National Pollution Discharge Elimination System (NPDES) permitting program, applicants will be required to employ Best Management Practices (BMPs) to address non-point pollution concerns.

Studies conducted throughout the United States have shown that wet basins and in particular constructed wetlands are effective in traditional stormwater management areas such as channel stability and flood control, and are one of the most effective ways to remove stormwater pollutants (United States Environmental Protection Agency 1991, Center for Watershed Protection 2000). From Maryland to Oregon, studies have shown that as urbanization and impervious surface increase in a watershed, the streams in those watersheds become degraded (CWP 2000). Although there is debate over the threshold of impervious cover when degradation becomes apparent (some studies show as little as 6% while others show closer to 20%), there is agreement that impervious surfaces cause non-point pollution in urban and urbanizing watersheds, and that degradation is ensured if stormwater BMPs are not implemented.

Although constructed wetlands and ponds are desirable from a water quality perspective there may be concerns about the possibility of these stormwater management structures becoming breeding grounds for mosquitoes. The Conservation District feels that although it may be a valid concern, **municipalities should not adopt ordinance provisions prohibiting wet basins for stormwater management.**

### Mosquitoes

The questions surrounding mosquito production in wetlands and ponds have intensified in recent years by the outbreak of the mosquito-borne West Nile Virus. As is the case with all vector-borne maladies, the life cycle of West Nile Virus is complicated, traveling from mosquito to bird, back to mosquito and then to other animals including humans. *Culex pipiens* was identified as the vector species in the first documented cases from New York in 1999. This species is still considered the primary transmitter of the disease across its range. Today there are some 60 species of mosquitoes that inhabit Pennsylvania. Along with *C. pipiens*, three other species have been identified as vectors of West Nile Virus while four more have been identified as potential vectors.

The four known vectors in NE Pennsylvania are *Culex pipiens*, *C. restuans*, *C. salinarius* and *Ochlerotatus japonicus*. All four of these species prefer, and almost exclusively use, artificial containers (old tires, rain gutters, birdbaths, etc.) as larval habitats. In the case of *C. pipiens*, the most notorious of the vector mosquitoes, the dirtier the water the better they like it. The important factor is that these species do not thrive in functioning wetlands where competition for resources and predation by larger aquatic and terrestrial organisms is high.

The remaining four species, *Aedes vexans*, *Ochlerotatus Canadensis*, *O. triseriatus* and *O. trivittatus* are currently considered potential vectors due to laboratory tests (except the *O. trivittatus*, which did have one confirmed vector pool for West Nile Virus in PA during 2002). All four of these species prefer vernal habitats and ponded woodland areas following heavy summer rains. These species may be the greatest threat of disease transmission around

stormwater basins that pond water for more than four days. This can be mitigated however by establishing ecologically functioning wetlands.

### **Stormwater Facilities**

If a stormwater wetland or pond is constructed properly and a diverse ecological community develops, mosquitoes should not become a problem. Wet basins and wetlands constructed as stormwater management facilities, should be designed to attract a diverse wildlife community. If a wetland is planned, proper hydrologic soil conditions and the establishment of hydrophytic vegetation will promote the population of the wetland by amphibians and other mosquito predators. In natural wetlands, predatory insects and amphibians are effective at keeping mosquito populations in check during the larval stage of development while birds and bats prey on adult mosquitoes.

The design of a stormwater wetland must include the selection of hydrophytic plant species for their pollutant uptake capabilities and for not contributing to the potential for vector mosquito breeding. In particular, species of emergent vegetation with little submerged growth are preferable. By limiting the vegetation growing below the water surface, larvae lose protective cover and there is less chance of anaerobic conditions occurring in the water.

Stormwater ponds can be designed for multiple purposes. When incorporated into an open space design a pond can serve as a stormwater management facility and a community amenity. Aeration fountains and stocked fish should be added to keep larval mosquito populations in check.

Publications from the PA Department of Health and the Penn State Cooperative Extension concerning West Nile Virus identify aggressive public education about the risks posed by standing water in artificial containers (tires, trash cans, rain gutters, bird baths) as the most effective method to control vector mosquitoes.

### **Conclusion**

The Conservation District understands the pressure faced by municipalities when dealing with multifaceted issues such as stormwater management and encourages the incorporation of water quality management techniques into stormwater designs. As Bucks and Montgomery Counties continue to grow, conservation design, groundwater recharge and constructed wetlands and ponds should be among the preferred design options to reduce the impacts of increases in impervious surfaces. When designed and constructed appropriately, the runoff mitigation benefits to the community from these design options will far out-weigh their potential to become breeding grounds for mosquitoes.

## APPENDIX F: SMALL PROJECT STORMWATER MANAGEMENT SITE PLAN

This small project stormwater site plan has been developed to assist those proposing residential projects to meet the requirements of the Stormwater Management Ordinance without having to hire professional services to draft a formal stormwater management plan. This small project site plan is only permitted for residential projects proposing less than or equal to 5,000 square feet of impervious surface and less than 1 acre of earth disturbance.

### A. What is an applicant required to submit?

A brief description of the proposed stormwater facilities, including types of materials to be used, total square footage of proposed impervious areas, volume calculations, and a simple sketch plan showing the following information:

- Location of proposed structures, driveways, or other paved areas with approximate surface area in square feet.
- Location of any existing or proposed onsite septic system and/or potable water wells showing proximity to infiltration facilities.
- Bucks or Montgomery County Conservation District erosion and sediment control "Adequacy" letter as required by Township, County or State regulations.

### B. Determination of Required Volume Control and Sizing Stormwater Facilities

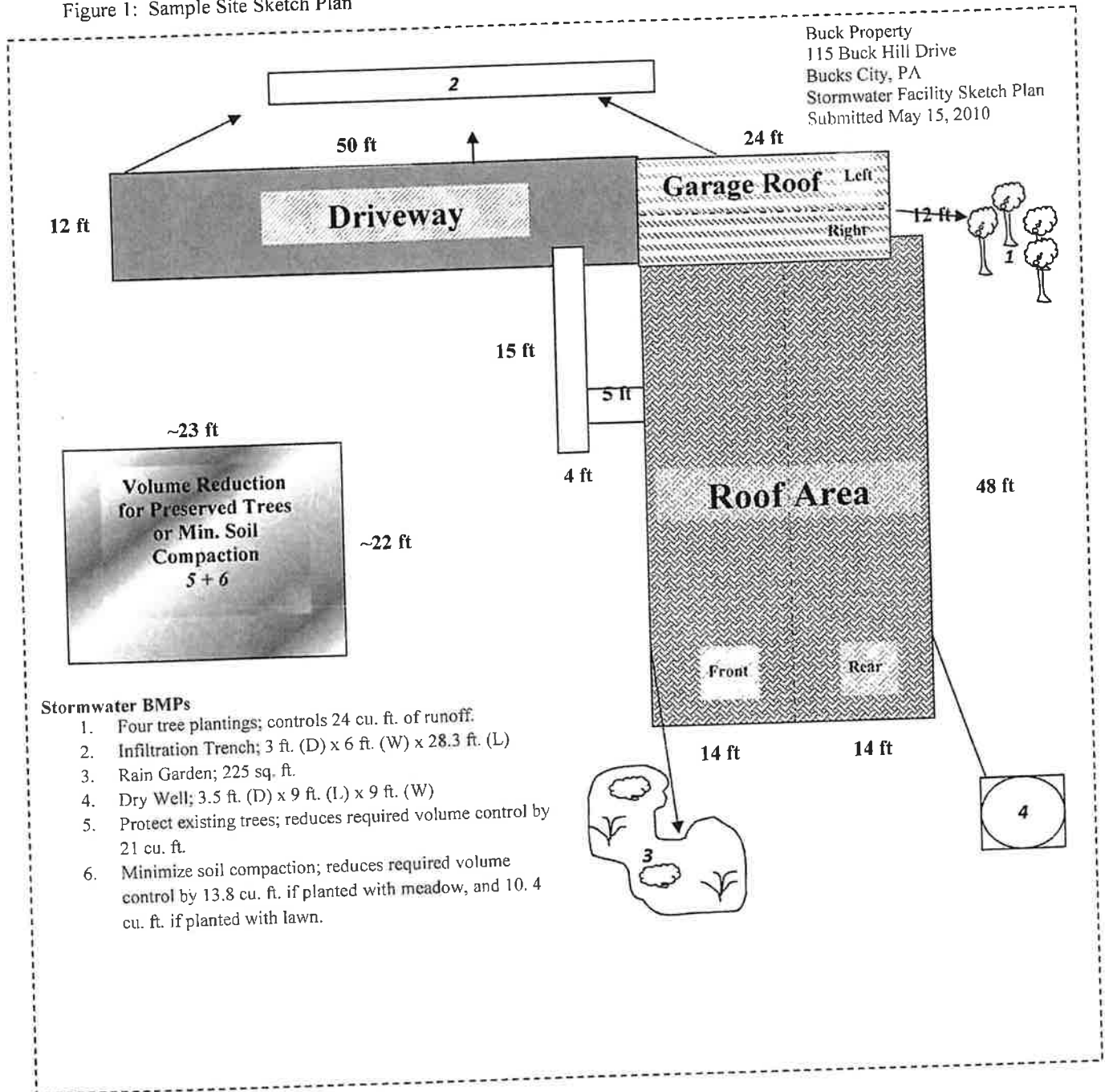
By following the simple steps outlined below in the provided example, an applicant can determine the runoff volume that is required to be controlled and how to choose the appropriate stormwater facility to permanently remove the runoff volume from the site. Impervious area calculations must include all areas on the lot proposed to be covered by roof area or pavement which would prevent rain from naturally percolating into the ground, including, but not limited to, impervious surfaces such as sidewalks, driveways, parking areas or patios or swimming pools. Sidewalks, driveways or patios that are designed and constructed to allow for infiltration are not included in this calculation.

#### Site Plan Example: Controlling runoff volume from a proposed home site

##### Step 1: Determine Total Impervious Surfaces

Impervious Surface			Area (sq. ft.)
House Roof (Front)	14 ft. x 48 ft.	=	672 sq. ft.
House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
Garage Roof (Left)	6 ft. x 24 ft.	=	144 sq. ft.
Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq. ft.
Driveway	12 ft. x 50 ft.	=	1000 sq. ft.
Walkway	4 ft. x 20 ft.	=	80 sq. ft.
			-----
	Total Impervious		3000 sq ft

Figure 1: Sample Site Sketch Plan





**Step 2: Determine Required Volume Control (cubic feet) using the following equation:**

Volume (cu. ft.) = (Total impervious area in square feet x 2 inches of runoff) / 12 inches

(3,000 sq. ft. x 2 inches of runoff) / 12 inches = 500 cu. ft.

**Step 3: Sizing the Selected Volume Control BMP**

Several Best Management Practices (BMPs), as described below, are suitable for small stormwater management projects. However, their application depends on the volume required to be controlled, how much land is available, and the site constraints. Proposed residential development activities can apply both non-structural and structural BMPs to control the volume of runoff from the site. A number of different volume control BMPs are described below. Note that Figure 1 is an example of how these BMPs can be utilized in conjunction to control the total required volume on one site.

**Structural BMPs**

**1. Infiltration Trench**

An Infiltration Trench is a linear stormwater BMP consisting of a continuously perforated pipe at a minimum slope in a stone-filled trench. During small storm events, infiltration trenches can significantly reduce volume and serve in the removal of fine sediments and pollutants. Runoff is stored between the stones and infiltrates through the bottom of the facility and into the soil matrix. Runoff should be pretreated using vegetative buffer strips or swales to limit the amount of coarse sediment entering the trench which can clog and render the trench ineffective. In all cases, an infiltration trench should be designed with a positive overflow.

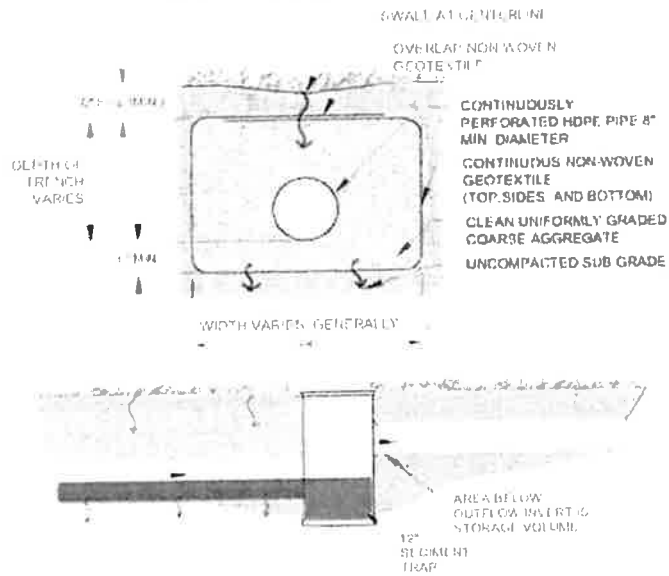
**Design Considerations:**

- Although the width and depth can vary, it is recommended that Infiltration Trenches be limited in depth to not more than six (6) feet of stone.
- Trench is wrapped in nonwoven geotextile (top, sides, and bottom).
- Trench needs to be placed on uncompacted soils.
- Slope of the Trench bottom should be level or with a slope no greater than 1%.
- A minimum of 6" of topsoil is placed over trench and vegetated.
- The discharge or overflow from the Infiltration Trench should be properly designed for anticipated flows.
- Cleanouts or inlets should be installed at both ends of the Infiltration Trench and at appropriate intervals to allow access to the perforated pipe.
- Volume of facility = Depth x Width x Length x Void Space of the gravel bed (assume 40%).

**Maintenance:**

- Catch basins and inlets should be inspected and cleaned at least two times a year.
- The vegetation along the surface of the infiltration trench should be maintained in good condition and any bare spots should be re-vegetated as soon as possible.
- Vehicles should not be parked or driven on the trench and care should be taken to avoid soil compaction by lawn mowers.

Figure 3: Infiltration Trench Diagram



Source: PA BMP Guidance Manual, Chapter 6, page 42.

Figure 4: Example of Infiltration Trench Installation



Source: PA BMP Guidance Manual, Chapter 6, Page 46.

## Sizing Example for Infiltration Trench

1. Determine Total Impervious Surface to drain to Infiltration Trench:

Garage Roof (Left)	6 ft. x 24 ft.	=	144 sq ft
Driveway	12 ft. x 50 ft.	=	1000 sq ft
Walkway	4 ft. x 20 ft.	=	80 sq ft

2. Determine the required infiltration volume:

$$(1224 \text{ sq. ft.} \times 2 \text{ inches of runoff}) / 12 \text{ ft.} = 204 \text{ cu. ft.} / 0.4^* = 510 \text{ cu. ft.} \quad (*0.4 \text{ assumes 40\% void ratio in gravel bed})$$

3. Sizing the infiltration trench facility:

$$\text{Volume of Facility} = \text{Depth} \times \text{Width} \times \text{Length}$$

Set Depth to 3 feet and determine required surface area of trench.

$$510 \text{ cu. ft.} / 3 \text{ ft} = 170 \text{ sq ft.}$$

The width of the trench should be greater than 2 times its depth ( $2 \times D$ ), therefore in this example the trench width of 6 feet selected.

$$\text{Determine trench length: } L = 170 \text{ sq. ft.} / 6 \text{ ft.} = 28.3 \text{ ft.}$$

*Final infiltration trench dimensions: 3 ft. (D) x 6 ft. (W) x 28.3 ft. (L)*

## 2. Rain Garden

A Rain Garden is a planted shallow depression designed to catch and filter rainfall runoff. The garden captures rain from a downspout or a paved surface. The water sinks into the ground, aided by deep rooted plants that like both wet and dry conditions. The ideal location for a rain garden is between the source of runoff (roofs and driveways) and the runoff destination (drains, stream, low spots, etc).

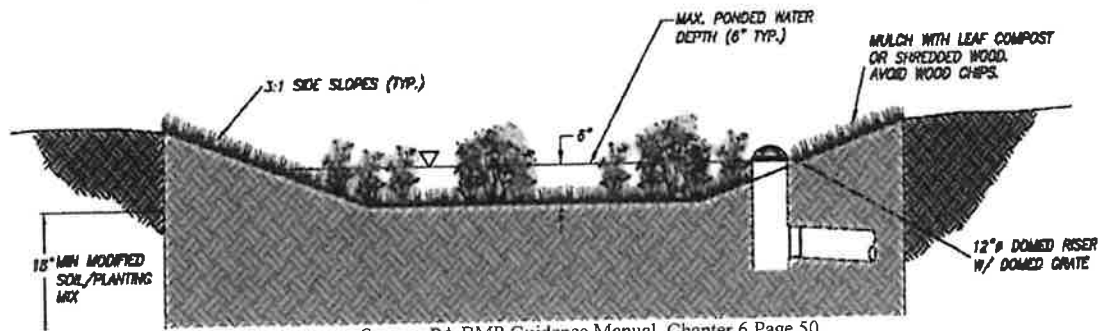
### Design Considerations:

- A maximum of 3:1 side slope is recommended.
- The depth of a rain garden can range from 6 - 8 inches. Ponded water should not exceed 6 inches.
- The rain garden should drain within 72 hours.
- The garden should be at least 10-20 feet from a building's foundation and 25 feet from septic system drainfields and wellheads.
- If the site has clay soils, soil should be amended with compost or organic material.
- Choose native plants. See [http://pa.audubon.org/habitat/PDFs/RGBrochure\\_complete.pdf](http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf) for a native plant list. To find native plant sources go to [www.pawildflower.org](http://www.pawildflower.org).
- At the rain garden location, the water table should be at least 2' below the soil level. If water stands in an area for more than one day after a heavy rain you can assume it has a higher water table and is not a good choice for a rain garden.

### Maintenance:

- Water plants regularly until they become established.
- Inspect twice a year for sediment buildup, erosion and vegetative conditions.
- Mulch with hardwood when erosion is evident and replenish annually.
- Prune and remove dead vegetation in the spring season.
- Weed as you would any garden.
- Move plants around if some plants would grow better in the drier or wetter parts of the garden.

Figure 5: Rain Garden Diagram



Source: PA BMP Guidance Manual, Chapter 6 Page 50

### Sizing Example for Rain Garden

1. Pick a site for the rain garden between the source of runoff and between a low lying area, a.k.a., a drainage area.
2. Perform an infiltration test to determine the depth of the rain garden:
  - Dig a hole 8" x 8"
  - Fill with water and put a popsicle stick at the top of the water level.
  - Measure how far it drains down after a few hours (ideally 4).
  - Calculate the depth of water that will drain out over 24 hours.
3. Determine total impervious surface area to drain to rain garden:

House Roof (Front)	14 ft. x 48 ft.	=	672 sq ft
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4. Sizing the rain garden:

For this example the infiltration test determined 6" of water drained out of a hole in 24 hours. The depth of the rain garden should be set to the results of the infiltration test so 6" is the depth of the rain garden. The sizing calculation below is based on controlling 1" of runoff. First divide the impervious surface by the depth of the rain garden.

$$(672 \text{ sq ft} / 6 \text{ ft.}) = 112 \text{ sq. ft.}$$

In order to control 2" of runoff volume, the rain garden area needs to be multiplied by 2.

$$112 \text{ sq. ft.} * 2 = 224 \text{ sq. ft.}$$

*The rain garden should be about 225 sq. ft. in size and 6" deep.*

### 3. Dry Well (a.k.a., Seepage Pit)

A Dry Well, sometimes called a Seepage Pit, is a subsurface storage facility that temporarily stores and infiltrates stormwater runoff from the roofs of structures. By capturing runoff at the source, Dry Wells can dramatically reduce the increased volume of stormwater generated by the roofs of structures. Roof leaders connect directly into the Dry Well, which may be either an excavated pit filled with uniformly graded aggregate wrapped in geotextile, or a prefabricated storage chamber or pipe segment. Dry Wells discharge the stored runoff via infiltration into the

surrounding soils. In the event that the Dry Well is overwhelmed in an intense storm event, an overflow mechanism (surcharge pipe, connection to a larger infiltration are, etc.) will ensure that additional runoff is safely conveyed downstream.

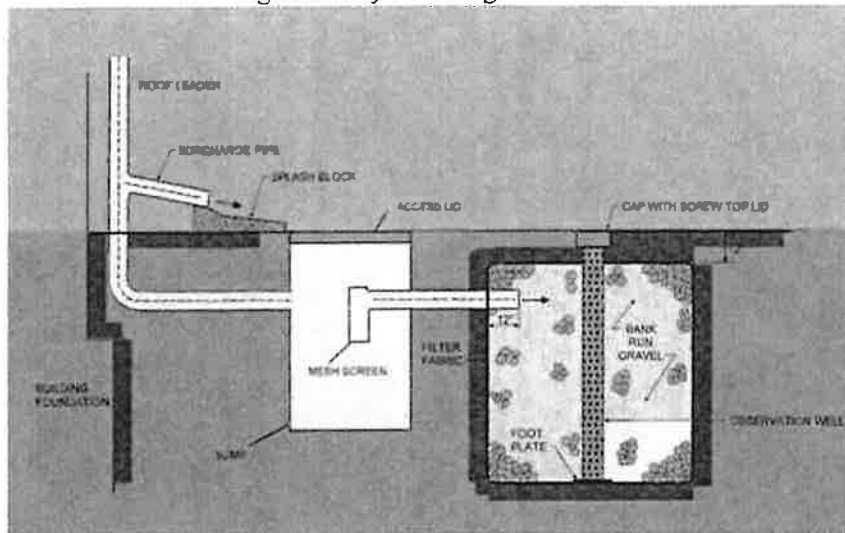
#### Design Considerations:

- Dry Wells typically consist of 18 to 48 inches of clean washed, uniformly graded aggregate with 40% void capacity (AASHTO No. 3, or similar). "Clean" gravel fill should average one and one-half to three (1.5 – 3.0) inches in diameter.
- Dry Wells are not recommended when their installation would create a significant risk for basement seepage or flooding. In general, 10 - 20 feet of separation is recommended between Dry Wells and building foundations.
- The facility may be either a structural prefabricated chamber or an excavated pit filled with aggregate.
- Depth of dry wells in excess of three-and-a-half (3.5) feet should be avoided unless warranted by soil conditions.
- Stormwater dry wells must never be combined with existing, rehabilitated, or new septic system seepage pits. Discharge of sewage to stormwater dry wells is strictly prohibited.

#### Maintenance:

- Dry wells should be inspected at least four (4) times annually as well as after large storm events.
- Remove sediment, debris/trash, and any other waste material from a dry well.
- Regularly clean out gutters and ensure proper connections to the dry well.
- Replace the filter screen that intercepts the roof runoff as necessary.

Figure 6: Dry Well Diagram



Source: PA BMP Guidance Manual, Chapter 6, Page 65.

#### Sizing Example for Dry Wells:

1. Determine contributing impervious surface area:

House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
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2. Determine required volume control:

$$(672 \text{ sq. ft.} * 2 \text{ inches of runoff}) / 12 \text{ inches} = 112 \text{ cu. ft.}$$

$$112 \text{ cu ft} / 0.4 = 280 \text{ cu. ft. (assuming the 40\% void ratio in the gravel bed)}$$

3. Sizing the dry well:

Set depth to 3.5 ft; Set width equal to length for a square chamber.

$$280 \text{ cu. ft.} = 3.5 \text{ ft.} \times L \times L; L = 9 \text{ ft.}$$

$$\text{Dimensions} = 3.5 \text{ ft. (D)} \times 9 \text{ ft. (L)} \times 9 \text{ ft. (W)}$$

## Non-Structural BMPs

### 1. Tree Plantings and Preservation

Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Tree roots and leaf litter also create soil conditions that promote the infiltration of rainwater into the soil. In addition, trees and forests reduce pollutants by taking up nutrients and other pollutants from soils and water through their root systems. A development site can reduce runoff volume by planting new trees or by preserving trees which existed on the site prior to development. The volume reduction calculations either determine the cubic feet to be directed to the area under the tree canopy for infiltration or determine a volume reduction credit which can be used to reduce the size of any one of the planned structural BMPs on the site.

#### Tree Considerations:

- Existing trees must have at least a 4" trunk caliper or larger.
- Existing tree canopy must be within 100 ft. of impervious surfaces.
- A tree canopy is classified as the continuous cover of branches and foliage formed by a single tree or collectively by the crowns of adjacent trees.
- New tree plantings must be at least 6 ft. in height and have a 2" trunk caliper.
- All existing and newly planted trees must be native to Pennsylvania. See <http://www.dcnr.state.pa.us/forestry/commontr/commontrees.pdf> for a guide book titled *Common Trees of Pennsylvania* for a native tree list.
- When using trees as volume control BMPs, runoff from impervious areas should be directed to drain under the tree canopy.

Determining the required number of planted trees to reduce the runoff volume:

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 Sq ft
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2. Calculate the required control volume:

$$(144 \text{ sq. ft.} \times 2 \text{ inches of runoff}) / 12 \text{ inches} = 24 \text{ cu. ft.}$$

3. Determine the number of tree plantings:

- A newly planted deciduous tree can reduce runoff volume by 6 cu. ft.
- A newly planted evergreen tree can reduce runoff volume by 10 cu. ft.

$$24 \text{ cu. ft.} / 6 \text{ cu. ft.} = 4 \text{ Deciduous Trees}$$

Determining the volume reduction for preserving existing trees:

1. Calculate approximate area of the existing tree canopy:

$$\sim 22 \text{ sq. ft.} \times \sim 23 \text{ sq. ft.} = 500 \text{ sq. ft.}$$

2. Measure distance from impervious surface to tree canopy: 35 ft.

3. Calculate the volume reduction credit by preserving existing trees:

- For Trees within 20 feet of impervious cover:  
Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft.  $\times$  1 inch) / 12

- For Trees beyond 20 feet but not farther than 100 feet from impervious cover:  
Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft. x 0.5 inch) / 12

$$(500 \text{ sq. ft.} \times 0.5 \text{ inches}) / 12 = 21 \text{ cu. ft.}$$

This volume credit can be utilized in reducing the size of any one of the structural BMPs planned on the site. For example, the 21 cu. ft. could be subtracted from the required infiltration volume when sizing the infiltration trench;

$$510 \text{ cu. ft.} - 21 \text{ cu. ft.} = 489 \text{ cu. ft.}$$

$$489 \text{ cu. ft.} / 3 \text{ ft (Depth)} = 163 / 6 \text{ ft. (Width)} = 27.1 \text{ ft (Length)}$$

Using the existing trees for a volume credit would decrease the length of the infiltration trench to 27.1 ft. instead of 28.3 ft.

## 2. Minimize Soil Compaction and Replant with Lawn or Meadow

When soil is overly compacted during construction it can cause a drastic reduction in the permeability of the soil and rarely is the soil profile completely restored. Runoff from vegetative areas with highly compacted soils similarly resembles runoff from an impervious surface. Minimizing soil compaction and re-planting with a vegetative cover like meadow or lawn, not only increases the infiltration on the site, but also creates a friendly habitat for a variety of wildlife species.

### Design Considerations:

- Area shall not be stripped of topsoil.
- Vehicle movement, storage, or equipment/material lay down shall not be permitted in areas preserved for minimum soil compaction.
- The use of soil amendments and additional topsoil is permitted.
- Meadow should be planted with native grasses. Refer to *Meadows and Prairies: Wildlife-Friendly Alternatives to Lawn* at <http://pubs.cas.psu.edu/FreePubs/pdfs/UH128.pdf> for reference on how to properly plant the meadow and for a list of native species.

Determining the volume reduction by minimizing soil compaction and planting a meadow:

1. Calculate approximate area of preserved meadow:

$$\sim 22 \text{ sq. ft.} \times \sim 23 \text{ sq. ft.} = 500 \text{ sq. ft.}$$

2. Calculate the volume reduction credit by minimizing the soil compaction and planting a lawn/meadow:

- For Meadow Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/3 inch of runoff) / 12

$$(500 \text{ sq. ft.} \times 1/3 \text{ inch of runoff}) / 12 = 13.8 \text{ cu. ft.}$$

- For Lawn Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/4 inch of runoff) / 12

$$(500 \text{ sq. ft.} \times 1/4 \text{ inch of runoff}) / 12 = 10.4 \text{ cu. ft.}$$



This volume credit can be used to reduce the size of any one of the structural BMPs on the site. See explanation under the volume credit for preserving existing trees for details.

### Alternative BMP to Capture and Reuse Stormwater

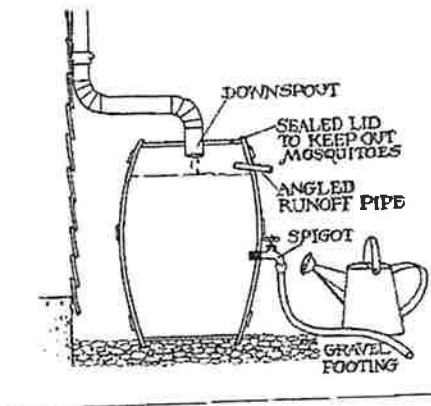
#### Rain Barrels

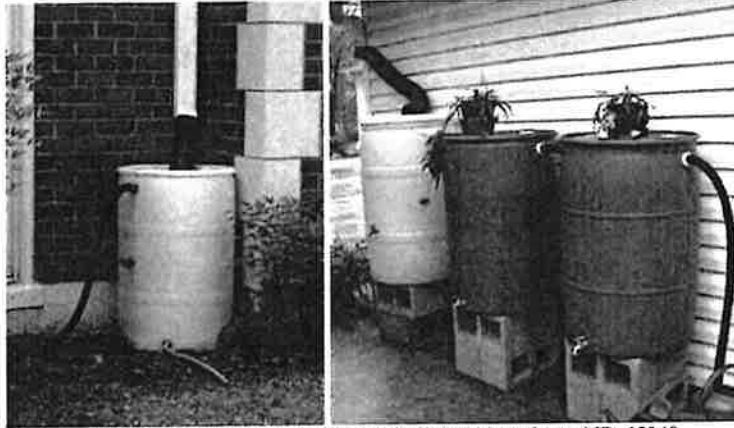
Rain barrels are large containers that collect drainage from roof leaders and temporarily store water to be released to lawns, gardens, and other landscaped areas after the rainfall has ended. Rain barrels are typically between 50 and 200 gallons in size. It is not recommended for rain barrels to be used as a volume control BMP because infiltration is not guaranteed after each storm event. For this reason, a rain barrel is not utilized in the site plan example. However, the information is included to provide an alternative for a homeowner to utilize when considering capture and reuse stormwater methods.

#### Design Considerations:

- Rain barrels should be directly connected to the roof gutter/spout.
- There must be a means to release the water stored between storm events to provide the necessary storage volume for the next storm.
- When calculating rain barrel size, rain barrels are typically assumed to be 25% full because they are not always emptied before the next storm.
- Use screens to filter debris and cover lids to prevent mosquitoes.
- An overflow outlet should be placed a few inches below the top with an overflow pipe to divert flow away from structures.
- It is possible to use a number of rain barrels jointly for an area.

Figure 2: Rain Barrel Diagram and Examples





Sources: (top picture) <http://www.citywindsor.ca/DisplayAttach.asp?AttachID=12348>  
 (bottom picture on left) <http://repurposinglife.blogspot.com/2009/05/rainwater-harvesting.html>  
 (bottom picture on right) <http://www.floridata.com/tracks/transplantedgardener/Rainbarrels.cfm>

### Sizing Example for a Rain Barrel

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq ft
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2. Determine the amount of rainfall to be captured by the Rain Barrel. A smaller storm, no more than 2", is recommended to calculate the runoff to be captured. This example chose the 1" storm event.
3. Calculate the volume to be captured and reused:  
 $(144 \text{ sq. ft.} \times 1 \text{ inch of runoff}) / 12 \text{ inches} = 12 \text{ cu. ft.}$
4. Size the rain barrel:

1 cu. ft. = 7.48 gallons

12 cu. ft. x 7.48 = 90 gallons

90 gallons x (0.25\*) = 22.5 gallons (\*assuming that the rain barrel is always at least 25% full)

90 gallons + 22.5 gallons = 112 gallons

*The rain barrel or barrels should be large enough hold at least 112 gallons of water.*

## REFERENCES:

- Center for Watershed Protection and US Forest Service. (2008). *Watershed Forestry Resource Guide*. Retrieved on May 26, 2010 from <http://www.forestsforwatersheds.org/reduce-stormwater/>.
- Department of Environmental Protection. (2006). *Pennsylvania Stormwater Best Management Practices Manual*.
- Wissahickon Watershed Partnership. *Pennsylvania Rain Garden Guide*. Retrieved on May 4, 2010 from [http://pa.audubon.org/habitat/PDFs/RGBrochure\\_complete.pdf](http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf).
- Building a Backyard Rain Garden. North Carolina Cooperative Extension. Retrieved on May 4, 2010 from <http://www.bae.ncsu.edu/topic/raingarden/Building.htm>
- Delaware County Planning Commission. (2010). *Draft Crum Creek Watershed Act 167 Stormwater Management Plan. Ordinance Appendix B. Simplified Approach to Stormwater Management for Small Projects*.
- Solebury Township. (2008). *Solebury Township Stormwater Management Ordinance*. "Appendix J Simplified Stormwater Management Procedures for Existing Single Family Dwelling Lots"