Township of West Donegal
Appendix A-3
Stormwater Management
Small Project Design/Application
West Donegal Township, Lancaster County, Pennsylvania

This application pertains to projects that qualify as a Small Project (between 1,001 and 2,500 square feet of impervious area (cumulative)). If a formal Stormwater Management Plan is required in accordance with the West Donegal Township Stormwater Management Ordinance, **please consult a qualified person (ex. Engineer, Surveyor, Landscape Architect).**

Property Owner's Name:

_____

Address of Property:

_____

Parcel ID 160-_____

Phone Number: Home:_____ Cell:_____

Email Address:

_____

1000 SF Exemption Used since April 28, 2014: _____ No _____ Yes: how much: _____

New Impervious Area Associated with this Project _____

Lot Size (Sq. Ft.) _____

Existing Impervious Coverage (Sq. Ft.) _____

Total New Impervious Area Since Adoption of SWM Ordinance:

_____

The allowable impervious coverage per lot is subject to the regulations of the Township Zoning Ordinance, as amended.

Acknowledgement - I declare that I am the property owner, or representative of the owner, and that the information provided is accurate to the best of my knowledge. I understand that stormwater may not adversely affect adjacent properties or be directed onto another property without written permission. I also declare that the proposed construction is not within an existing easement or wetland area. I also understand that false information may result in a stop work order or revocation of permits. Municipal representatives are also granted reasonable access to the property for review and/or inspection of this project if necessary.

Signature _____ Date _____

Small Project Guidance Document

Introduction

If you are considering a relatively small construction project on your property that creates new impervious area and you need to manage the stormwater that is generated, this document will guide you through the appropriate process required by the Township. Some general background information is provided below, prior to reviewing the necessary requirements for the Township.

What is Stormwater?

Stormwater runoff is precipitation (rain or snowmelt) that flows across the land. Stormwater may be absorbed by the ground, flow directly into streams, bodies of water and drainage inlets, or evaporate back into the atmosphere. In nature, most precipitation is absorbed by trees and plants, or infiltrates into the ground, which results in consistent stream flow and good water quality. However, in the built environment, runoff is redirected. Precipitation that falls on a roof, driveway, patio (impervious areas) or lawn, runs off the surface more rapidly. This water runoff picks up pollutants as it moves along.

Stormwater Can Be a Problem!

If runoff is not managed or controlled, it can be a problem. These potential problems include:

- *Flooding*-When runoff moves more rapidly over the surface of the built environment, large volumes of water quickly reach streams causing them to rise faster than normal. When more impervious areas exist, flooding can occur more rapidly and more severely, sometimes resulting in damage to both property and people.
- *Pollution*-When runoff moves over the surface of the built environment, it picks up pollutants such as oil, fertilizers, pesticides, bare soil/sediment, trash, and animal waste. When these pollutants are carried by the runoff to local steams without having any treatment, they pollute our waters.
- *Streambank Erosion*-When runoff flows into streams at a higher volume and speed due to the built environment, it can cause severe stream bank erosion. Erosion can reduce the amount of streamside property, create dangerous situations, and damage natural habitat for fish and other aquatic life. Erosion also causes water pollution.
- *Threats to Human Health*-When runoff picks up pollutants from the built environment, it can carry toxic elements from metals, organic compounds, bacteria and viruses. Polluted stormwater can contaminate drinking water, impact recreational activities, as well as threaten fish and other aquatic life.

A homeowner can help to avoid the problems associated with runoff by managing or controlling runoff as follows:

- Reduce impervious area to allow more precipitation to soak into the ground
- Install plantings which help to infiltrate stormwater, and increase evaporation and transpiration.
- Install stormwater management controls such as rain barrels, rain gardens, etc…

Step 1: Prepare a Site Plan

A Site Plan illustrates the existing and proposed features of a property including both pervious and impervious areas. Depicting the relationship between the proposed improvements and existing features such as property lines, bodies of water and vegetated areas will help determine if the stormwater runoff created by the proposed project can be managed naturally within the property itself, or if additional stormwater best management practices (manmade BMPs) are needed to accommodate the proposed runoff.

You may be able to find useful mapping information on your property tax assessment, deed of your house, or by utilizing Bing Maps. A Site Plan illustrating key feature of the site shall be drawn by hand or computer, or depicted, prepared to scale showing the following:

- The date of the plan
- North arrow
- Property boundary
- Location of all existing and proposed structures (house, shed, home addition etc…) and any proposed downspouts. The size of the proposed features shall be shown by providing dimensions.
- Site conditions (grassed areas, agricultural fields, direction of slope and stormwater flow/runoff on the property).
- Distance from proposed downspouts to property lines.
- Existing and proposed driveways, pathways and other impervious areas (stone and gravel driveways and walkways are considered impervious).
- Natural features such as streams, wetlands, tree lines and other vegetation on the property and within 50 feet of the property line.
- Location, orientation and size of wells and on-site septic systems

Step 2: Determine the amount of proposed impervious area for your proposed project.

The amount of stormwater runoff that will be generated from your proposed project is the **additional** amount of rain or snowmelt that will flow across your land after the proposed project is constructed. In order to do so, you will need to determine how much impervious area is being created by your project. Impervious areas are hard surfaces that prevent stormwater from soaking into the ground. They include buildings/structures, parking areas, walkways, decks, patios or other hard surfaces.

PROPOSED IMPERVIOUS AREA					
Surface	**Length (ft)**	**x**	**Width (ft)**	**=**	**Impervious Area (ft^2)**
Buildings		x		=	
Driveway		x		=	
Patios/ walkways		x		=	
Other		x		=	
Total Proposed Impervious Surface Area (Sum of all impervious areas)					

Step 3: Determine the review/approval process required for your project.

Utilize the total impervious surface area to be managed from Step 2 to determine which approval category below your proposed project falls under:

I. If the total new impervious surface area is **less than or equal to 1,000 ft²**, the project is exempt from the requirement to prepare a Small Project Application or Site Plan. Stop and sign the Acknowledgement and file the completed PROPOSED IMPERVIOUS AREA chart in Appendix 4 of the West Donegal Township Stormwater Management Ordinance.

OR

II. If the additional impervious area is more than **1,000 ft²** and less than **2,500 ft²,** the project is eligible to qualify as a Small Project. Continue to Section 4 to find out how to make an application to the Township for a Small Project.

OR

III. If total new impervious surface area is **greater than 2**,**500 ft²,** then a Stormwater Management Plan, either major or minor, shall be submitted in accordance with the *West Donegal Township Stormwater Management Ordinance.*

*** NOTE: These numbers represent the total square foot threshold limits AFTER any square foot reduction credits are applied as may be in the case of Disconnect Impervious Area (DIA) Credits Refer to Section 5, Alternative Stormwater Types for further explanation of Disconnection Credits BEFORE making a final determination concerning which approval process is applicable.**

Section 4: **Making an application to the Township for a Small Project.**

1. Assess the stormwater management need for your proposed project.

    a. Prepare a Site Plan of existing and proposed property features.
    b. Determine the amount of proposed impervious area for your proposed project.
    c. Determine if any Stormwater Credit or Disconnected Impervious Area (DIA) Credit applies to your project.
    d. Determine the total stormwater runoff to be managed.

2. Consider and select alternative stormwater management type(s) for your project.

3. Meet with Municipal Staff. All individuals planning on using the Small Project approach are encouraged to review the planned project with Township Staff to verify eligibility, approach, impacts to wetlands/other bodies of water, easements, and other known information that may be beneficial. Prior to meeting with Township Staff, the applicant should prepare a basemap sketch of applicant's existing property, measure existing and proposed impervious areas, and consider which stormwater management control(s) are desired. Township Staff shall assist the property owner in determining the best stormwater alternatives for the specific property involving the Small Project.

4. The applicant shall complete the required Small Projects Worksheet(s) then submit these items with the Site Plan and permit fee to the Township.

5. Township Staff shall review the submittal, conduct a site visit, and coordinate any recommended revisions to the proposed project with the applicant, and with the Township Engineer if necessary.

6. The applicant shall address the review comments provided by the Township, and resubmit any necessary information back to the Township for further processing.

7. Once the Township's review comments have been addressed, the Owner shall sign and submit and record the Operations and Maintenance Agreement with the approved Site Plan at the County Recorder of Deeds office**.**

8. The Township shall sign the Permit and distribute a copy to the applicant. The Township shall also establish an inspection schedule based on the proposed facilities.

9. The Township shall inspect during and/or after construction based on the schedule.

Section 5: Determine the total stormwater runoff to be managed for your project.

Estimate how much stormwater will be generated on your property as a result of the proposed project. Estimate the volume of stormwater runoff created by new impervious surfaces by using the following equations to obtain stormwater *runoff in cubic feet (ft^3).*

Cubic Feet of Runoff to be Managed:

(ft^2 of impervious area) x 0.0833 = ft^3 of runoff

_____SF Impervious Area = _____Cubic Feet to be managed

Cubic Feet of Runoff to be Managed Following Subtraction of Credits

_____Cubic Feet to be Managed - _____Total Credits = _____Net Cubic Feet to be Managed

Step 6: Consider and select an alternative stormwater management type for your project.

Stormwater Management Alternatives/Best Management Practices (BMPs)

Now that you know what areas of your proposed project generate stormwater runoff, and how much runoff each area will generate, you can evaluate stormwater management alternatives and select an alternative(s) that would be most suitable to your project.

Below is a guide to various alternatives for your consideration. Note that each BMP worksheet will contain additional information and criteria for further consideration in selecting a particular type of BMP.

- Stormwater Disconnection Credit
- Tree planting
- Rain Barrel
- Cistern
- Rain Garden
- Vegetated Swale
- Infiltration Trenches
- Drywells.
- Pervious Pavers

Additional consideration should be given as to determine the best location to install the best management practice on your property. Below are some general considerations to assist in selecting the appropriate BMP. Refer to BMP Worksheets for additional considerations.

General Considerations in Locating BMPs

a) **Ponding Water**. Many stormwater BMPs encourage water to infiltrate into the soil. (such as rain gardens, infiltration trenches, pervious pavers). Where water ponds on your property, water is unable to infiltrate. Areas that are often saturated are not appropriate places to put these practices.

b) **Proximity to foundations**. You should also avoid constructing infiltration practices within 10 feet of building foundations.

c) **Location of underground utilities.** Do not construct infiltration practices near septic systems or drinking water wells. Also avoid any utilities like electric, cable, water, sewer, and gas lines. (Use the PA ONE-CALL system to locate underground utilities prior to planning and constructing your BMP.)

d) **Slope.** Depending on the practice, a steeper slope may prohibit the location of the BMP, or it may be something that needs to be taken into account during the design stage. Refer to BMP Worksheets.

Stormwater Disconnection Credit

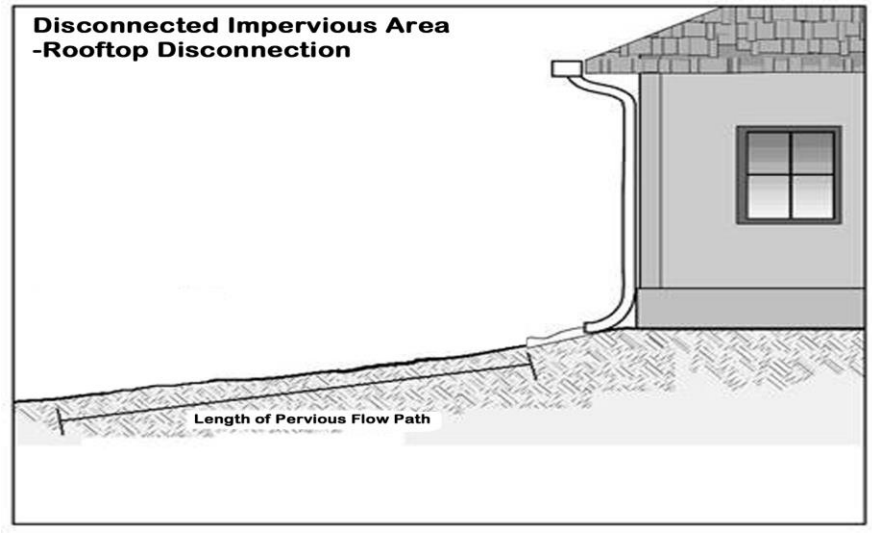
Description

All or parts of new impervious surfaces may qualify as a Disconnected Impervious Area (DIA) if runoff is directed to a pervious area that allows for infiltration and filtration. Pervious areas are areas that allow water to soak into the ground, such as grass and other vegetative areas. The volume of stormwater that needs to be managed could be reduced through DIA, thereby reducing the required stormwater controls that need to be constructed.

Disconnection Credit Criteria

- The receiving area from the downspout or paved area is a pervious area.
- The receiving pervious area is generally flat in slope (less than 5%). Steep areas shall not qualify. Slope areas in question shall be determined eligible at the discretion of the Township.
- The receiving pervious area shall not include another person's property.

Square Foot of Impervious Surface Area	Length of Flow path (linear feet)	Amount of Stormwater being Managed (%)
1,000 maximum	75 minimum	50
SF amount over and above 1st 1,000 SF of project area	No additional credit may be taken for the project	



Tree Planting Credit

Description

Trees soak up rain water through their root system. Planting trees can reduce surface water and ground water can be increased.

Recommended Resource

A recommend resource for tree planting and care is *Planting and After Care of Community Trees*, published by the Penn State Cooperative Extension, 2008. http://pubs.cas.psu.edu/freepubs/pdfs/uh143.pdf

Criteria and Calculations

Planting of new trees may be used to manage a portion of the proposed stormwater volume. First, calculate the cubic feet of stormwater that can be managed by planting new trees. If the criteria below can be met, planting of new trees can be used to manage a portion of the proposed stormwater volume:

Deciduous Trees or Evergreen Trees = 10 ft^3 per tree

Criteria:

- Trees must be PA native species. A good resource to assist you in selecting the appropriate tree is the Pennsylvania Native Plant Society http://www.panativeplantsociety.org/plant-information-and-landscaping.html
- Trees shall be a minimum 1 inch caliper deciduous tree or a minimum 5 foot tall evergreen tree.
- Trees shall be adequately protected during construction
- No more than 25% of the total required capture volume can be mitigated through the use of trees
- Dead trees shall be replaced by the property owner within 6 months
- Trees have a better chance of survival and require less water if planted between September 15th and May 15th.
- Consider the growing parameters for each tree species when determining location and spacing

Rain Barrel Credit

Description

Rain barrels are large containers that are typically used to collect drainage from roof gutters or roof leaders and temporarily store non-potable water. The water is then used to irrigate gardens, lawns and landscaped areas, used for car washing, etc… after the rain fall has ended. Rain barrels typically come in sizes ranging from 50 to 100 gallons. Whenever used, they must make provisions for the following:

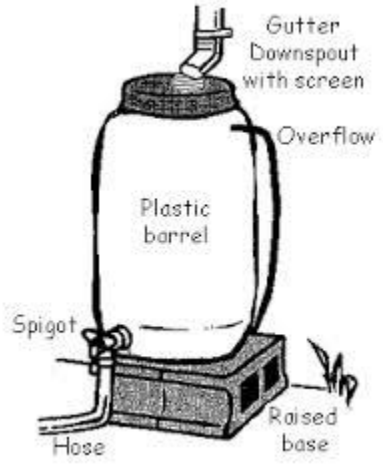
- There must be a means to release the stored water in the containers between rain events in order to maintain storage volume at all times.
- Stormwater must be kept from entering other potable systems. Pipes and storage systems must be clearly identified "Do Not Drink".
- An overflow outlet is required a few inches below the top of the storage container with an overflow pipe to divert excess flow away from adjacent structures once the storage container is full.
- Screens and covered lids shall be used at the top opening of the container to filter or block debris and insects from entering the storage chamber.

Recommended Resource

A recommend resource for rain barrels is *Rain Barrel Installation Instructions* published by the Rutgers Cooperative Extension. http://water.rutgers.edu/Stormwater_Management/rainbarrelbrochure.pdf
A recommended resource for both rain barrels and cisterns is Rainwater Harvesting: Guidance for Homeowners published by the North Carolina Cooperative Extension.
http://www.ces.ncsu.edu/depts/agecon/WECO/documents/WaterHarvestHome2008.pdf

If installed properly, a rain barrel can be used to manage a portion of the proposed stormwater volume:

One 50 Gallon Rain Barrel = 5 ft³ credit (maximum of 5 ft³ credit per project)



Rain Garden and Vegetated Swale

Description

A rain garden is an excavated depression area on the surface of the ground that is planted with native vegetation. This vegetation filters and soaks up the runoff that is directed to the depression. Special soil within the rain garden helps the plants to grow and enables the excess water to be absorbed in the ground. Key elements of a rain garden include:

- Maximum recommended depth of one foot
- Native vegetation that tolerates dry and wet conditions
- An adjacent overflow area, where if the rain garden would overflow, the excess runoff would flow over a pervious surface and not cause harm to a nearby property.
- An overflow control device, such as a domed riser, to allow excess flow from large rain events to flow to an overflow area or another BMP, stormwater control device, or pipe.
- Generally, slopes should be limited to a maximum ratio of 3 horizontal feet to 1 vertical foot.
- Soil depth shall be a minimum of 1.5 feet deep and consist of a blended mixture of approximately 50% topsoil, 30% sand, and 20% compost or mulch

A vegetated swale is a broad, shallow drainage channel densely planted with a variety of trees, shrubs, and/or grasses. Stormwater runoff is both slowed and absorbed as it flows within the channel. Key elements of a vegetated swale include:

- Installed with slopes ranging from 1-6%
- Side slopes range from 3:1 to 5:1
- Bottom width of 5 feet minimum
- Planted with dense, low-growing native vegetation that is water-resistant and drought resistant.

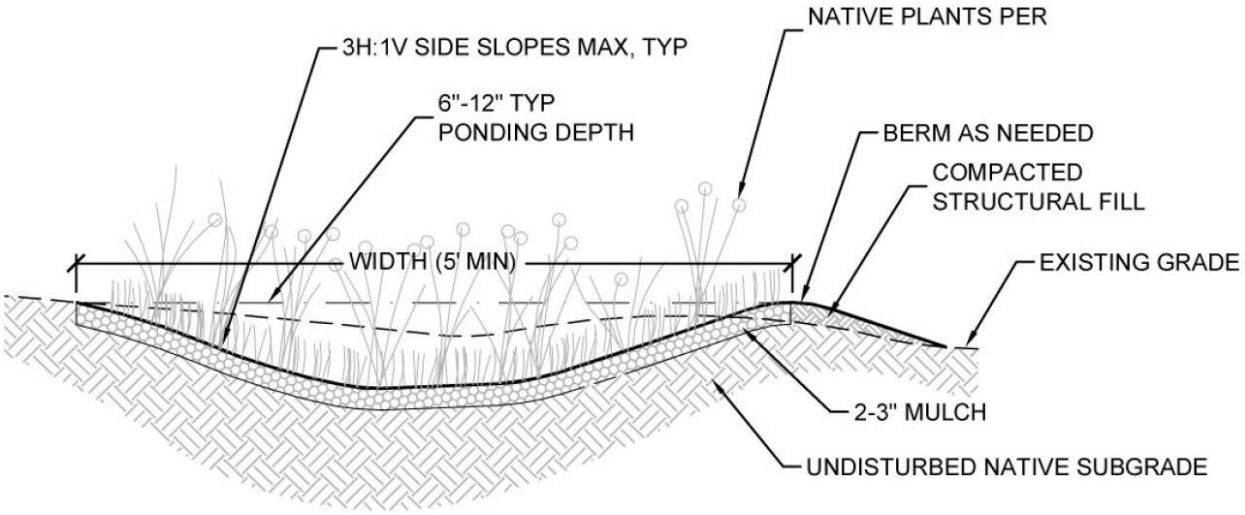
Recommended Resource

A recommend resource for rain gardens is, *Rain Gardens: A How-To Manual for Homeowners* published by the University of Wisconsin Cooperative Extension, 2003.
http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf

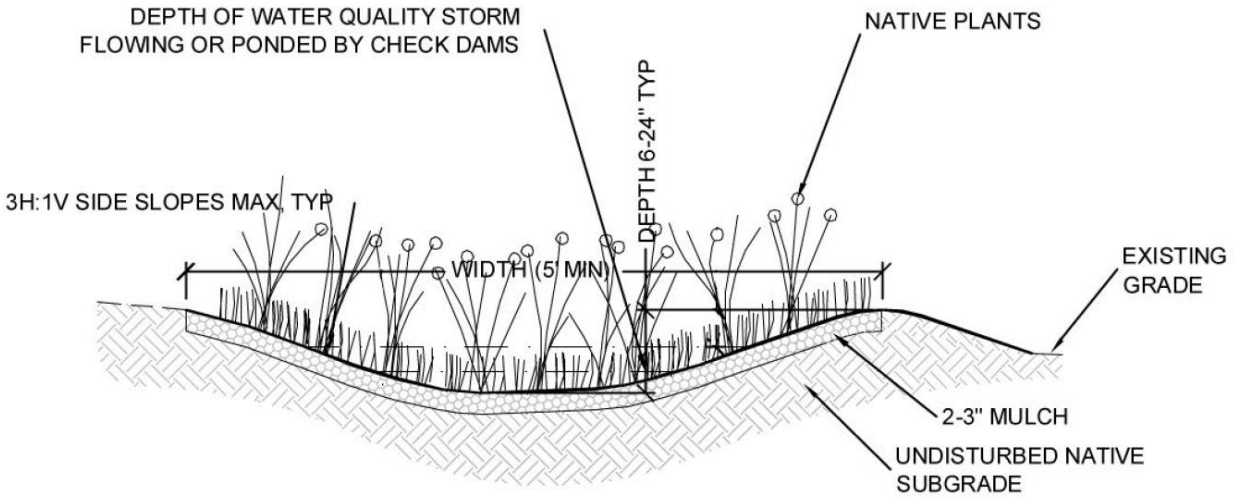
Sizing Rain Gardens and Vegetated Swales

The rain garden or vegetated swale would be required to be sized to accommodate the net cubic feet to be managed.

Rain Garden



Vegetated Swale



Infiltration Trench and Dry Well

Description

An infiltration trench is long, narrow, rock-filled trench that receives stormwater runoff. It allows the water to be stored in the open space between the stones and also permits the water to soak into the ground. Sometimes the trench includes a perforated pipe within the rock area to distribute the water evenly along the trench. Key elements of an infiltration trench include:

- These facilities should be located a minimum of ten (10) feet (or as otherwise required by the Township) from the building foundation to avoid foundation seepage problems.
- Trench stone shall be wrapped in nonwoven geotextile (top, sides and bottom).
- A positive flow or slope shall be maintained to permit excess runoff which cannot be stored or infiltrated to drain into a nearby vegetated area.
- Roof downspouts can be connected to infiltration trenches, but shall contain a cleanout to collect sediment and debris before entering the infiltration area.
- They should have over overflow pipes to allow high volumes of runoff to overflow the facility and flow into an infiltration area, pervious area, or other connected storm sewer designed to receive the excess runoff.
- Protect infiltration areas from compaction by heavy equipment during and after construction. They shall be constructed generally after all earth disturbance associated with the construction site is stabilized to avoid clogging.

Recommended Resource

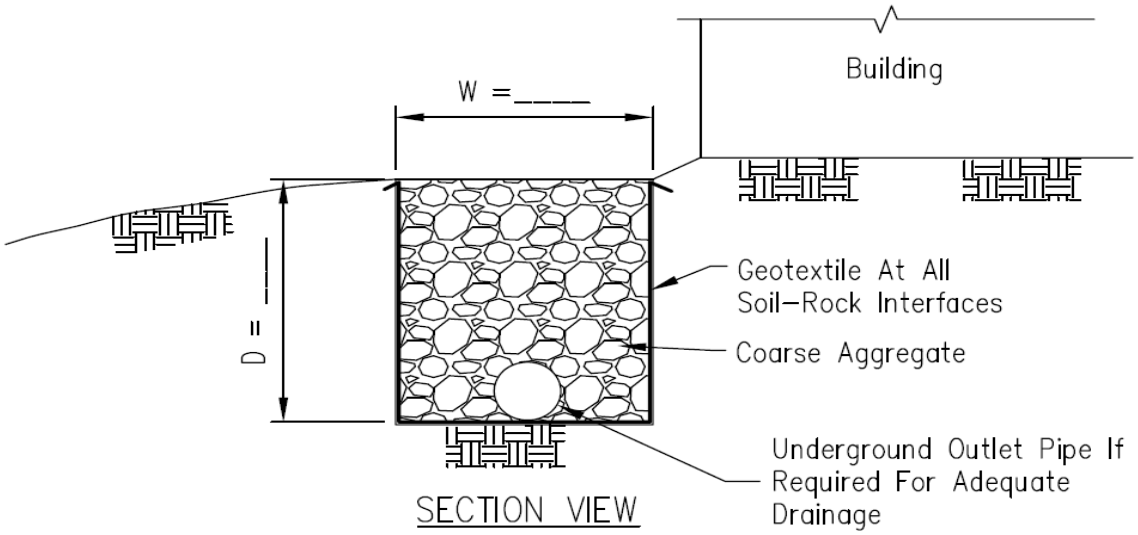
Fact Sheet #5, Infiltration Trenches and Dry Wells, Massachusetts Low Impact Development Toolkit, a production of the Metropolitan Area Planning Council,
http://www.mapc.org/sites/default/files/LID_Fact_Sheet_-_Infiltration_Trenches_and_Dry_Wells.pdf

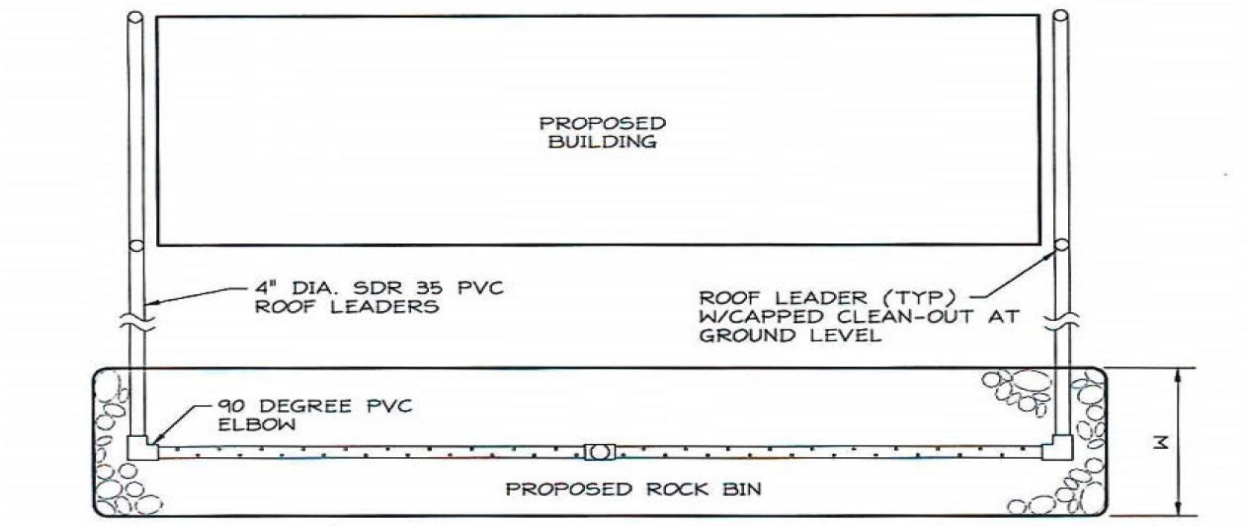
Sizing Infiltration Trenches

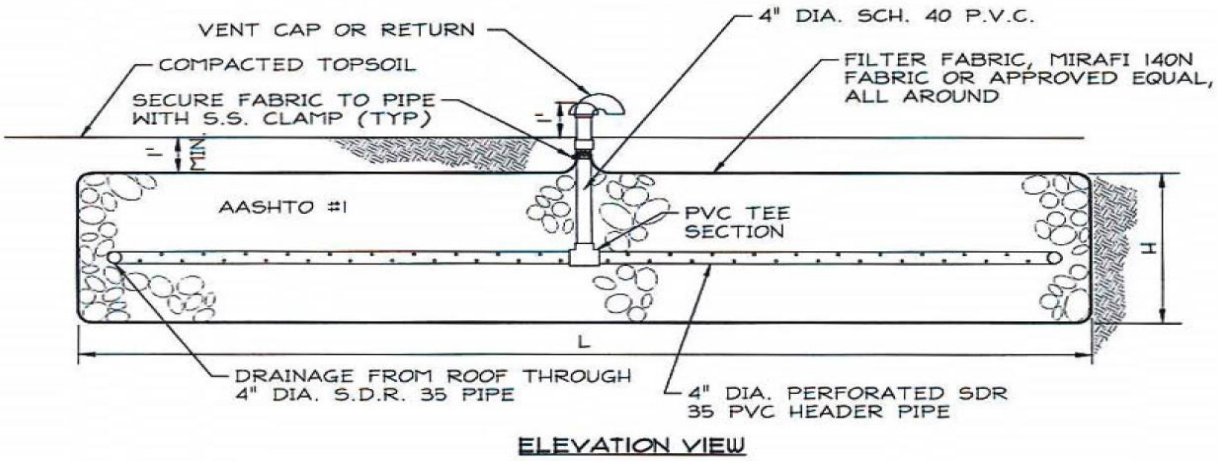
For example, following subtraction of all possible credits above, 1,500 ft^2 net of runoff to be managed can be accommodated by a 310 cubic foot infiltration trench(rounding **up** to the next value if the number is between two values).

BMP Sizing Chart								
Net Square Feet to be Managed	250	500	750	1000	1,250	1,500	1,750	2,000
Infiltration Trench Required (ft^3)	50	100	155	210	260	310	365	415

Infiltration Trenches







Pervious Pavers

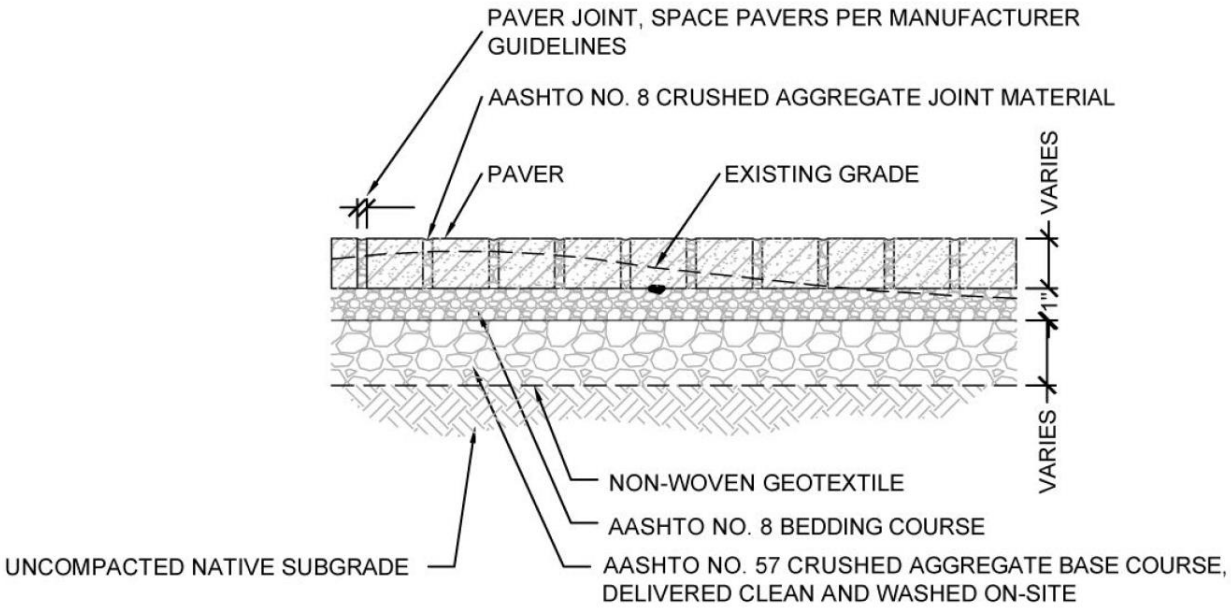
Description

A pervious paver system consist of impervious building materials such as stone, concrete or brick, laid with space in between. This space is filled with gravel, sand or vegetation creating a pervious area for runoff to infiltrate into the ground. Pervious paving is commonly used for patios, walkways, driveways and parking areas.

Recommended Resource

A recommended resource for paver installation is*: Permeable Hard-scapes (*Section 4 of the Chesapeake Stormwater Network Homeowner Guide for a More Bay- Friendly Property), http://chesapeakestormwater.net/be-bay-friendly/permeable-hardscapes/

The installation of a pervious paver system per the manufactures specifications will satisfy the stormwater management requirements for that surface.



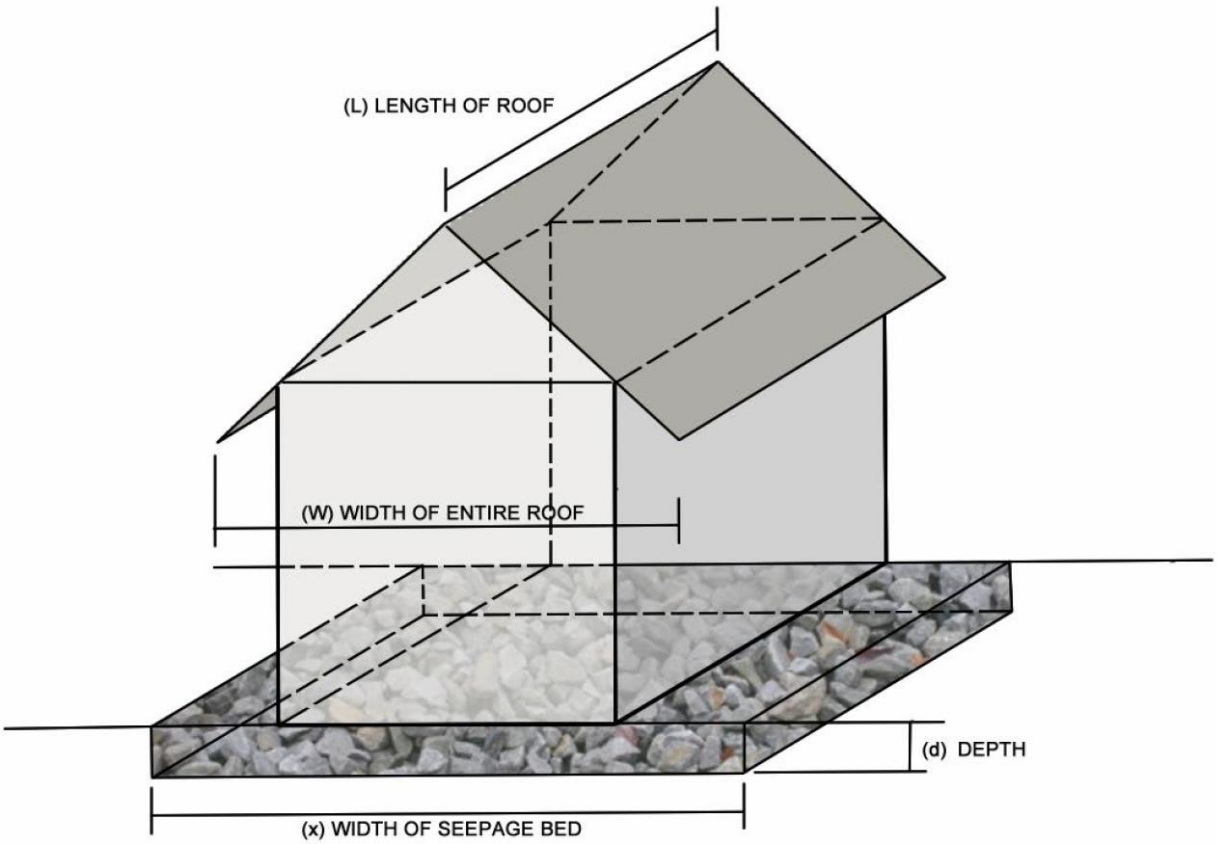
PERMEABLE PAVER INSTALLATION

Setting bed and stone base shall be per manufacture recommendation. Stone bed shall be a minimum of 6-inches deep.

Stone Bed Under a Shed

Description

A stone bed under a shed can be used to manage the runoff from the structure.



KEY
L = LENGTH OF STRUCTURE ROOF = LENGTH OF SEEPAGE BED (FT.)
W = WIDTH OF ENTIRE ROOF (FT)
x = WIDTH OF SEEPAGE BED (FT)
x = W + 2 FT
d = DEPTH OF SEEPAGE BED (FT)
d = 8"

NOTES
1.) SIDE AND BOTTOM OF BED TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
2.) BED TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
3.) BED TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
4.) BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

SMALL PROJECTS OPERATIONS AND MAINTENANCE AGREEMENT
West Donegal Township

1. Development activities shall begin only after West Donegal Township approves the Small Project and plan has been recorded at the County Recorder of Deeds office.

2. The installed Stormwater BMPs will not adversely affect any property, septic systems, or drinking water wells on this or any other property.

3. The applicant acknowledges that the proposed Disconnected Impervious Area and/or Stormwater BMPs will be a permanent fixture of the property that cannot be altered or removed without approval by West Donegal Township.

4. If, after approval of the Small Project by West Donegal Township, the applicant wishes to pursue alternative stormwater management measures in support of the project, the applicant will submit revised Small Project information and worksheets to West Donegal Township for approval. If a site requires a more complex system or if problems arise, the applicant may need the assistance of a licensed professional engineer, landscape architect or surveyor.

5. The Best Management Practices (BMPs) shall be constructed by the Landowners in accordance with the plans and specifications.

6. The Landowner shall operate and maintain the BMPs in good working order acceptable to the Township and in accordance with the specifications maintenance requirements and attached hereto as Exhibit A.

7. The Landowner hereby grants permission to the Township, its authorized agents and employees to enter upon the property, at reasonable times and upon presentation of proper identification, to inspect the BMPs whenever it deems necessary. Whenever possible the Township shall notify the Landowner prior to entering the property.

8. In the event the Landowner fails to operate and maintain the BMPs in good working order acceptable to the Township, the Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMPs. This provision shall not be construed to allow the Township to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Township is under no obligation to maintain, or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Township.

9. In the event the Township, pursuant to this Agreement, performs work of any nature, or expands any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Township for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Township.

10. The intent and purpose of the Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.

11. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Township's employees and designated representatives from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMPs by the Landowner or the Township. In the event that a claim is asserted against the Township, its designated representatives or employees, the Township shall promptly notify the Landowner and the Landowner shall defend at his own expense any suit based on the claim. If any judgment or claims against the Township's employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.

I (we) _____, hereby certify and acknowledge that I (we) understand the above Operations and Maintenance provisions and agree to assume full responsibility for the implementation, construction, operation, and maintenance of the proposed stormwater management facilities. Furthermore, I (we) also acknowledge that the steps, assumptions, and guidelines provided in this submission, including but not limited to the West Donegal Township Small Project Guidance will be adhered to.

This Agreement shall be recorded at the Office of the Recorder of Deeds of Lancaster County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, his administrators, executors, assigns, heirs, and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For the Township:

_____

For the Landowner:

_____

ATTEST:

_____ (Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the county and state aforesaid, whose commission expires on the _____ day of _____, 20_____, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 20_____, has acknowledged the same before me in my said county and state.

GIVEN UNDER MY HAND THIS _____ day of _____, 20_____.

_____ _____

NOTARY PUBLIC **(SEAL)**

APPENDIX A

MAINTENANCE OF BMPS FOR SMALL PROJECT PERMITS

Disconnected Impervious Areas/Vegetated Swales/Filter Strips/Buffers

1. The flow path for runoff from impervious areas shall be vegetated and maintained in a stable non-erosive condition. Erosion shall be repaired and vegetation re-established in a timely manner.
2. Vehicles shall not park or drive on the infiltration area and care shall be taken to avoid excess compaction by mowers or other equipment.
3. The area shall remain graded to promote sheet flow of the runoff and infiltration of the rainfall.
4. Trash and sediment shall be removed and disposed of properly and in a timely manner.

Tree Plantings

1. Trees shall be maintained in a healthy, vigorous growing condition.
2. Care shall be taken to not overly compact the ground above the tree root system.
3. Dead trees shall be replaced by the property owner within 6 months.
4. Replacement trees shall be a minimum 1 inch caliper deciduous tree or a minimum 5 foot tall evergreen tree.

Underground Infiltration Trenches, Beds or Pits/ Dry Wells/ Seepage Pits

1. Roof gutters, downspouts, roof leaders, inlets, and overflows shall be regularly inspected for leaves, trash, debris and sediment and cleaned out as necessary to maintain the system in good condition.
2. The surface vegetation shall be maintained in good condition.
3. Vehicles shall not park or drive on the infiltration area and care shall be taken to avoid excess compaction by mowers or other equipment.
4. Regularly inspect after heavy rainfall events to make sure water is being infiltrated into the soil.

Surface Retention Basins/Infiltration Basins or Berms/Rain Gardens

1. Regularly inspect the basin after heavy rainfall events to make sure the water collect drains down within approximately 3 days.
2. The flow path for runoff from impervious areas to the basin shall be maintained in a stable non-erosive condition.

3. Roof gutters, downspouts, roof leaders, inlets, and overflows shall be regularly inspected for leaves, trash, debris and sediment and cleaned out as necessary to maintain the system in good condition.
4. The vegetation on the surface of the basin shall be maintained in healthy, vigorous growing condition. Dead plant material shall be replaced within 6 months.
5. Vehicles shall not park or drive on the infiltration area and care shall be taken to avoid excess compaction by mowers or other equipment.
6. Trash and sediment shall be removed and disposed of properly and in a timely manner.
7. The berm and overflow pipe shall be maintained in good working condition.
8. Mulch cover is to be maintained, re-spread and replaced as needed to prevent erosion, reduce weed growth, and assist with plant survival, without restricting the infiltration of water.

Rain Barrels

1. The storage facility shall be routinely emptied to allow for storage of additional rainwater/subsequent rainfall events.
2. Roof gutters, downspouts, roof leaders, inlets, and overflows shall be regularly inspected for leaves, trash, debris and sediment and cleaned out as necessary to maintain the system in good condition
3. Overflow outlets shall be kept free and clear of debris.

Pervious Pavers

1. Pavers shall be maintained in accordance with specific manufacture recommendations to permit required infiltration.
2. Surface shall be maintained clear of debris, sediment, and unwanted vegetation.
3. Sand, grit and other similar type snow removal material shall not be utilized in snow removal process.
4. Infiltration stone between pavers shall be kept up to proper surface elevation.
5. Areas that have differentially settled shall be reset to grade.

APPENDIX B

Rain Garden Native Planting List

Perennials and Ferns:

Blue false indigo (Baptisia australis)
Blue flag iris (Iris versicolor)
Blue star (Amsonia tabernaemontana)
Blue vervain (Verbena hastata)
Boltonia (Boltonia asteroides)
Boneset (Eupatorium perfoliatum)
Bottlebrush grass (Hystrix patula)
Broomsedge (Andropogon virginicus)
Cardinal flower (Lobelia cardinalis)
Cinnamon fern (Osmunda cinnamomea)
Culvers root (Veronicastrum virginicum)
Golden ragwort (Senecio aureus)
Goldenrod (Solidago patula, S. rugosa)
Great blue lobelia (Lobelia siphlitica)
Green bullrush (Scirpus atrovirens)
Horsetail (Equisetum species)
Marsh marigold (Caltha palustris)
Mistflower (Eupatorium colestinum)
Monkey flower (Mimulus ringens)
New England aster (Aster novae-anglia)
New York aster (Aster novi-belgii)
Obedient plant (Physotegia virginiana)
Royal fern (Osmunda regalis)
Seedbox (Ludwigia alternifolia)
Sensitive fern (Onoclea sensibilis)
Sneezeweed (Helenium autumnale)
Soft rush (Juncus effusus)
Swamp milkweed (Asclepias incarnata)
Swamp rose mallow (Hibiscus moscheutos)
Swamp sunflower (Helianthus angustifolius)
Switchgrass (Panicum virgatum)
Threadleaf coreopsis (Coreopsis verticillata)
Tussock sedge (Carex stricta)
White turtlehead (Chelone glabra)
Woolgrass (Scirpus cyperinus)

Shrubs:

American beautyberry (Calicarpa americana)
Arrowwood (Viburnum dentatum)
Black chokeberry (Aronia melanocarpa)
Broad-leaved meadowsweet (Spirea latifolia)
Buttonbush (Cephalanthus occidentalis)
Elderberry (Sambucus canadensis)
Inkberry (Ilex glabra)
Narrow-leaved meadowsweet (Spirea alba)
Ninebark (Physocarpus opulifolius)
Possumhaw (Viburnum nudum)
Red-osier dogwood (Cornus sericea)
St. Johnswort (Hypericum densiflorum)
Silky dogwood (Cornus amomum)
Smooth alder (Alnus serrulata)
Spicebush (Lindera benzoin)
Swamp azalea (Rhododendron viscosum)
Swamp rose (Rosa palustris)
Sweet pepperbush (Clethra alnifolia)
Wild raisin (Viburnum cassinoides)
Winterberry (Ilex verticillata)
Virginia sweetspire (Itea virginica)