

Guidelines for Small Project Stormwater Management Plans & Exemptions



PENN
TOWNSHIP
LANCASTER COUNTY, PA

Introduction

This manual is designed as a tool to help Penn Township property owners manage stormwater runoff resulting from small construction projects. The management of runoff, notably the flows that result from the construction of impervious surfaces like buildings and driveways, is regulated by the Township's Stormwater Management Ordinance (Chapter 23 of the Municipal Code). Penn Township recognizes that this process can be streamlined for small projects creating no more than 5,000 square feet of new impervious surfaces in order to reduce impacts on landowners.

Stormwater is the runoff produced by precipitation and snow or ice melt. Land development activities can affect stormwater runoff characteristics, including its rate, volume, and water quality. When stormwater is not managed, the increased volume can lead to aggravated flooding in our community. Therefore, the principal objective of stormwater management is to prevent or mitigate the adverse impacts of the increase in rate and volume of stormwater runoff, while also protecting health, safety, and property.

Stormwater basins and similar facilities have been used for decades to reduce flooding impacts, but a group of Best Management Practices (BMPs) are becoming a more suitable way to deal with runoff and do the following:

- encourage infiltration (in appropriate areas)
- promote groundwater recharge
- maintain the natural drainage characteristics of a site
- maintain or improve water quality
- protect stream banks and beds

Sections 401 & 402 of the Stormwater Management Ordinance establish exemption criteria and the streamlined small project process outlined in this manual. This process is not intended to be used with large-scale subdivision or land development projects or activities that include public infrastructure like roadways. The stormwater BMPs mentioned within serve as examples and are not a comprehensive list of options. Please contact Penn Township with any questions or to discuss alternative solutions for site-specific applications.

Standard Terms Used in the Manual

BMP (Best Management Practice) – activities, facilities, control measures, planning or procedures used to minimize accelerated erosion and sedimentation and manage stormwater to protect, maintain, reclaim, and restore the quality of waters and the existing and designated uses of waters within this Commonwealth before, during and after earth disturbance activities. See also BMP, Non-structural and BMP, Structural.

BMP, Non-structural – planning and design approaches, operational and/or behavior-related practices which minimize stormwater runoff generation resulting from an alteration of the land surface or limit contact of pollutants with stormwater runoff.

BMP, Structural – physical devices and practices that capture and treat stormwater runoff. Structural stormwater BMPs are permanent appurtenances to the development site.

Disturbed Area – a land area where an earth disturbance activity is occurring or has occurred.

Earth Disturbance Activity – construction or other human activity which disturbs the surface of the land, including, but not limited to: clearing and grubbing; grading; excavations; embankments; land development; agricultural plowing or tilling; operation of animal heavy use areas; timber harvesting activities; road maintenance activities; oil and gas activities; well drilling; mineral extraction; building construction; and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials.

Flow Path – the path that stormwater follows from the discharge point to the nearest property line or channelized flow (i.e. stream, drainage ditch, etc.). The length of the path is measured along the ground slope.

Impervious Surface (or Impervious Area) – surfaces which prevent the infiltration of water into the ground. All structures, buildings, parking areas, driveways, roads, streets, sidewalks, decks, and any areas of concrete, asphalt, packed stone, and compacted soil shall be considered impervious surface if they prevent infiltration.

Karst – a type of topography or landscape characterized by features including but not limited to surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

Regulated Activities – activities, including earth disturbance activities that involve the alteration or development of land in a manner that may affect stormwater runoff. Regulated activities shall include, but not be limited to:

- Land development subject to the requirements of the Penn Township Subdivision and Land Development Ordinance;
- Removal of ground cover, grading, filling or excavation;
- Construction of new or additional impervious or semi-impervious surfaces (driveways, parking lots, etc.), and associated improvements;
- Construction of new buildings or additions to existing buildings;
- Installation or alteration of stormwater management facilities and appurtenances thereto;
- Diversion or piping of any watercourse; and,
- Any other regulated activities where the municipality determines that said activities may affect any existing watercourse's stormwater management facilities, or stormwater drainage patterns.

Runoff – that part of precipitation which flows over the land.

Small Project Stormwater Management Plan – a plan prepared and submitted for regulated activities which meet the small project stormwater management plan criteria in the Township Stormwater Management Ordinance. The plan depicts existing conditions on the property, proposed impervious areas, and, if required, the location of proposed BMPs.

SWM Ordinance – the Penn Township Stormwater Management Ordinance.

What Type of Stormwater Management Submission is Needed?

Under the SWM Ordinance, regulated activities require the preparation and submission of an engineered stormwater management plan to be reviewed and approved by the Township. Alternative provisions have been adopted for projects that propose no more than 5,000 square feet of impervious area and meet certain criteria. These categories are referred to as “exemptions” and “small projects”, and the criteria listed below will help determine eligibility. Ultimately, Sections 401 & 402 of the SWM Ordinance govern and should be consulted in the case that interpretation is needed.

EXEMPTIONS TO THE SWM ORDINANCE

❖ NON-CONSTRUCTION-RELATED: Are you proposing any of the following non-construction projects? These activities are specifically exempt from the plan preparation and submission requirements of the SWM Ordinance.

- Normal agricultural activities
- Forest management and timber operations
- Implementation of a conservation plan
- Landscaping and/or vegetable gardening

❖ CONSTRUCTION-RELATED: Certain construction activities resulting in increased impervious areas may also be eligible for an exemption from the plan preparation and submission requirements. Does your project fit either of these two scenarios?

1. Your lot is subject to an approved stormwater management plan – likely part of a subdivision plan – that includes future impervious surface coverage assigned to individual lots.

NEXT STEP: Contact the Township Office for details and to determine eligibility.

2. Your lot is NOT subject to an approved stormwater management plan, and the construction project will create no more than 1,000 square feet of impervious area.¹ If so, your project may be exempt if the following criteria can be met:

- Environmentally sensitive areas (e.g. floodplains, riparian corridors, steep slopes, natural drainageways, etc.) will not be disturbed.
- Existing drainage or stormwater easements will not be disturbed.
- Disturbed areas will either be revegetated or covered by the new impervious area.
- Runoff will be directed to pervious areas on the lot, NOT onto streets or neighboring properties.
- Known problem areas or downstream properties will not be adversely impacted by the new runoff.
- The quality of runoff entering the Township’s storm sewer system will not be degraded.
- Erosion will not be created by the new runoff.

¹ The 1,000 square feet of impervious area permitted by an exemption is measured cumulatively from January 1, 2011.

NEXT STEP: Submit the following to the Township to request an exemption:

- Completed *Small Project Stormwater Management Plan/Exemption Application*

STORMWATER MANAGEMENT THROUGH THE SMALL PROJECT PROCESS

If your construction project does not meet the exemption criteria above, the small project process may be right for you. Although this streamlined process does not allow for a full exemption from the submission of a stormwater management plan, the *Small Project Stormwater Management Worksheet* and sample BMP details included in this manual are provided to help you or your contractor prepare a small project stormwater management plan. More information on how to prepare the plan can be found in the worksheet itself.

The primary criteria for this process are:

- ✓ The amount of impervious area will not be greater than 10% of the lot size or 5,000 square feet, whichever is less.²
- ✓ The distance between a BMP(s) managing the resultant runoff and any property line will be at least 5 feet.
- ✓ Any earth disturbance greater than 5,000 square feet will be managed by an Erosion & Sedimentation Control Plan that must be on site at all times during construction. Earth disturbances over 1 acre must be managed by an Erosion & Sedimentation Control Plan approved by the Lancaster County Conservation District.

NEXT STEP: Contact the Township to discuss whether this is appropriate for your project, and then submit the following to begin the application process:

- Completed *Small Project Stormwater Management Plan/Exemption Application*
- *Small Project Stormwater Management Worksheet*
- Small project stormwater management plan

The *Storm Water Management Agreement and Declaration of Easement* must be signed and notarized following the Township's approval of the application. Although the executed document will not be submitted with the application, it is required prior to commencement of construction. It will be recorded at Lancaster County Office of the Recorder of Deeds so it will be connected to the property's title for future reference.

Note: Applications that meet the above criteria may be required to manage stormwater and provide formal plans and calculations as required by the SWM Ordinance if the Township determines that the activity poses a potential for runoff to adversely affect adjacent or downstream property.

² The maximum amount of impervious area permitted to be added through the small project process is cumulative from the date of April 29, 2014.

The Small Project Application Package

After the Township has determined that your project can be submitted under the small project process, the application package must be prepared. Complete the *Small Project Stormwater Management Plan/Exemption Application* and the *Small Project Stormwater Management Worksheet* to get started. The worksheet includes step-by-step instructions for calculating the amount of runoff from the proposed impervious area that must be managed and the volume of the BMP(s) to accommodate it. Steps 1-3 use simple tables and arithmetic to guide these calculations, which lead into the subsequent steps.

SELECTING A STORMWATER BMP

The minimum size of the BMP is determined by the amount of stormwater that must be managed and the type of facility it is. However, there are other considerations that should be evaluated when deciding which BMP is best for your lot and construction project; such as size, maintenance responsibilities, and constraints of the site. Generally speaking, above-ground BMPs such as rain gardens and earth berms detain water while allowing the vegetated area to provide some pollution reduction benefits. Subsurface BMPs like infiltration trenches and dry wells are hidden from sight, but need to be sized 250% larger than the volume to be managed since they are filled with stone. The voids between the stone provide the storage area for the stormwater.

As referenced in Step 4 of the worksheet, several stock stormwater BMP construction details can be found at the rear of this manual or at the Township Office and are available for you or your contractor to use. Depending on the volume calculations and desired type of stormwater facility, the stock details can be customized with the required dimensions and submitted to the Township with the application package. If another type of BMP is desired, the *PA Stormwater Management BMP Manual* (which is available for download on the Penn Township website or for viewing at the Township Office) should be consulted. This document identifies stormwater BMPs that have been deemed to be of a nature and cost that will accomplish the goals of the Lancaster County Stormwater Management Plan, while not unduly burdening Penn Township's landowners. It is your decision to use a stock detail available through the Township or have a qualified professional design a facility found in the BMP Manual. Multiple BMPs may be ideal for your situation and acceptable to the Township.

CREATING THE SMALL PROJECT STORMWATER MANAGEMENT PLAN

An essential requirement of the small project application package is the small project stormwater management plan. This plan depicts the existing conditions of a property, new impervious areas, stormwater BMP(s), and routing or grading to convey the runoff to the BMP(s). Illustrating the relationship between the proposed activities and distances to features like property lines, streams, and vegetated areas will help determine how best to accommodate the stormwater runoff and minimize impacts to other properties.

It is your responsibility to prepare and submit the stormwater management plan with the application package, but assistance may be available from the Township to obtain access to property maps or GIS information with some existing features. Please note that the larger or more complex the project is, the more appropriate it may be for a contractor, surveyor, or other professional to prepare the plan and to consider having a professional evaluate the viability and potential economic benefits of modeling, designing and installing stormwater facilities. Step 5 of the *Small Project Stormwater Management Worksheet* contains a thorough list of features to be shown on the plan, in addition to considerations for its preparation.

Small Project Stormwater Management Worksheet

Step 1: Calculate the amount of new impervious surface area and total disturbed area to be created by the proposed project by completing the table below. New stone and gravel areas are considered to be impervious.

Surface	Length (ft)	x	Width (ft)	=	Impervious Area (ft ²)
Buildings		x		=	
Driveway		x		=	
Parking Areas		x		=	
Patios/ walkways		x		=	
Other		x		=	
Total Proposed Impervious Surface Area (Sum of all impervious areas to be managed)					
Area of Grading, Filling, Earth Disturbance (excluding Impervious Area)					
Total Proposed Disturbed Area (Impervious Area plus Area of Grading, Filling, Earth Disturbance)					

NOTE: If an area greater than 5,000 square feet of earth is disturbed, an erosion and sedimentation (E&S) control plan must be prepared. Penn Township may require that the E&S plan be submitted to, reviewed, and approved by the Lancaster County Conservation District prior to approval of the small project stormwater site plan.

Step 2: Calculate the volume of stormwater runoff created by new impervious surfaces. Use the following table to determine this volume.

Impervious Area (ft ²) to be Managed (See Step 1)	x	3.0 in/12 in = 0.25 ft (3.0 in is approx. 2-year 24-hour rainfall amount)	=	Volume of Stormwater to be Managed (ft ³)
	x	0.25 ft	=	

Step 3: Determine the techniques to be used to manage the stormwater volume calculated in Step 2 and prepare the minor stormwater management plan. The sizing of the structural BMPs depends on the type of facility – surface or subsurface. For the purposes of this worksheet, use the applicable table below to calculate the required volume of the facility.

(a) Surface BMP Facilities (e.g. rain garden or earth berm)

Volume of Stormwater to be Managed (ft ³)	x	Conversion Factor	=	Minimum Volume of Surface BMP (ft ³)
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	X	1.0	=	
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(b) Subsurface BMP Facilities (e.g. dry well or infiltration trench)

Volume of Stormwater to be Managed (ft ³)	X	Conversion Factor	=	Minimum Volume of Subsurface BMP (ft ³)
	X	2.5*	=	

* Assumes clean stone with 40% voids is used as storage volume.

Step 4: Provide construction details for the BMP(s) with dimensions sufficient to provide the required storage volume as determined in Step 3. Sample construction details for selected BMPs, including those mentioned in Step 3, are available at the Township Office for use and customization. The sample details can easily be filled in with the proper dimensions. Alternatively, you may have custom details prepared by your contractor or design professional.

EXAMPLE: 1,100 ft² of impervious area is proposed to be constructed on a lot. The table in Step 2 shows that 275 ft³ of volume of stormwater runoff must be managed from this new area. A decision must be made to use a surface or a subsurface BMP. Based on Step 3, the volume of the BMP depends on this decision.

Either a surface BMP with a volume of 275 ft³ or a subsurface BMP with 690 ft³ can be used to accommodate the project. A rain garden with dimensions of 11'x 25'x 1' could be used to achieve the necessary storage volume. Alternatively, an infiltration trench with dimensions of 23'x 10'x 3' will achieve this storage volume underground.

Step 5: Prepare a small project stormwater management plan and submit it to the Township Office for review and approval. The plan must depict the following site features, be drawn to scale, and show the following:

- 1) Property owner name, address, email and phone number
- 2) Property address (if different from owner address)
- 3) Tax account number
- 4) Name, address, phone number & email address of plan preparer
- 5) Property boundary
- 6) Site conditions (e.g. grassed areas, agricultural fields, direction of slope and stormwater flow on the property)
- 7) Location and dimensions of all existing and proposed structures, and any existing and proposed downspouts
- 8) Distance from proposed downspouts to downstream property line(s)
- 9) All existing and proposed driveways and other impervious areas (stone and gravel driveways are considered impervious)
- 10) Natural features such as streams, wetlands, floodplains, tree lines and other vegetation on the property and within 50 feet of property lines

- 11) Distance from proposed structures or downspouts along the stormwater flow path to any stream or wooded area
- 12) Any other pertinent information that may be significant to the project site (e.g. existing drainage ways, steep slopes, exposed bedrock, upslope drainage areas, etc.)
- 13) Wells and on-lot sanitary sewer systems (e.g. septic tank, drainfield, etc.)
- 14) Surface and subsurface utilities
- 15) Existing and proposed easements (e.g. gas, electric, stormwater, water, sewer, etc.)
- 16) Location and size of proposed stormwater BMPs

The following should be considered in the preparation of small project stormwater management plans:

- Soil testing is highly recommended to select and apply the appropriate stormwater BMPs. The use of soil maps, infiltration tests, and/or perc tests may provide the applicant basic information about soil characteristics. In situations where more than 2,000 square feet of impervious area is proposed, soil testing is required. However, the Township reserves right to require testing in any situation based on site-specific concerns.
- Proposed stormwater BMPs must be designed to handle flows from the contributing area.
- The site shall not have any pre-existing stormwater drainage-related problems (as verified by the Township), at the discretion of the Township.
- Water quality shall be protected per Chapter 93 of PA Code.
- Penn Township may inspect all stormwater BMPs during and after construction and installation.
- Infiltration BMPs should not be constructed nor receive runoff until the entire contributory drainage area has achieved final stabilization.
- Ensure that infiltration in geologically susceptible areas such as, but not limited to, carbonate geology/karst topography do not cause adverse effects. The site plan should incorporate steps to ensure that salt or chloride will not contaminate the groundwater.
- Selected stormwater BMPs shall be designed, constructed, and maintained in accordance with the manufacturer's recommendation, acceptable construction details, the *PA Stormwater Management BMP Manual*, or other written guidance acceptable to the Township.
- Proposed sump pumps shall discharge to infiltration or vegetated stormwater BMPs to the maximum extent practicable, with maximum separation from downstream property lines in order to avoid adverse impacts to adjacent and downstream properties.

Step 6: Sign the *Storm Water Management Agreement and Declaration of Easement*. This document is available at the Township Office as an electronic file or hard copy.

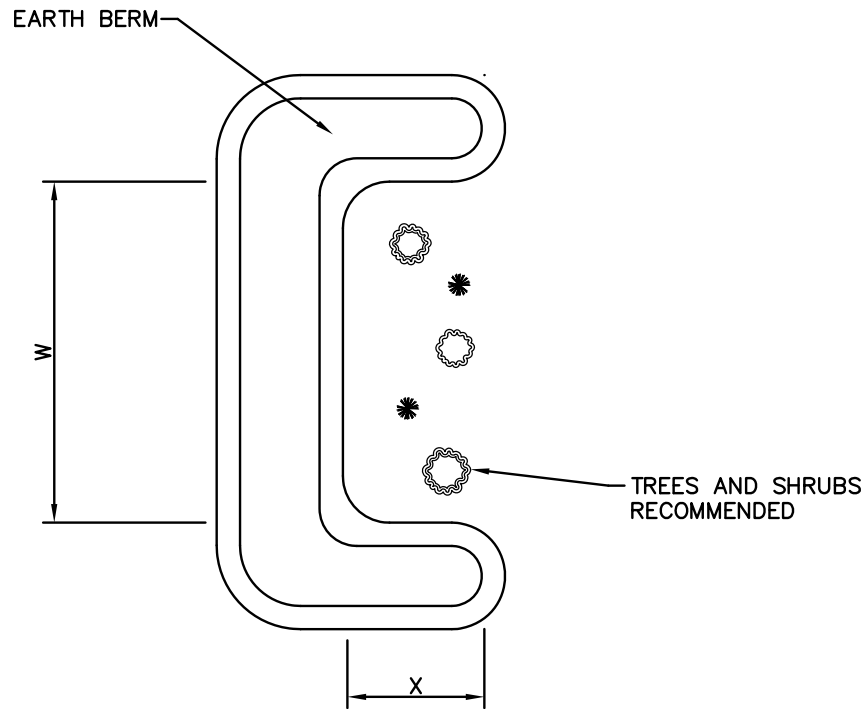
Storm Water Management Agreement and Declaration of Easement

It is the landowner's responsibility to properly maintain BMPs and to inform any future buyers of the function, operation, and maintenance of BMPs on the property prior to its sale. The *Storm Water Management Agreement and Declaration of Easement* outlines the responsibilities of the landowner for the various BMP(s) that could be installed as part of the project as well as the rights of the Township to inspect the facility and enforce the maintenance requirements.

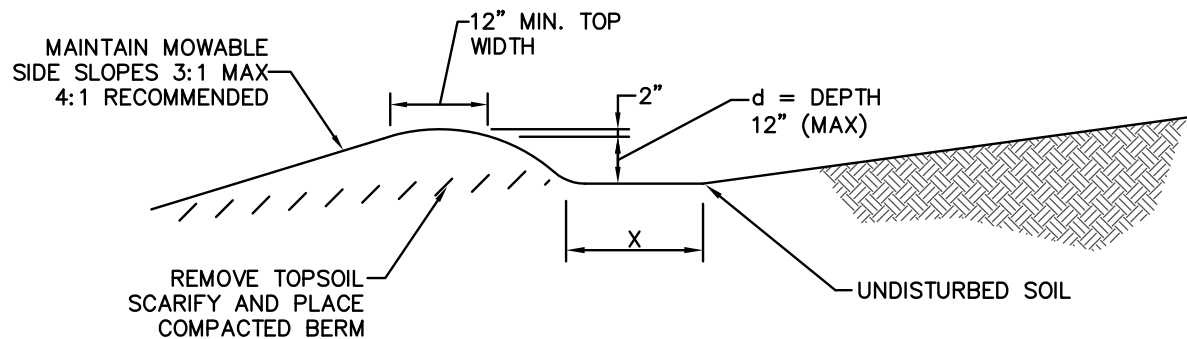
The *Storm Water Management Agreement and Declaration of Easement* must be signed, notarized and submitted to Penn Township prior to commencing construction. Following approval and signature by the Township, the agreement must be recorded at the Lancaster County Office of the Recorder of Deeds so it will be available to future landowners and title searches. The document can be obtained from the Township Office in electronic or hard copy format.

Sample Stormwater BMP Construction Details

The following pages contain sample construction details of acceptable BMPs for use with small projects. If custom details from a design professional are not needed, these can be modified to incorporate the necessary dimensions to provide the minimum volume needed to manage the runoff calculated in the *Small Project Stormwater Management Worksheet*. For an electronic copy of the details or assistance with adapting them to your project, contact the Township Office.



PLAN VIEW



SECTION VIEW

KEY:

REQUIRED VOLUME (RV) FROM WORKSHEET = _____

STORAGE VOLUME OF BED (SV) = $X \cdot W \cdot d$ = _____

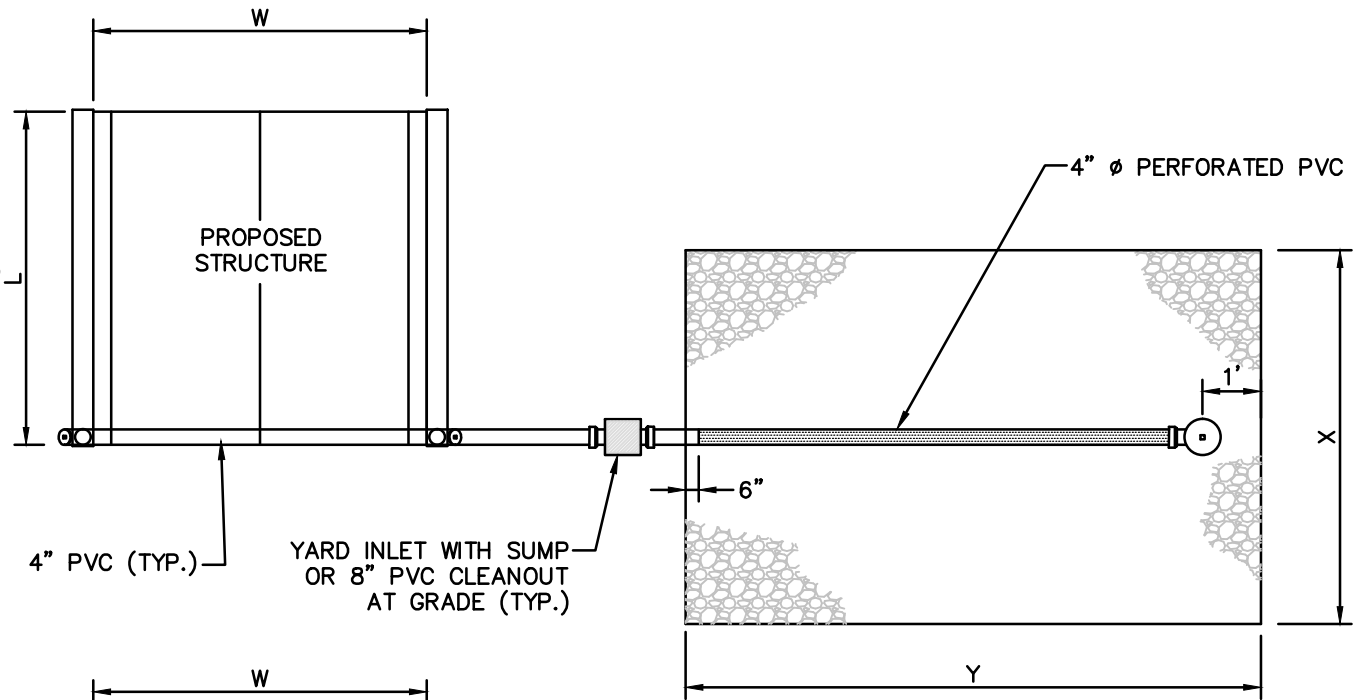
IS $SV > RV$ _____

NOTES:

1. STORAGE AREA BEHIND BERM AND INTENDED FOR INFILTRATION SHALL NOT BE COMPACTED.
2. CONSIDER SCARIFYING SOIL AND USING AMENDED SOIL TO INHANCE AND MAXIMIZE INFILTRATION.

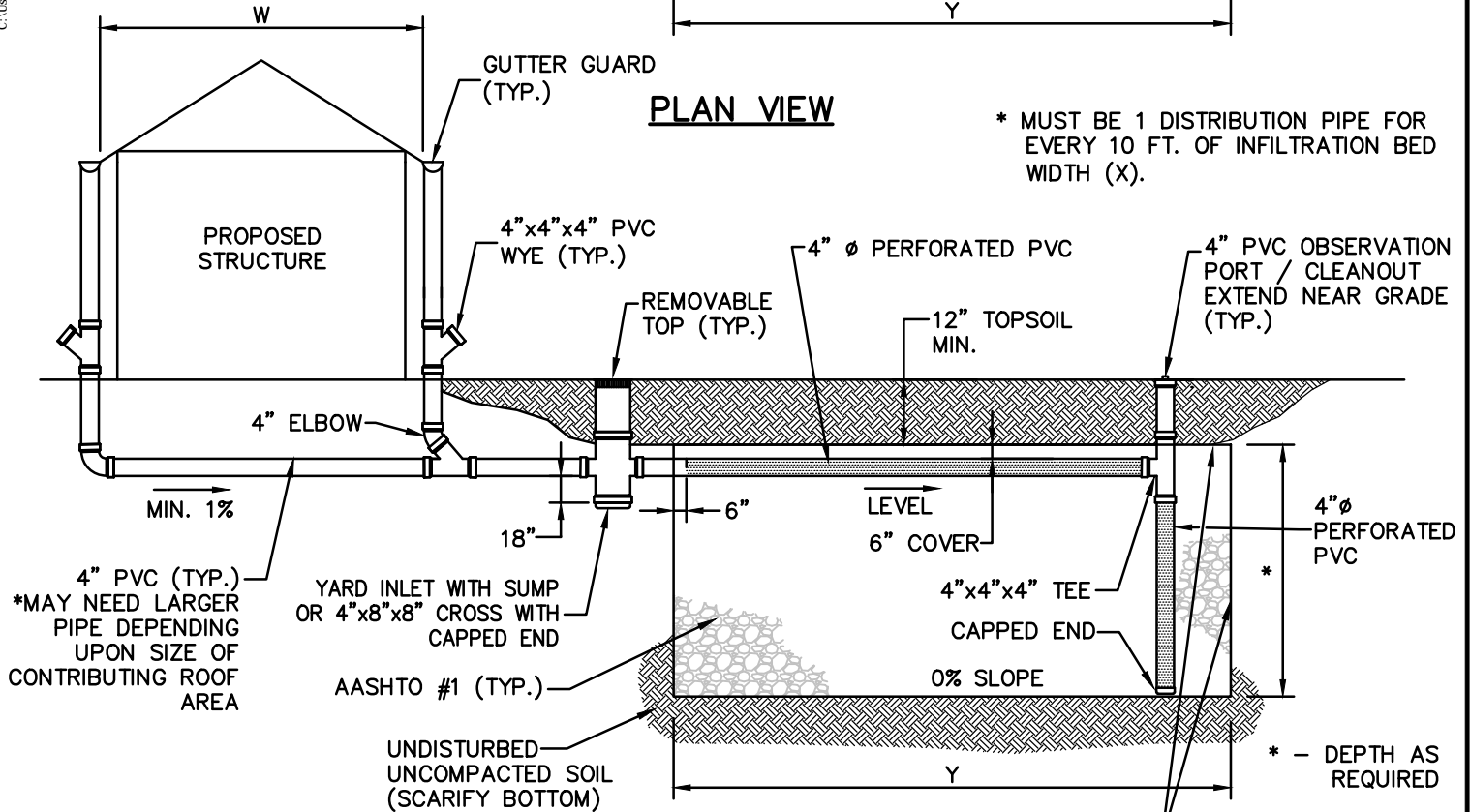
EARTH BERM

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PLAN VIEW

* MUST BE 1 DISTRIBUTION PIPE FOR EVERY 10 FT. OF INFILTRATION BED WIDTH (X).



SECTION VIEW

WRAP TOP AND SIDES IN CLASS 1 NON-WOVEN GEOTEXTILE

NOTES:

L = LENGTH OF STRUCTURE ROOF (FT.)
W = WIDTH OF ENTIRE ROOF (FT.)
X = WIDTH OF INFILTRATION BED (FT.)
Y = LENGTH OF INFILTRATION BED (FT.)

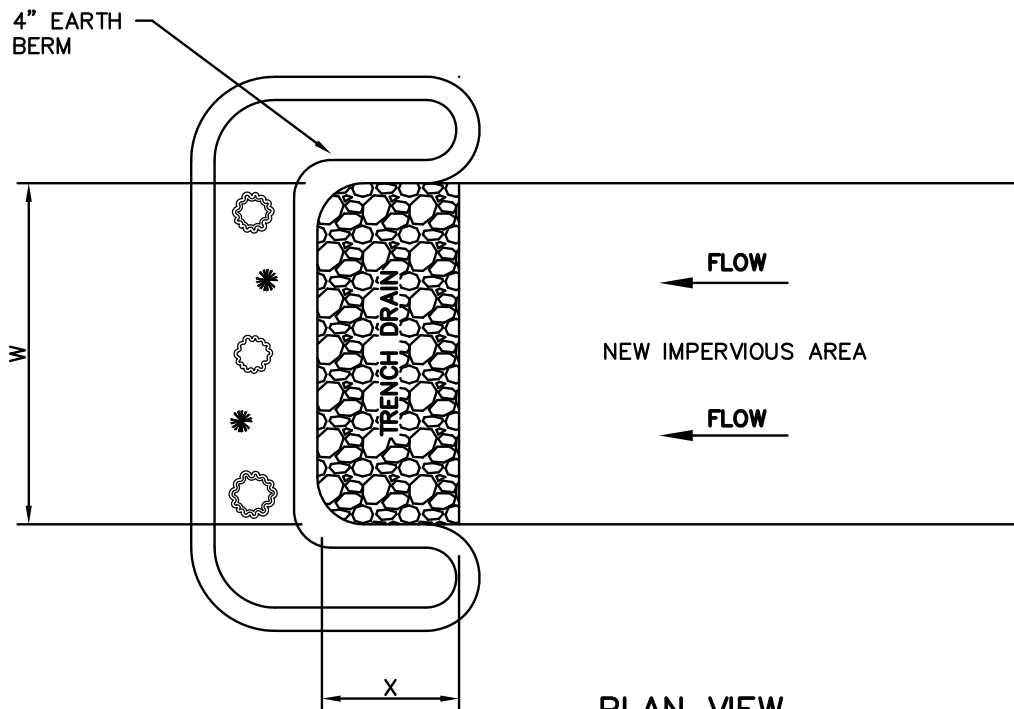
REQUIRED VOLUME (RV) FROM WORKSHEET
STORAGE VOLUME OF BED = $X \cdot Y \cdot D \cdot 0.4$
IS SV > RV _____

NOTES:

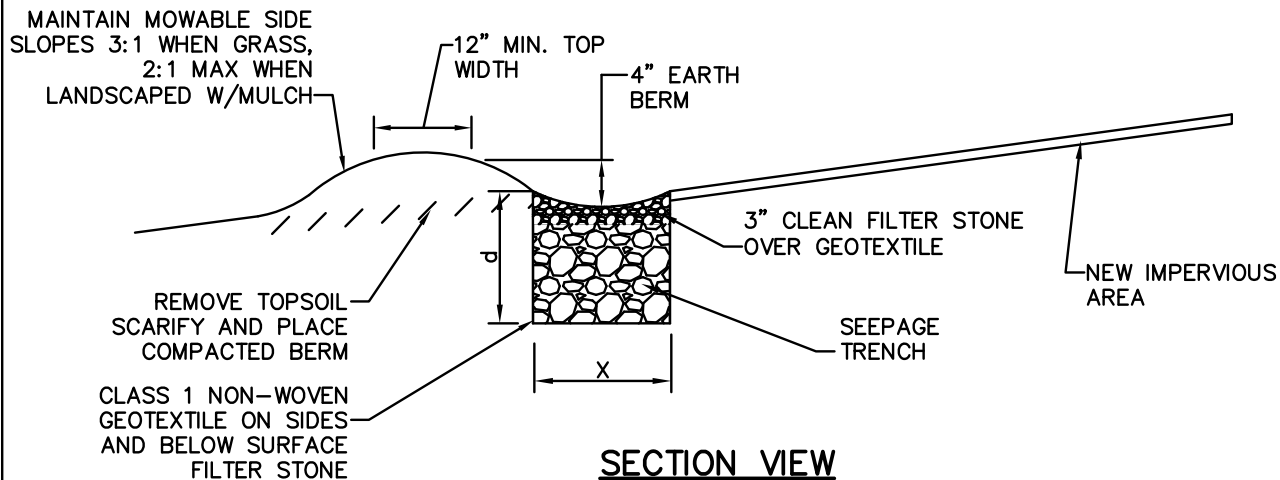
1. BED BOTTOM AREA CAN BE NO LESS THAN 20% OF IMPERVIOUS AREA CONTRIBUTING TO IT (5:1 MAX LOADING RATIO).
2. PIPING AND CLEANOUTS TO BE CENTERED WITHIN INFILTRATION BED.
3. BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.
4. IDENTIFY OVERFLOW LOCATIONS.

INFILTRATION BED

NTS



PLAN VIEW



SECTION VIEW

KEY:

W = WIDTH OF NEW IMPERVIOUS SURFACE = LENGTH OF SEEPAGE TRENCH (FT.)

X = WIDTH OF SEEPAGE TRENCH (FT)

d = DEPTH OF SEEPAGE TRENCH (FT)

REQUIRED VOLUME (RV) FROM WORKSHEET = _____

STORAGE VOLUME OF BED (SV) = $X \cdot W \cdot d \cdot 0.4$ _____

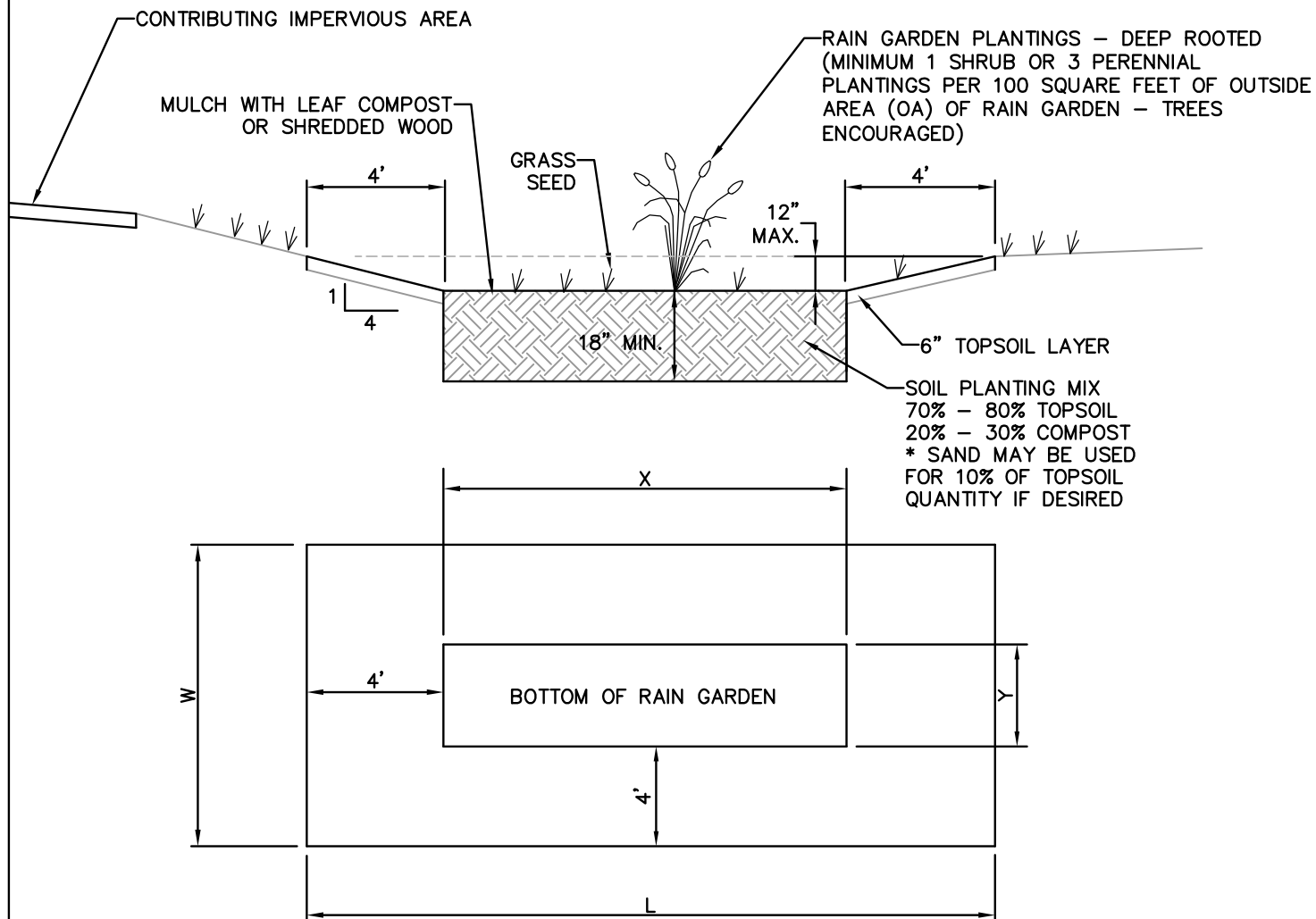
IS SV > RV _____

NOTES:

1. SIDE AND BOTTOM OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
2. TRENCH TO BE FILLED WITH CLEAN STONE AASHTO #1.
3. TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
4. TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.
5. A LAWN AREA MAY BE LOCATED BETWEEN THE NEW IMPERVIOUS AREA AND INFILTRATION TRENCH AS LONG AS THE RUNOFF FROM NEW IMPERVIOUS AREA IS CONVEYED TO INFILTRATION TRENCH.

INFILTRATION TRENCH

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1. REQUIRED RAIN GARDEN VOLUME FROM WORKSHEET (RV)

RV = _____ ft³

2. CALCULATE OUTSIDE AREA OF RAIN GARDEN (OA)
(OA) = LENGTH (L) X WIDTH (W)

OA = _____ ft²

3. CALCULATE INSIDE AREA OF RAIN GARDEN (IA)
(IA) = [X] X [Y]

IA = _____ ft²

4. CALCULATE AVERAGE AREA OF RAIN GARDEN (AA)
(AA) = (OA)/2 + (IA)/2

AA = _____ ft²

5. CALCULATE STORAGE VOLUME (SV)
(SV) = (AA) X 1.0'

SV = _____ ft²

6. CHECK FOR ADEQUATE STORAGE
STORAGE VOLUME (SV) MUST BE GREATER THAN REQUIRED VOLUME (RV)
RV = _____ ft³ > SV = _____ ft³

7. ADJUST RAIN GARDEN SIZE
IF STORAGE VOLUME (SV) IS NOT GREATER THAN REQUIRED VOLUME (RV), INCREASE THE SIZE OF THE RAIN GARDEN AND REPEAT STEPS 2–6

RAIN GARDEN

NTS