

## **Appendix C: Credit Worksheets and Details**



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## **Antrim Township Stormwater Fee Credit Program – Tier 2**

### **Calculation Worksheet Instructions**

1. Any BMP edit must be in addition to the stormwater management BMP(s) required for your property. “Double-counting” the required stormwater management BMPs will not be permitted.
2. For each Infiltration Bed or Rain Garden proposed to generate, complete Worksheet 1 to determine the volume of water flowing to the device in a typical rainfall event. If you plan to install multiple BMP’s, complete a new Worksheet #1 for the drainage flowing to each one. If you are proposing an area of amended soils, Worksheet #1 can be skipped.
3. Depending upon the type of BMP proposed, complete the appropriate credit worksheet. If you plan to install multiple BMP’s, complete the applicable worksheet for each one.
  - a. Use worksheet 2 for an infiltration bed.
  - b. Use worksheet 3 for a rain garden.
  - c. Use worksheet 4 for amended soils.
4. On worksheet 5, sum the for all BMPs you plan to install. If you only plan to install one BMP, it is not necessary to complete worksheet 5.
5. Review the construction detail for each BMP you have selected, including any notes. Identify the area(s) on your property where you would like to install the BMP(s).
6. Contact Antrim Township to schedule the necessary inspections and apply your credit.

Antrim Township Stormwater Management Fee Credit Program - Tier 2  
Worksheet #1 - Runoff Volume Calculation

RUNOFF VOLUME CALCULATION			
Line	Quantity	Value	Instructions
101	Impervious Drainage Area Length (ft)		Enter length of the impervious drainage area flowing to the BMP
102	Impervious Drainage Area Width (ft)		Enter width of the impervious drainage area flowing to the BMP
103	Drainage Area (s.f.)		Multiply lines 2 and 3 and enter the result here
104	Runoff Volume (cf)		Divide line 103 by <u>4.46</u> and enter the result here

**Certification (must be completed by applicant)**

I \_\_\_\_\_ hereby certify that by submitting this worksheet I agree to  
(Printed Name)

reimburse Antrim Township for all associated costs with the review, inspection, permitting, and other costs incurred as a result of each BMP proposed regardless of whether the system is approved or installed.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

Antrim Township Stormwater Management Fee Credit Program - Tier 2  
Worksheet #2

INFILTRATION BED CREDIT CALCULATION WORKSHEET			
Line	Quantity	Value	Instructions
201	Runoff volume flowing to the Infiltration Bed (cf)		Enter the value from line 104 on Worksheet 1
202	Length of infiltration bed (ft)		Enter length of the infiltration bed you plan to build
203	Width of infiltration bed (ft)		Enter width of the infiltration bed you plan to build
204	Depth of infiltration bed (ft)		Enter depth of the infiltration bed you plan to build (3' maximum)
205	Area of storage bed (square feet)		Multiply line 202 by line 203 and enter the value here
206	Volume of stone required (Cubic feet)		Multiply line 204 by line 205 and enter the value here
207	Volume of stone required (Cubic yards)		Divide line 206 by <u>27</u> and enter the value here
208	Volume of storage provided in stone (cubic feet)		Divide line 206 by <u>2.5</u> and enter the value here
209	Volume of runoff removed (cubic feet)		Compare line 208 to line 201 and enter the <u>smaller</u> of the two values here
210	Impervious Area credit (square feet)		Multiply line 209 by <u>4.46</u> and enter the value here
<b>211</b>	<b>Credit</b>		Divide line 210 by <u>4,130</u> and enter the value here

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\_\_\_\_\_  
(Date)

Antrim Township Stormwater Management Fee Credit Program - Tier 2  
Worksheet #3

RAIN GARDEN CREDIT CALCULATION WORKSHEET			
Line	Quantity	Value	Instructions
301	Runoff volume flowing to the Rain Garden (cf)		Enter the value from line 104 on Worksheet 1
302	Length of rain garden bottom (ft)		Enter length of the bottom of the rain garden you plan to build
303	Width of rain garden bottom (ft)		Enter width of the bottom of the rain garden you plan to build
304	Depth of ponding area (ft)		Enter the depth of the ponding area for the rain garden you plan to build (1/2 foot maximum)
305	Depth of amended soils (ft)		Enter the depth of the amended soils for the rain garden you plan to build (2 foot maximum)
306	Area of rain garden bottom (square feet)		Multiply line 302 by line 303 and enter the value here
307	Volume of amended soils required (Cubic feet)		Multiply line 305 by line 306 and enter the value here
308	Volume of amended soils required (Cubic yards)		Divide line 307 by <u>27</u> and enter the value here
309	Volume of storage provided in amended soils (cubic feet)		Divide line 307 by <u>5</u> and enter the value here
310	Volume of storage provided in ponding area (cubic feet)		Multiply line 304 by line 306 and enter the value here
311	Volume of runoff removed (cubic feet)		Add lines 309 and 310 and enter the value here
312	Impervious Area credit (square feet)		Multiply line 311 by <u>4.46</u> and enter the value here
313	Credit		Divide line 312 by <u>4,130</u> and enter the value here

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(Signature)

\_\_\_\_\_  
(Date)

Antrim Township Stormwater Management Fee Credit Program - Tier 2  
Worksheet #4

AMENDED SOILS CREDIT CALCULATION WORKSHEET			
Line	Quantity	Value	Instructions
401	Length of Amended Soils Area (ft)		Enter the length of the proposed amended soils area
402	Width of Amended Soils Area (ft)		Enter the width of the proposed amended soils area
403	Area of Amended Soils		Multiply line 401 with line 402 and enter the result here
404	Volume of runoff removed (cubic feet)		Divide line 403 by <u>24</u> and enter the value here
405	Impervious Area credit (square feet)		Multiply line 404 by <u>4.46</u> and enter the value here
<b>406</b>	<b>Credit</b>		Divide line 405 by <u>4,130</u> and enter the value here

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(Signature)

\_\_\_\_\_  
(Date)

Antrim Township Stormwater Fee Credit Program  
Worksheet #5

CREDIT SUMMARY WORKSHEET			
Line	Quantity	Value	Instructions
501	Total credit from infiltration bed(s)		Sum the total credits from line 211 for all infiltration beds you plan to install and enter the value here
502	Total credit from rain garden(s)		Sum the total credits from line 313 for all of the rain gardens you plan to install and enter the value here
503	Total credit from amended soils area(s)		Sum the total credits from line 406 for all of the amended soils you plan to install and enter the value here
504	Total Credit		Add lines 501, 502, and 503 together and enter the value here

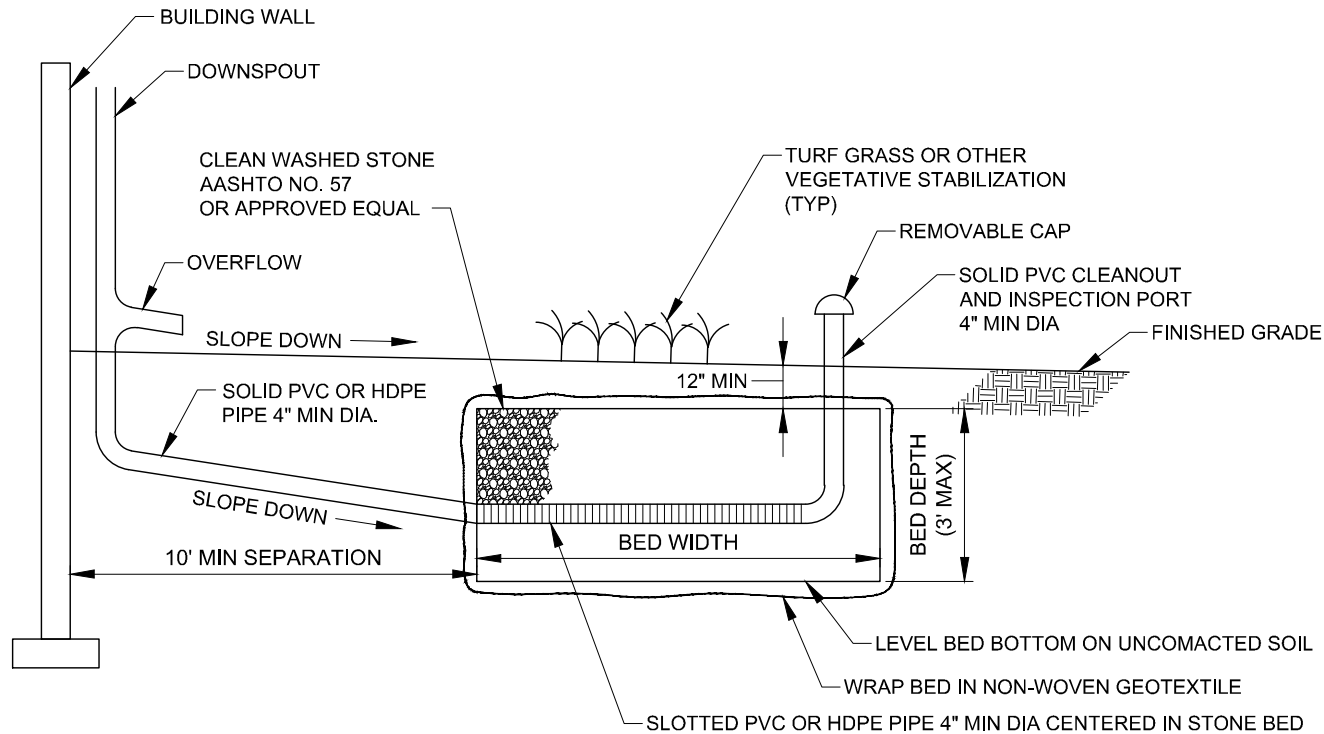
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\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)



**INFILTRATION BED:**

1. CONSTRUCTION EQUIPMENT SHALL NOT BE PERMITTED TO DRIVE ON THE INFILTRATION BED FOOTPRINT AT ANY STAGE OF THE CONSTRUCTION ACTIVITIES.
2. INFILTRATION BED BOTTOM CANNOT BE SITUATED ON BEDROCK OR SATURATED SOILS. IF EITHER CONDITION IS ENCOUNTERED DURING CONSTRUCTION, THE BMP CANNOT BE CREDITED TOWARD AN ERU REDUCTION.
3. WHEN THE EXCAVATION IS COMPLETE BUT BEFORE PLACING GEOTEXTILE OR STONE, TILL OR SCARIFY THE SOILS AT THE BOTTOM OF THE EXCAVATION TO A DEPTH OF AT LEAST 3 INCHES.
4. DOWNSPOUTS MUST BE EQUIPPED WITH AN OVERFLOW DEVICE TO PERMIT DISCHARGE OF DRAINAGE WHEN THE INFILTRATION BED IS FULL. DOWNSPOUT DRAINAGE MUST BE DIRECTED AWAY FROM THE FOUNDATION AND OVER A STABILIZED, VEGETATED AREA.
5. THE CLEANOUT AND INSPECTION CAP PORT MUST BE LOCATED IN AN AREA THAT IS ACCESSIBLE TO TOWNSHIP STAFF.



DEWBERRY ENGINEERS INC.  
100 STERLING PARKWAY  
SUITE 201  
MECHANICSBURG, PA 17050

**ANTRIM TOWNSHIP STORMWATER  
MANAGEMENT FEE CREDIT PROGRAM**

**OWNER:** ANTRIM TOWNSHIP  
10655 ANTRIM CHURCH ROAD  
GREENCASTLE, PA 17225  
717-597-3818 EXT 124

**TITLE:**

**INFILTRATION  
BED**

**DRAWN BY:**  
SWK

**DESIGNED BY:**  
JMH

**CHECKED BY:**  
JMH

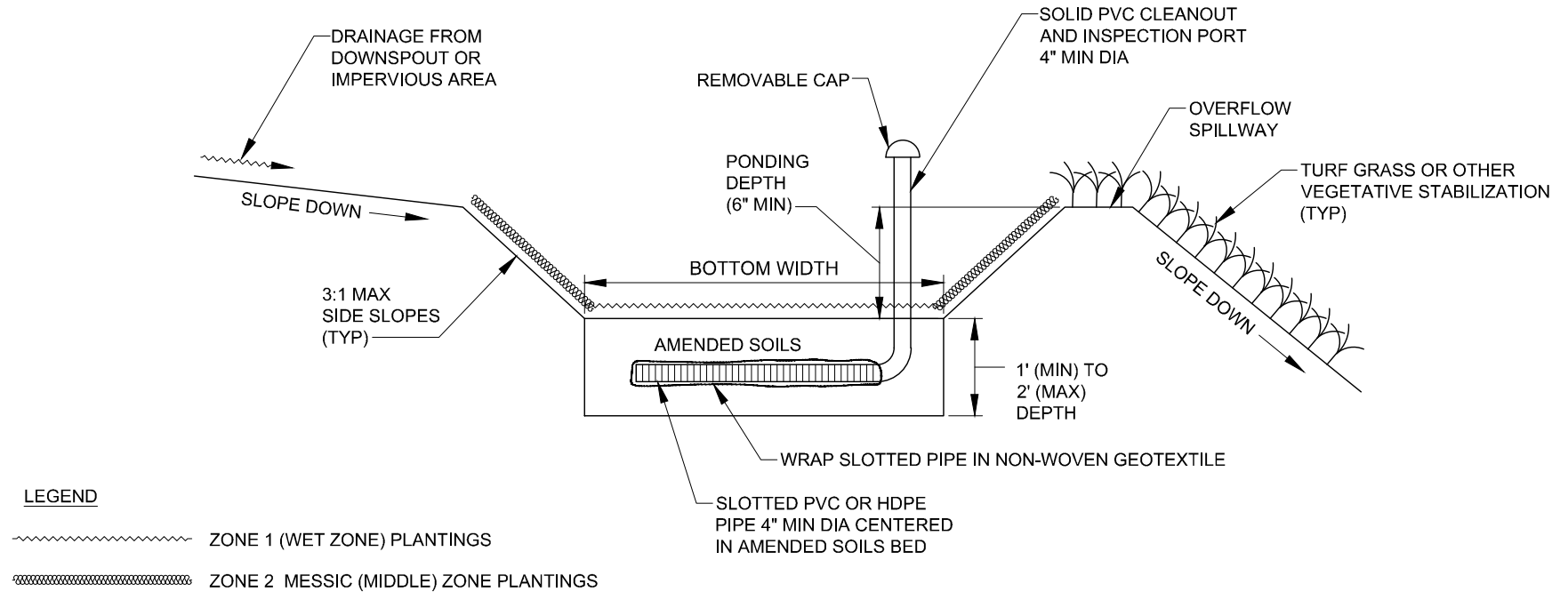
**PROJ. NO.:**  
50099039

**SCALE:**  
N.T.S.

**DATE:**  
01/25/2019

**SHEET NO.:**  
1 OF 3





#### RAIN GARDEN

1. CONSTRUCTION EQUIPMENT SHALL NOT BE PERMITTED TO DRIVE ON THE RAIN GARDEN BOTTOM FOOTPRINT AT ANY STAGE OF THE CONSTRUCTION ACTIVITIES.
2. THE AMENDED SOILS BED CANNOT BE SITUATED ON BEDROCK OR SATURATED SOILS. IF EITHER CONDITION IS ENCOUNTERED DURING CONSTRUCTION, THE BMP CANNOT BE CREDITED TOWARD AN ERU REDUCTION.
3. WHEN THE EXCAVATION IS COMPLETE BUT BEFORE PLACING AMENDED SOILS, TILL OR SCARIFY THE SOILS AT THE BOTTOM OF THE EXCAVATION TO A DEPTH OF AT LEAST 3 INCHES.
4. AMENDED SOILS MIX SHALL BE AS FOLLOWS:
  - A. 20-30% ORGANIC MATERIAL (COMPOST)
  - B. 60-70% TOPSOIL
  - C. 5-10% SAND
5. PROVIDE SUFFICIENT PLANTING DENSITY TO RESIST THE GROWTH OF WEEDS AND INVASIVE SPECIES. REPLACE ANY PLANTINGS THAT DO NOT SURVIVE. PLANTING MATERIALS SHALL BE NATIVE TO PENNSYLVANIA AND SUITABLE FOR THE SOIL SATURATION CONDITIONS FOUND IN A RAIN GARDEN. REFER TO THE PENN STATE EXTENSION'S ARTICLE TITLED "RAIN GARDENS-THE PLANTS" FOR A LIST OF SPECIES THAT ARE APPROPRIATE FOR ZONE 1 AND ZONE 2.



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#### ANTRIM TOWNSHIP STORMWATER MANAGEMENT FEE CREDIT PROGRAM

OWNER: ANTRIM TOWNSHIP  
10655 ANTRIM CHURCH ROAD  
GREENCASTLE, PA 17225  
717-597-3818 EXT 124

TITLE:

## RAIN GARDEN

DRAWN BY:  
SWK

DESIGNED BY:  
JMH

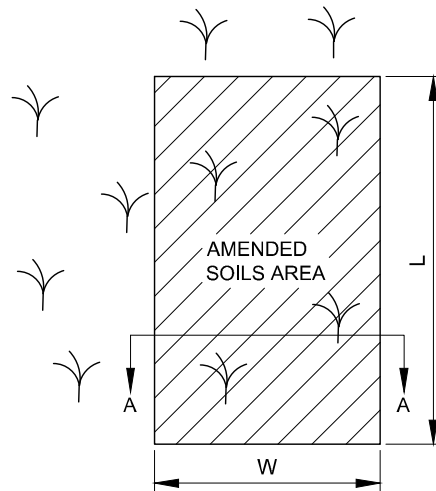
CHECKED BY:  
JMH

PROJ. NO.:  
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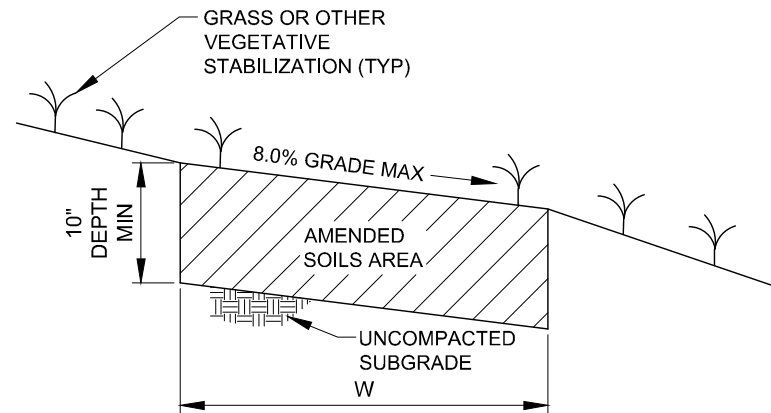
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N.T.S.

DATE:  
01/25/2019

SHEET NO.:  
2 OF 3



PLAN



CROSS SECTION A-A

#### AMENDED SOILS

1. DO NOT ALLOW CONSTRUCTION EQUIPMENT TO COMPACT THE SUBGRADE BENEATH THE AMENDED SOILS AREA
2. THE AMENDED SOILS MIXTURE SHALL BE:
  - a. 20-30% ORGANIC MATERIAL (COMPOST)
  - b. 60-70% TOPSOIL
  - c. 5-10% SAND
3. AMENDED SOILS MAY BE MIXED ON-SITE, OR PROVIDED BY AN OFFSITE SUPPLIER, AS FOLLOWS:
  - a. ON-SITE MIXING
    - i. EXCAVATE THE AMENDED SOILS AREA TO A DEPTH OF 10 INCHES. IF DESIRED, RESERVE THE TOPSOIL MATERIAL FOR INCORPORATION INTO THE AMENDED SOILS MIXTURE.
    - ii. PLACE LAYERS OF ORGANIC MATERIAL, NATIVE AND/OR IMPORTED TOPSOIL, AND SAND AT THE PROPORTIONS SPECIFIED ABOVE.
    - iii. MIX THOROUGHLY USING A GARDEN TILLER OR SIMILAR LIGHTWEIGHT EQUIPMENT. DO NOT COMPACT AMENDED SOILS WITH THE MIXING EQUIPMENT.
    - iv. WATER THE AMENDED SOILS AREA TO ACHIEVE INITIAL SETTLING OF THE SOILS. ADD ADDITIONAL TOPSOIL IF NECESSARY TO CORRECT AREAS OF EXCESSIVE SETTLING.
    - v. IMMEDIATELY SEED AND MULCH THE DISTURBED AREA.
    - vi. WATER AS NEEDED TO ESTABLISH VEGETATIVE COVER.
  - b. OFF-SITE SUPPLY
    - i. EXCAVATE THE AMENDED SOILS TO A DEPTH OF 10 INCHES. INCORPRATE THE EXCAVATED MATERIAL ELSEWHERE ON-SITE OR DISPOSE OF IT IN AN APPROVED LOCATION.
    - ii. PLACE COMMERCIALY SOURCED AMENDED SOILS MEETING THE MIXTURE REQUIREMENTS ABOVE. DO NOT ALLOW EARTHMOVING EQUIPMENT TO COMPACT THE AMENDED SOILS AREA.
    - iii. WATER THE AMENDED SOILS AREA TO ACHIEVE INITIAL SETTLING OF THE SOILS. ADD ADDITIONAL TOPSOIL IF NECESSARY TO CORRECT AREAS OF EXCESSIVE SETTLING.
    - iv. IMMEDIATELY SEED AND MULCH THE DISTURBED AREA.
    - v. WATER AS NEEDED TO ESTABLISH VEGETATIVE COVER.
4. AMENDED SOILS MUST BE MAINTAINED IN AN UNCOMPACTED STATE. DO NOT PARK VEHICLES, TRAILERS, OR OTHER EQUIPMENT ON THE AMENDED SOILS AREA. DO NOT DRIVE ON THE AMENDED SOILS AREA WITH ANYTHING HEAVIER THAN LAWN MAINTENANCE EQUIPMENT.



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TITLE:

AMENDED  
SOILS

DRAWN BY:  
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3 OF 3