STORM WATER MANAGEMENT PLAN APPLICATION
Manheim Borough

DATE_____

Application is hereby made to Manheim Borough for the issuance of a Storm Water Management Plan approval pursuant to the Manheim Borough Storm Water Management Ordinance.

1. Name of Property Owner(s):_____

   Address:_____ Phone No._____

   _____

2. Project Location:_____

   _____

3. Brief Description of Work to be Performed:_____

   _____
   _____
   _____
   _____

4. Amount of Impervious Cover Proposed (sq. ft.):_____

5. Amount of Disturbed Area (sq. ft.):_____

The SWM Plan shall comply with the Ordinance requirements. For projects with 1,000 square feet of new impervious surfaces or less, a basic sketch of the lot configuration, building location, and proposed improvements shall be shown on 8 ½ x 11 sheets for informational purposes.

5. Name of Applicant (if other than owner):_____

Address: _____Phone No._____

The undersigned hereby represents that, to the best of his knowledge and belief, all information listed above and on the storm water management plan herewith submitted is true, correct and complete.

_____ _____

Date Signature of Applicant

STORM WATER MANAGEMENT PLAN EXEMPTION APPLICATION

Date Received		Manheim Borough File Number		Property Account #	
Submitted Fee	$		Approval of Application Date		

↑↑↑ (above information to be completed by Manheim Borough) ↑↑↑

↓↓↓ (below information to be completed by Applicant) ↓↓↓

By my signature below, I certify to Manheim Borough that, to the best of my knowledge, the following statements are true:

- The Proposed Activity will not result in the disturbance of land within Floodplains, Wetlands, Environmentally Sensitive Areas, Riparian Forest Buffers, or slopes greater than 15%.
- The Proposed Activity will not be conducted within any existing drainage or storm water easement created by or shown on any recorded plan.
- The Proposed Activity will minimize soil disturbance, take steps to minimize Erosion during construction activity, and promptly reclaim all disturbed areas with topsoil and vegetation.
- The Proposed Activity will not adversely impact any existing known problem areas or downstream property owners or the quality of Runoff entering any Storm Sewer.
- I will minimize soil disturbance, take steps to minimize Erosion during construction activity, and promptly reclaim all disturbed areas with topsoil and vegetation.
- I will take steps to insure that Runoff will be directed to Pervious Areas on the subject property. No Runoff will be directed onto an abutting street or neighboring property.
- I acknowledge the Borough's right to review the provided information, at my expense, and to deny this application or to revoke this permit application if any of the above statements are found to be false.

Project Street Address _____

Owner's Name _____

Signature: _____

Phone# / Fax# / Email: _____

Person/Firm to be completing work: _____

Signature: _____

Phone# / Fax# / Email: _____

Description of Existing Conditions and Proposed Activity:

- After _____ *(INSERT ENFORCEMENT DATE)* has any impervious surface been previously installed on this property?
  - [ ] No
  - [ ] Yes, Total area of previously installed impervious surface _____ sq. ft

- Are you removing existing impervious surface as part of this project?
  - [ ] No
  - [ ] Yes, Total area of impervious surface to be removed _____ sq. ft

- Addition of impervious surface (1,000 square feet or less)

  Total area of new impervious surface proposed _____ sq. ft.

  Type of new impervious surface: [ ] driveway, [ ] shed, [ ] garage, [ ] deck, [ ] walkway, [ ] other (please describe)

  _____

- Removal of ground cover, grading, filling, or excavation of an area

Total area of land disturbance: _____ sq. ft.

Type of regulated removal activity (check all that apply): [ ] Ground Cover, [ ] Grading, [ ] Filling, [ ] Excavation,

[ ] Other earth disturbance activity (please describe) _____

_____

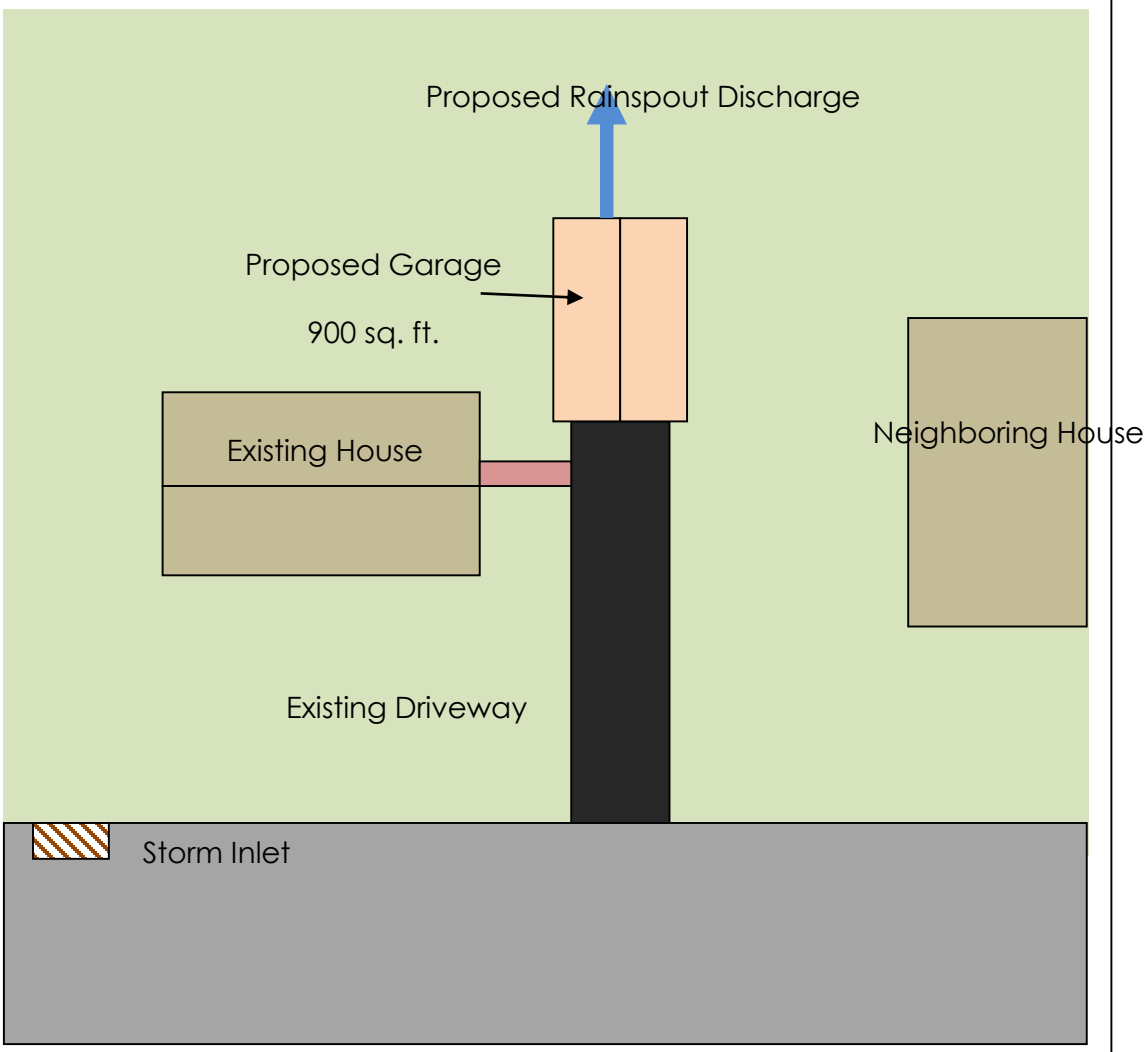
Sketch

Provide a sketch of the proposed additional impervious area or land disturbance.

- Show direction of proposed storm water discharges
- Show all structures within 50 feet of site
- If storm sewers are present, show approximate location of inlets
- Indicate square footage of proposed impervious area or land disturbance

EXAMPLE EXEMPTION PROJECT SKETCH

- Show direction of proposed storm water discharges
- Show all structures within 50 feet of site
- If storm sewers are present, show approximate location of inlets
- Indicate square footage of proposed impervious area or land disturbance



Minor Land Disturbance/Small Project
Worksheets, Design Tables & Construction Notes

The following guidance has been provided for those regulated activities that qualify as a Minor Land Disturbance/Small Project. The Retention Volume/Removed Runoff computed below represents the volume required per Section 506 of the Manheim Borough Storm Water Management Ordinance. This volume represents the amount of runoff to be permanently removed (managed onsite through reuse, infiltration, evaporation, or transpiration). The volume does not account for the rate of percolation into the ground.

Variables: A = Impervious Area (Square Foot)
V = Retention Volume/Removed Runoff

Compute Required Retention Volume:

V = 0.2 x A
or;
V = 0.2 x _____ = _____cu. ft.

Once the Retention Volume/Removed Runoff (V) has been calculated, the following table can be utilized to select the corresponding volume of a variety of BMP options.

Sizing Chart for Various Storm Water BMP's

Impervious Area (sq-ft)	Retention Volume/Removed Runoff (cu-ft)	Cubic Feet of Infiltration Trench Storage (incl. 40% void ratio)	Square Feet of Rain Garden Surface Area (6" Depth)	Gallons of Storage in Cistern	Linear Feet of 8' Wide Swale w/ Check Dam (6" Ponding Depth)
500	100	250	200	748	25
750	150	375	300	1122	37.5
1000	200	500	400	1496	50
1250	250	625	500	1870	62.5
1500	300	750	600	2244	75
1750	350	875	700	2618	87.5
2000	400	1000	800	2992	100
2250	450	1125	900	3366	112.5
2500	500	1250	1000	3740	125
2750	550	1375	1100	4114	137.5
3000	600	1500	1200	4488	150
3250	650	1625	1300	4862	162.5
3500	700	1750	1400	5236	175
3750	750	1875	1500	5610	187.5
4000	800	2000	1600	5984	200
4250	850	2125	1700	6358	212.5
4500	900	2250	1800	6732	225
4750	950	2375	1900	7106	237.5
5000	1000	2500	2000	7480	250

Infiltration Trench

Total Trench Depth = _____ inches of stone + 12 inches of cover = _____ inches*
*must be between 24 inches and 40 inches

Depth of Stone (D) = _____ feet (inches of stone divided by 12)

Width (W) = _____ feet

Length (L) = _____ feet

Note: Depth of Stone x Width x Length x 40% (for voids) must be equal to or greater than (V) Retention Volume/Removed Runoff.

Trench Volume = D x W x L x 0.4 = _____

Vegetated Swale w/ Check Dam

Storage Volume Provided = (Length) x (Bottom Width) x (Ponding Depth)

Ponding Depth (D) = _____ feet

Width (W) = _____ feet

Length (L) = _____ feet

Note: Ponding Depth is measured from the bottom of the swale to the top of the check dam. Storage volume provided must be equal to or greater than the Retention Volume/Removed Runoff.

Storage Volume = L x W x D = _____

Rain Garden

Storage Volume Provided = (Length) x (Width) x (Depth)
(or for irregular shapes) Storage Provided = (Surface Area) x (Depth)

Depth (D) = _____ feet

Width (W) = _____ feet

Length (L) = _____ feet

Note: Storage volume provided must be equal to or greater than the Retention Volume/Removed Runoff.

Storage Volume = L x W x D = _____ or Surface Area x D = _____

Cistern

Storage Volume Provided in Circular Cistern (cu-ft) = [Radius (ft)]^2 x [Height (ft)] x (3.14)

Storage Volume Provided in Circular Cistern (gal) = [Radius (ft)]^2 x [Height (ft)] x (3.14) x (7.48)

Radius of Cistern (R) = _____ feet

Height (H) = _____ feet

Note: Storage volume provided must be equal to or greater than the Retention Volume/Removed Runoff.

Storage Volume Provided in Circular Cistern (cu-ft) = [R]^2 x [H] x (3.14) = _____

Storage Volume Provided in Circular Cistern (gal) = [R]^2 x [H] x (3.14) x (7.48) = _____

Infiltration Trench Construction - General Notes

1. Use the worksheets and table to compute the required volume in the infiltration trench (in cubic feet) for all proposed impervious areas. The calculated total volume is the minimum requirement for on-site construction. The actual horizontal dimensions of the infiltration trench may vary to fit specific site configurations and constraints, but the vertical depth of the infiltration trench must be a minimum of twenty-four (24) inches and a maximum of forty (40) inches. The total volume of the infiltration trench must be equal to or greater than the required minimum Retention Volume/Removed Runoff.

2. Multiple stone infiltration trenches may also be utilized. If multiple infiltration trenches are desired, the volume for each infiltration trench should be a proportional amount of the calculated total storage volume (i.e. utilizing two [2] trenches, if 60 percent of the total roof area is piped to one infiltration trench, then that infiltration trench should be sized for 60 percent of the total required minimum volume. The second infiltration trench would then be sized for the remaining 40 percent of the total required minimum volume.).

3. Based on the calculations of the required infiltration trench dimensions computed using the worksheet and table, stake out the locations of the infiltration trench corners. Staking is critical and should outline the location of the infiltration trench. The infiltration trench should be located as far as possible downslope from the proposed home (10’ min.) while maintaining at least 10’ to property lines and 20’ to any existing roadways. The infiltration trench should also be located beside or downslope (10’ min.) of any proposed on-lot sewage drain field or sewage drain field replacement area, or if that is not possible, as far as possible from any proposed on-lot sewage drain field or sewage drain field replacement area.

4. Excavation of the infiltration trench should be conducted from outside of the infiltration trench perimeter, preferably from the upslope side, using equipment which has a bucket on a reaching arm. If equipment is permitted in the infiltration trench area, it should be limited to lightweight, track vehicles. If wheeled equipment enters the infiltration trench area, or the infiltration trench

bottom is smeared as a result of scraping with a bucket, the soil in the bottom of the infiltration trench should be chiseled or ripped to break up any compaction; if necessary, equipment operation on top of some aggregate placed in the infiltration trench will protect the soil beneath.

5. After excavation of the infiltration trench is complete, ensure that the bottom is graded with a slope that is no greater than two (2) inches per one hundred (100) feet. Then, line the infiltration trench sides with Class 1 Geotextile filter fabric while leaving enough excess filter fabric to cover the infiltration trench before it is backfilled with earthen fill. If multiple runs of filter fabric are required to completely enclose the infiltration trench, a minimum of 12 inches overlapping must be provided. This filter fabric layer keeps the fine particles of the backfilled soil from moving down through the stone and clogging the infiltration trench.

6. Connect roof drain leaders from downspouts to infiltration facility leaving trenches open for inspection. If project involves paved surface (such as driveway or parking) rather than building, perform grading to direct runoff either overland or via storm water collection system and into infiltration trench.

7. Aggregate (clean washed stone with no fines in the range of coarse aggregate sizes from AASHTO #1 to AASHTO #57) is then placed in the infiltration trench. This should be done without permitting heavy equipment, especially trucks, to travel in the infiltration trench area. The stone is deposited in the infiltration trench to a uniform depth of a minimum of six (6) inches which must leave at least eighteen (18) inches of depth between the surface of the stone and the top of the infiltration trench. The perforated pipe (minimum four [4] inch PVC) with cleanout pipe extension should then be placed on the stone.

8. At this time, before more stone is placed in the infiltration trench to cover the pipe, or roof leader trenches are backfilled, the Borough should be notified for inspection of the facility to verify proper pipe installation.

9. Following the Borough inspection, add more stone around and over the pipe to a uniform depth a minimum of two (2) inches over the top of the pipe. Carefully cover the top of the stone bed with the remaining Geotextile fabric, being careful to overlap a minimum of twelve (12) inches.

10. The infiltration trench should then be backfilled to the top of the infiltration trench with at least twelve (12) inches of clean earth fill. The fill should be mounded slightly to allow for settling.

11. To ease maintenance of the underground pipes, and prevent clogging of the infiltration trench, consideration should be given to providing screens for all roof gutters. The screens prevent foreign materials from clogging the pipes and stone infiltration trench.

Rain Garden Construction - General Notes

1. Use the worksheet and table to compute the required volume in the rain garden (in cubic feet) for all proposed impervious areas. The calculated total volume is the minimum requirement for on-site construction. The actual horizontal dimensions of the infiltration trench may vary to fit specific site configurations and constraints, but the vertical depth of the rain garden should not exceed six (6) inches. The total volume of the infiltration trench must be equal to or greater than the required minimum Retention Volume/Removed Runoff.

2. Multiple rain gardens may also be utilized. If multiple rain gardens are desired, the volume for each rain garden should be a proportional amount of the calculated total storage volume (i.e. utilizing two [2] rain gardens, if 60 percent of the total roof area is piped to one rain garden, then that rain garden should be sized for 60 percent of the total required minimum volume. The second rain garden would then be sized for the remaining 40 percent of the total required minimum volume.).

3. Based on the calculations of the required rain garden dimensions computed using the worksheets and table, stake out the locations of the rain garden corners. Staking is critical and should outline the location of the rain garden. The rain garden should be located as far as possible downslope from the proposed home while maintaining at least 10' to property lines and 20' to any existing roadways. The rain garden should also be located beside or downslope (10' min.) of any proposed on-lot sewage drain field or sewage drain field replacement area, or if that is not possible, as far as possible from any proposed on-lot sewage drain field or sewage drain field replacement area.

4. Excavation of the rain garden should be conducted from outside of the rain garden perimeter, preferably from the upslope side, using equipment which has a bucket on a reaching arm. The existing subsurface soils should be scarified but not compacted. The side slopes of the rain garden should be no steeper than 3:1. The planting soil depth in the rain garden should be at least 18 inches deep below the bottom of the elevation of the rain garden and should be a mixture of 30% organic material (compost) and 70% topsoil. Soil amendments typically consist of topsoil relocated from other on-site areas containing 20% to 30% compost or manufactured silt loam mix containing 20% to 30% compost.

5. Backfill rain garden with amended soils as noted above to the proposed bottom elevation of facility. Connect roof drain leaders from downspouts or perform grading to direct runoff from overland impervious areas to rain garden and notify for inspection.

6. At this time, before planting and placement of compost layer, the Borough should be notified for inspection of the facility to verify proper installation.

7. Following the Borough inspection, plant vegetation in the rain garden and add a two (2) inch to three (3) inch layer of shredded mulch or leaf compost. The amended soils should be overfilled to allow for settlement and lightly hand tamped in place. Presoaking the amended soils is recommended prior to planting. The plant selection should be suited to a variety of wet and dry weather conditions.

Vegetated Swale Construction - General Notes

1. Use the worksheet and table to compute the required volume in the swale (in cubic feet) for all proposed impervious areas. The calculated total volume is the minimum requirement for on-site construction. The total volume of the swale must be equal to or greater than the required minimum Retention Volume/Removed Runoff.

2. Multiple swales may also be utilized. If multiple rain gardens are desired, the volume for each rain garden should be a proportional amount of the calculated total storage volume (i.e. utilizing two [2] swales, if 60 percent of the total roof area is piped to one swale, then that swale should be sized for 60 percent of the total required minimum volume. The second swale would then be sized for the remaining 40 percent of the total required minimum volume.).

3. Based on the calculations of the required swale dimensions computed using the worksheets and table, stake out the locations of the swale. Staking is critical and should outline the location of the swale. The swale should be located as far as possible downslope from the proposed home while maintaining at least 10' to property lines and 20' to any existing roadways. The swale should also be located beside or downslope (10' min.) of any proposed on-lot sewage drain field or sewage drain field replacement area, or if that is not possible, as far as possible from any proposed on-lot sewage drain field or sewage drain field replacement area.

4. Excavation of the swale should be conducted from outside of the swale perimeter, preferably from the side, using equipment which has a bucket on a reaching arm. The existing subsurface soils should be scarified but not compacted. The side slopes of the swale should be no steeper than 3:1 for a trapezoidal shape. A parabolic swale shape may also be utilized. The planting soil depth in the swale should be at least 18 inches deep below the bottom of the elevation of the swale and should be a mixture of 30% organic material (compost) and 70% topsoil. Soil amendments typically consist of topsoil relocated from other on-site areas containing 20% to 30% compost or manufactured silt loam mix containing 20% to 30% compost.

5. Backfill swale with amended soils as noted above to the proposed bottom elevation of facility. Install check dams at a minimum height of six (6) inches using materials such as natural wood, stone, or earth. The check dams are intended to promote infiltration, improve filtering, and decrease the runoff rate. Direct roof drain leaders from downspouts or perform grading to direct runoff from overland impervious areas to swale and notify for inspection.

6. At this time, before planting and seeding, the Borough should be notified for inspection of the facility to verify proper installation.

7. Following the Borough inspection, seed and vegetate the swale. Presoaking the amended soils is recommended prior to planting. The plant selection should be suited to a variety of wet and dry weather conditions.

Cistern - General Notes

1. Use the worksheet and table to compute the required volume in the cistern (in cubic feet) for all proposed impervious areas. The calculated total volume is the minimum requirement for on-site construction. The total volume of the cistern must be equal to or greater than the required

minimum Retention Volume/Removed Runoff. The applicant needs to consider the usage requirements for the water stored in the cistern so that the necessary storm water storage volume is available for use.

2. Multiple cisterns may also be utilized. If multiple cisterns are desired, the volume for each cistern should be a proportional amount of the calculated total storage volume (i.e. utilizing two (2) cisterns, if 60 percent of the total roof area is piped to one cistern, then that cistern should be sized for 60 percent of the total required minimum volume. The second cistern would then be sized for the remaining 40 percent of the total required minimum volume.).

3. The cistern and any associated conveyance piping should be marked as “Reclaimed Water, Do Not Drink” and shall not be connected to domestic or commercial potable water systems

4. Cisterns should be protected from direct sunlight as much as possible to reduce the risk of algae growth. Cisterns should be emptied during winter to reduce the risk of freezing.

5. Cisterns should be watertight with overflow outlets located several inches below the top of the cistern for emergency overflow purposes. The location of the cistern relative to any buildings should be considered in terms of potential overflow.