

**PENN TOWNSHIP REVIEW CHECKLIST  
POST REGULATED EARTH DISTURBANCE ACTIVITY WATER QUALITY REQUIREMENTS**

Name of Project: \_\_\_\_\_ Date Project Received by EADS: \_\_\_\_\_ Developer's Contact Person: \_\_\_\_\_  
 Project Plans Reviewed by: \_\_\_\_\_ Date of Review: \_\_\_\_\_ Review Acknowledged: \_\_\_\_\_ Date Acknowledged: \_\_\_\_\_ Developer's Email Address: \_\_\_\_\_

Code Section	Code Requirement	Plans Meet Code	Plans Do Not Meet Code	Other	Comments, if any	Sheet/s on which Requirement is Met	Developer's Comments, if any
144-18	Water quality requirements after regulated earth disturbance activities are complete.						
144-18 A	No regulated earth disturbance activities within the Township shall commence until approval by the Township of a plan which demonstrates compliance with state water quality requirements after construction is complete.						
144-18 B	The BMP's must be designed, implemented, operated, and maintained to meet state water quality requirements and any other more stringent requirements as determined by the Township. Because water quality requirements vary depending on the uses of the water bodies in the watershed, a framework methodology is provided here.						
144-18 C	To control postconstruction stormwater impacts from regulated earth disturbance activities, state water quality requirements can be met by BMP's, including site design, which provide for replication of preconstruction stormwater infiltration and runoff conditions, so that postconstruction stormwater discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters. As described in the DEP Comprehensive Stormwater Management Policy (#392-0300-002, September 28, 2002), this may be achieved by the following:						
144-18 C(1)	Infiltration: replication of preconstruction stormwater infiltration conditions,						

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144-18 C(2)	Treatment: use of water quality treatment BMP's to ensure filtering out of the chemical and physical pollutants from the stormwater runoff, and						
144-18 C(3)	Streambank and streambed protection: management of volume and rate of postconstruction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring). In addition, postconstruction stormwater infiltration of runoff must replicate preconstruction infiltration of runoff to the maximum extent possible; in high quality and exceptional value watersheds, special requirements may apply.						
144-18 D	The DEP has regulations that require municipalities to ensure design, implementation, and maintenance of best management practices ("BMP's") that control runoff from new development and redevelopment after regulated earth disturbance activities are complete. These requirements include the need to implement postconstruction stormwater BMP's with assurance of long-term operations and maintenance of those BMP's.						
144-18 E	Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office must be provided to the Township. The issuance of an NPDES construction permit [or permit coverage under the statewide general permit (PAG-2)] satisfies the requirements of Subsection A, above.						
144-18 F	BMP operations and maintenance requirements are described in Article IV of this chapter.						

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144-18 G	The volume of additional stormwater runoff to be captured, stored, and treated is called the Water Quality Volume (WQv).						
144-18 G(1)	The formula for determining WQv is:  $WQv = (P)(Rv)(A)/12$ , where: P = Rainfall depth in inches, using the "90% storm" - the volume of rainfall for 90% of the storm events which produce runoff in the watershed annually (e.g., 1.0 inch) see Appendix C) A = Project area in acres Rv = Volumetric Runoff Coefficient $[0.5 + 0.009(I)]$ , where I is the impervious surface percentage (impervious area / total project area) X 100%						
144-18 G(2)	In special protection watersheds, as described in 25 PA Code Chapter 93, this volume may be required to remain on site through infiltration and other methods, to protect water quality. Guidance can be obtained from PADEP.						
144-18 G(3)	Runoff treatment BMP's must be employed where necessary to ensure the water quality requirements are met.						
144-18 H	Water temperature is a particular concern in high quality and exceptional value watersheds. Temperature-sensitive BMP's and stormwater conveyance systems are to be used and designed with storage pool areas and supply outflow channels, and should be shaded with trees. Vegetation shall be planted within the facilities, provided that capacity for volumes and rate control as required by this chapter is maintained.						

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144-18 H(1)	At a minimum, the southern half of pond shorelines shall be planted with shade or canopy trees within 10 feet of the pond shoreline.						
144-18 H(2)	In conjunction with this requirement, the maximum slope allowed on the berm area to be planted is 10 to 1. This will lessen the destabilization of berm soils due to root growth.						
144-18 H(3)	A long-term maintenance schedule and management plan for the thermal control BMP's is to be established and recorded for all development project sites.						
144-18 I	The applicant may, subject to approval of the Township, use any of the following stormwater credits, described in the following table, in computing the required water quality volume.						
	Natural area conservation Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement thereby retaining their predevelopment hydrologic and water quality characteristics. Using this credit, a designer may subtract conservation areas from the total site area when computing the required water quality volume.						
	Disconnection of rooftop runoff Credit is given when rooftop runoff is disconnected and then directed over a pervious area where it may either infiltrate into the soil or filter over it. Credit is typically obtained by grading the site to promote overland flow or by providing bioretention on single-family residential lots. If a rooftop area is adequately disconnected, the impervious area may be deducted from the total impervious cover.						

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	Disconnection of nonrooftop runoff Credit is given for practices that disconnect surface impervious cover by directing it to pervious areas where it is either infiltrated or filtered through the soil. As with rooftop runoff, the impervious area may be deducted from the total impervious cover thereby reducing the required water quality volume.						
	Stream buffer credit Credit is given when a stream buffer effectively treats stormwater runoff. Effective treatment constitutes capturing runoff from pervious and impervious areas adjacent to the buffer and treating the runoff through overland flow across a grass or forested area. Areas treated in this manner may be deducted from the total site area.						
	Grass channel (open section roads) Credit may be given when open grass channels are used to reduce the volume of runoff and pollutants during smaller storms. If designed according to appropriate criteria, these channels may meet water quality criteria for certain types of residential development.						
	Environmental sensitive rural development Credit is given when a group of environment site design techniques are applied to low density or rural residential development. This credit eliminates the need for structural practices to address water quality volume. See Appendix A.						

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144-18 J	The volume and rate of any stormwater discharges allowed under this chapter must be managed to prevent the physical degradation of receiving waters, such as by streambank scour and erosion. If a detention facility is proposed which is part of the BMP's approved for the project, the facility(ies) must be designed to provide for twenty-four-hour extended detention of the one-year, twenty-four-hour storm event (i.e., the stormwater runoff will be released over a minimum 24 hours for the one-year, twenty-four-hour storm event).						
144-19	Infiltration.						
144-19 A	Prevention of stormwater runoff is the key objective of Chapter 93 of the DEP regulations because runoff can change the physical, chemical, and biological integrity of water bodies thereby impacting water quality.						
144-19 B	The project plan shall describe how these water quality protection requirements will be met. Infiltration BMPs shall be evaluated and utilized to the maximum extent possible to manage the net change in stormwater runoff generated so that postconstruction discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters. These BMP's may be used to satisfy all or part of the requirements in §144-18.						
144-19 C	Postconstruction stormwater infiltration of runoff shall replicate preconstruction infiltration of runoff to the maximum extent possible. In high quality and exceptional value watersheds, special requirements may apply. Guidance is available from PADEP.						

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144-19 D	In calculating the volume of runoff that can be infiltrated at a site, the following methodology shall be used:																
144-19 D(1)	<p>Methodology:</p> <p><math>Re_v = (S)(Rv)(A)/12</math>, where:  <math>Re_v</math> = Recharge volume (acre-feet)  <math>S</math> = Soil specific recharge factor (inches)  <math>A</math> = Site area contributing to the recharge facility (acres)  <math>Rv</math> = Volumetric runoff coefficient,  <math>Rv = 0.05 + -.009(I)</math>, where <math>I</math> is the percent impervious area and <math>S</math> is obtained based on hydrologic soil group, based upon the table below</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Hydrologic Soil Group</th> <th>Soil Specific Recharge Factor (S)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.38</td> </tr> <tr> <td>B</td> <td>0.25</td> </tr> <tr> <td>C</td> <td>0.13</td> </tr> <tr> <td>D</td> <td>0.06</td> </tr> </tbody> </table> <p>If more than one hydrologic soil group (HSG) is present on a site, a composite recharge volume shall be computed based upon the proportion of total site area within each HSG.</p>	Hydrologic Soil Group	Soil Specific Recharge Factor (S)	A	0.38	B	0.25	C	0.13	D	0.06						
Hydrologic Soil Group	Soil Specific Recharge Factor (S)																
A	0.38																
B	0.25																
C	0.13																
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144-19 D(2)	In selecting the appropriate infiltration BMP's, the applicant shall consider the following:																
144-19 D(2)(a)	Permeability and infiltration rate of the site soils.																
144-19 D(2)(b)	Slope and depth to bedrock.																
144-19 D(2)(c)	Seasonal high water table.																
144-19 D(2)(d)	Proximity to building foundations and well heads.																
144-19 D(2)(e)	Erodibility of soils.																
144-19 D(2)(f)	Land availability and topography.																

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144-19 D(3)	A detailed soils evaluation of the project site shall be performed to determine the suitability of infiltration BMP's. The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. The general process for designing the infiltration BMP shall be:						
144-19 D(3)(a)	Analyze hydrologic soil groups as well as natural and manmade features within the watershed to determine general areas suitable for infiltration BMP's.						
144-19 D(3)(b)	Provide field testing data to determine appropriate percolation rate and/or hydraulic conductivity.						
144-19 D(3)(c)	Design infiltration BMP's for required stormwater volume based on field-determination capacity at the level of the proposed infiltration surface.						
144-19 D(4)	Soil characteristics. Subject to the specific considerations in Subsection D(7) below:						
144-19 D(4)(a)	Infiltration BMP's are particularly appropriate in hydrologic soil groups A and B, as described in the Natural Resources Conservation Service Manual TR-55.						
144-19 D(4)(b)	Low-erodibility factors ("K" factors) are preferred for the consideration of basins.						
144-19 D(4)(c)	There must be a minimum depth of 48 inches between the bottom of any facility and the seasonal high water table and/or bedrock (limiting zones), except for infiltration BMP's receiving only rooftop runoff, which shall be placed in soils having a minimum depth of 24 inches between the bottom of the facility and the limiting zone.						

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144-19 D(4)(d)	There must be an infiltration and/or percolation rate sufficient to accept the additional stormwater.						
144-19 D(4)(e)	Infiltration BMP's shall be located a minimum of 10 feet away from the foundation wall of any building.						
144-19 D(4)(f)	The infiltration system shall have positive overflow controls to prevent storage within one foot of the finished surface or grade.						
144-19 D(4)(g)	Infiltration rates shall not be used in computing the storage volume of the infiltration system.						
144-19 D(4)(h)	Surface inflows shall be designed to prevent direct discharge of sediment into the infiltration system.						
144-19 D(5)	The recharge volume provided at the site shall be directed to the most permeable HSG available, except where other considerations apply, such as in limestone geology.						
144-19 D(6)	Any infiltration BMP shall be capable of completely infiltrating the impounded water within 48 hours.						
144-19 D(7)	Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as:						
144-19 D(7)(a)	Strip mines,						
144-19 D(7)(b)	Where salt or chloride may be applied in deicing and other winter applications, causing groundwater pollution, since soils do little to filter this pollutant, and						
144-19 D(7)(c)	Limestone areas:						
144-19 D(7)(c)[1]	Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations.						

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144-19 D(7)(c)[2]	The design of all BMP's over limestone formations shall include measures to prevent groundwater contamination and, where necessary, sinkhole formation.						
144-19 D(7)(c)[3]	It shall be the applicant's responsibility to verify whether the site is underlain by limestone.						
144-19 D(7)(c)[4]	The following note shall be attached to all drainage plans and signed and sealed by the applicant's licensed engineer, surveyor, landscape architect, architect, or geologist if a detention facility is proposed: "I certify that the proposed facility is/is not underlain by limestone."						
144-19 D(8)	During the period of land disturbance, runoff shall be controlled prior to entering any proposed infiltration area and areas proposed for infiltration BMP's shall be protected from sedimentation and compaction during the construction phase so as to maintain their maximum infiltration capacity.						
144-19 D(9)	Infiltration BMP's shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has received final stabilization.						
Reviewer's Additional Comments, Questions, or Concerns							