

**PENN TOWNSHIP REVIEW CHECKLIST
STORMWATER BMP OPERATIONS AND MAINTENANCE PLAN 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
144-20	Submission required. Prior to the final approval of subdivision, land development, or any activity listed in §144-4 or the issuance of any permit or the commencement of any land disturbance activity, the owner, subdivider, developer, or his agent shall submit a stormwater management plan to Penn Township for approval. At the time of application, the Township shall determine if the subdivision/land development qualifies as a small development and, therefore, is eligible for a simplified stormwater plan submission. For the purposes of this chapter, a small development is any subdivision or land development which results (or will result when fully constructed) in the creation of not more than 5,000 square feet of impervious area and one acre or less of any land cover change.						
144-21	Plan requirements. The following items, where appropriate, shall be included in the plan.						
144-21 A	General.						
144-21 A(1)	A general description of the project.						
144-21 A(2)	A general description of stormwater controls both during and after development.						
144-21 A(3)	The expected project time schedule, including anticipated start and completion dates.						
144-21 A(4)	The training and experience of person(s) preparing the plan.						

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144-21 A(5)	An executed signature block by a registered professional engineer, surveyor, or landscape architect as follows: "I, _____, have prepared and hereby certify that the stormwater management plan meets all design standards and criteria of Penn Township's Stormwater Management Ordinance."						
144-21 B	General requirements.						
144-21 B(1)	No regulated earth disturbance activities within the Township shall commence until approval by the Township of a BMP operations and maintenance plan which describes how the permanent (e.g. postconstruction) stormwater BMP's will be properly operated and maintained.						
144-21 C	The additional following items shall be included in the BMP operations and maintenance plan:						
144-21 C(1)	Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Westmoreland County, and shall be submitted on eighteen-inch by twenty-four-inch sheets. The contents of the map(s) shall include, but not be limited to:						
144-21 C(1)(a)	Clear identification of the location and nature of permanent stormwater BMP's.						

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144-21 C(1)(b)	The location of the project site relative to highways, municipal boundaries, or other identifiable landmarks. A key map shall be provided, showing the location of the development site within the watershed(s) and watershed subarea(s). On all site drawings, the boundaries of the watershed(s) and subarea(s) shall be shown as they are located on the development site, and watershed name(s) and subarea number(s) shall be identified.						
144-21 C(1)(c)	Existing and final contours at intervals of two feet. In areas of steep slopes (greater than 15%), five-foot contour intervals shall be used.						
144-21 C(1)(d)	Existing streams, lakes, ponds, or other bodies of water within the project site area.						
144-21 C(1)(e)	Other physical features, including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved.						
144-21 C(1)(f)	The locations of all existing overhead, underground, and proposed utilities, sanitary sewers, and waterlines within 50 feet of property lines of the project site.						
144-21 C(1)(g)	Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.						
144-21 C(1)(h)	Proposed final structures, roads, paved areas, and buildings.						
144-21 C(1)(i)	A twenty-five-foot wide access easement around all stormwater BMP's that would provide ingress to and egress from a public right-of-way.						
144-21 C(1)(j)	Soil types and boundaries.						
144-21 C(1)(k)	Areas to be cut or filled.						

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144-21 C(1)(l)	The location where water will exit the site and the means for discharging.						
144-21 C(1)(m)	One-hundred-year floodplains on the development site (as appropriate), based on the municipal Flood Insurance Study Maps.						
144-21 C(1)(n)	The boundaries of the drainage areas employed in the runoff calculation performed.						
144-21 C(1)(o)	Existing stormwater management or drainage controls and/or structures, such as sanitary and storm sewers, swales, culverts, etc., which are located on the development site or which are located off-site but will be affected by runoff from the development.						
144-21 C(2)	A description of how each permanent stormwater BMP will be operated and maintained, and the identity of the person(s) responsible for operations and maintenance.						
144-21 C(3)	The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan, and						
144-21 C(4)	A statement, signed by the landowner, acknowledging that the stormwater BMP's are fixtures that can be altered or removed only after approval by the Township.						
144-21 C(5)	Major and minor subdivision plats.						
144-21 C(5)(a)	For all major subdivisions, plats must also be submitted in a digital format that may be directly imported into the Township's geographical information systems (GIS) in a manner consistent with the standards outlined for the Pennsylvania South Zone, NAD 83, US Foot, State Plane Coordinate System.						
144-21 C(5)(a)[1]	Scale factors such as grid factor and elevation factor shall be listed on plans.						

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144-21 C(5)(a)[2]	Control information can be brought to the site via fast static application from at least four control points, as published by NGS or by OPUS method, with a minimum two-hour observation.						
144-21 C(5)(a)[3]	Drawings shall be supplied in "dwg" or "dxf" format.						
144-21 C(5)(a)[4]	Drawings shall be in model space only; paper space will not be accepted.						
144-21 C(5)(a)[5]	Drawings shall be AutoCAD Version 14 or higher and all information shall be supplied in a two CD set that is write-protected, along with paper copies.						
144-21 C(5)(b)	For all minor subdivision plats, the applicant will be required to submit digitally formatted plans as described in Subsection C(5)(a) once Penn Township has established a grid system in the field for the Pennsylvania South State Plane Coordinate System.						
144-21 D	Stormwater management controls. All stormwater management controls must be shown on a map and described, including:						
144-21 D(1)	Groundwater recharge methods, such as seepage pits, seepage tanks, beds, and trenches. When these structures are used, the location of septic tank infiltration areas and wells must be shown and a cross section shall be provided.						
144-21 D(2)	Other control devices or methods, such as rooftop storage, semipervious paving materials, grass swales, parking lots, ponding, vegetated strips, detention and retention ponds, storm sewers, etc.						
144-21 D(3)	A schedule for installation of the control measures and devices.						
144-21 D(4)	All calculations, assumptions, and criteria used in the design of the control devices or method.						

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144-21 D(5)	A twenty-five-foot right-of-way around all stormwater management structures (retention/detention basins) and from such structures to a public right-of-way.						
144-21 D(6)	A twenty-foot easement around all stormwater conveyance/collection facilities.						
144-21 E	Other permits/approvals. A list of any approvals/permits relative to stormwater management required from other governmental agencies (including Pennsylvania DEP Chapter 105 and 106 permits) and anticipated dates of submission/receipt should be included with the stormwater plan submission. Copies of permit applications may be requested by the Township where they may be helpful for the plan review.						
144-22	Design criteria for stormwater management BMP's.						
144-22 A	Applicants may select a combination of runoff control techniques which are most suitable to control stormwater runoff from the site. All controls shall be subject to approval of the Township Engineer. The Township Engineer may request specific information on design and/or operating features of the proposed stormwater controls in order to determine their suitability and adequacy in terms of the standards of this section.						
144-22 B	The applicant shall consider the effect of the proposed stormwater management techniques on any special soil conditions or geological hazards, which may exist on the development site. In the event such conditions are identified on the site, the Township Engineer may require in-depth studies by a competent geotechnical engineer.						

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144-22 C	The stormwater management BMP's shall be selected according to the following order of preference:						
144-22 C(1)	Site planning for locating proposed buildings, impervious areas, and grading which minimizes disruption of the natural site characteristics.						
144-22 C(2)	Minimization of impervious areas and promotion of retentive grading.						
144-22 C(3)	Implementation of innovative nonstructural measures (See Appendix "A").						
144-22 C(4)	Infiltration and runoff on site.						
144-22 C(5)	Flow attenuation by use of open vegetated swales and natural depressions.						
144-22 C(6)	Stormwater detention/retention structures.						
144-22 D	Any BMP which is a dam, culvert, stream enclosure, or outfall as defined in 25 PA Code Chapter 105 shall be designed according to the requirements in those regulations.						
144-22 E	Any stormwater BMP which does not constitute a dam under 25 PA Code Chapter 105 and is designated to store runoff and requires a berm or earthen embankment (i.e. detention basins), shall be designed to satisfy the following:						
144-22 E(1)	Berms and earthen embankments shall be designed to provide an emergency spillway to handle flow up to and including the one-hundred-year postdevelopment conditions.						
144-22 E(2)	Berms and earthen embankments shall be designed to provide a minimum one foot of freeboard above the maximum pool elevation computed when the facility functions for the one-hundred-year postdevelopment flow.						

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144-22 E(3)	Water obstructions shall convey roof runoff from the twenty-five-year design storm with a minimum of one foot of freeboard, measured below the lowest point along the top of the roadway, without damage to the drainage structure or the roadway.						
144-22 E(4)	Roadway crossing located within designated floodplain areas must be able to convey runoff from a one-hundred-year design storm.						
144-22 E(5)	Drainage conveyances must be able to convey, without damage to the drainage structure or roadway, runoff from the twenty-five year, twenty-four-hour design storm without surcharging inlets, where appropriate.						
144-22 E(6)	Adequate erosion and sediment control protection shall be provided along all open channels and at all points of discharge.						
144-23	Calculation methodology.						
144-23 A	Stormwater runoff from all development and postdevelopment sites shall be calculated using either the rational method or a soil cover complex methodology.						
144-23 B	Any stormwater runoff calculations involving areas greater than 200 acres, including on- and off-site areas, shall use a generally accepted calculation technique that is based on the NRCS soil cover complex method. The table following §144-23J summarizes acceptable computation methods. All methods will be selected by the design professional, based on the individual limitations and suitability of each method for a particular site. These assumptions shall be used in runoff calculations:						
144-23 B(1)	Average antecedent moisture conditions.						

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144-23 B(2)	Type II distribution storm.						
144-23 B(3)	Meadow in good condition shall be used in predevelopment runoff calculations for all areas of existing cultivation.						
144-23 B(4)	All areas other than cultivation shall use the land cover condition which existed during the past 10 consecutive years.						
144-23 B(5)	All areas to be disturbed during construction and subsequently returned to open space will be assumed to be reduced one hydrologic group category level for postdevelopment runoff.						
144-23 B(6)	If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower curve numbers or Rational "C" value, such as forested lands.						
144-23 C	If a hydrologic computer model such as TR-20 PSRM or HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. The NRCS "S" curve shown in Appendix D of this chapter shall be used for the rainfall distribution.						
144-23 D	All calculations using the rational method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the design storm curves from PennDOT Design Rainfall Curves (1986) (Figure B-2). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation.						

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144-23 E	Runoff curve numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from the Table in Appendix D of this chapter.						
144-23 F	Runoff coefficient (c) for both existing and proposed conditions for use in the rational method shall be obtained from the Table in Appendix E of this chapter.						
144-23 G	Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient (n) shall be consistent with Table 2 at the end of this chapter.						
144-23 H	Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this chapter, using any generally accepted hydraulic analysis technique or method.						
144-23 I	The design of any stormwater detention facilities intended to meet the performance standards of this chapter shall be verified by routing the design storm hydrograph through these facilities using the storage-indication method. For drainage areas greater than 20 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of generally accepted full hydrograph approximation technique which shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.						

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144-23 J	The Township may require that computed existing runoff rates be reconciled with field observations and conditions. If the design professional can substantiate through actual physical calibration that more appropriate runoff and time-of-concentration values should be utilized at a particular site, the appropriate variations may be made upon the review and recommendation of the Township Engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.						
	TR-20 or commercial package based on TR-20 - developed by USDA-NRCS - applicable when use of full model is desirable or necessary						
	TR-55 or commercial package based on TR-55 - developed by USDA-NRCS - applicable for plans within the models limitations						
	HEC-1 - developed by U.S. Army Corps of Engineering - applicable when full model is desirable or necessary						
	PSRM - developed by Penn State University - applicable when full model is desirable or necessary						
	Rational method or commercial package based on rational method - developed by Emil Kuiching (1889) - applicable for sites less than 200 acres						
	Other models - developed by various others - applicable as approved by the Township Engineer						

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144-24	Responsibilities for operations and maintenance of BMP's.						
144-24 A	The BMP operations and maintenance plan for the project site shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater BMP's and shall detail the financial responsibility for any required maintenance as follows:						
144-24 A(1)	If a plan includes structures or lots which are to be separately owned and in which streets, sewers, and other public improvements are to be dedicated to the Township, stormwater BMP's may also be dedicated to and maintained by the Township.						
144-24 A(2)	If a plan includes operations and maintenance by a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the operation and maintenance of stormwater BMP's shall be the responsibility of the owner or private management entity.						
144-24 B	Priorities. The following priority process is established for facility ownership and maintenance:						
144-24 B(1)	As first priority, the facilities shall be incorporated within individual lots, so that the respective lot owners will own and be responsible for maintenance in accordance with recorded deed restrictions.						
144-24 B(2)	The second priority, in the event that the above priority cannot be achieved, is to dedicate the facilities to the Township in accordance with this chapter and pursuant to the regulations and requirements as established hereunder.						

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144-24 C	The municipality shall make the final determination on the continuing operations and maintenance responsibilities. The Township reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater BMP's.						
Reviewer's Additional Comments, Questions, or Concerns							