

CHELTENHAM TOWNSHIP
Chapter 290: WATERSHED STORMWATER MANAGEMENT
Article IV: Stormwater Management

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For all regulated activities, unless preparation of a stormwater management (SWM) site plan is specifically exempted:

(1)

Preparation and implementation of an approved SWM site plan is required.

(2)

No regulated activities shall commence until the municipality issues written approval of a SWM site plan that demonstrates compliance with the requirements of this chapter.

B.

The SWM site plan approved by the municipality shall be on-site throughout the duration of the regulated activity.

C.

The municipality may, after consultation with the Department of Environmental Protection (DEP), approve measures for meeting the state water quality requirements other than those in this chapter, provided that they meet the minimum requirements of, and do not conflict with, state law, including but not limited to the Clean Streams Law.

Editor's Note: See 35 P.S. § 691.1 et seq.

D.

For all regulated earth disturbance activities, E&S control best management practices (BMPs) shall be designed, implemented, operated and maintained during the regulated earth disturbance activities (e.g., during construction) to meet the purposes and requirements of this chapter and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law.

Editor's Note: See 35 P.S. § 691.1 et seq.

Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual (E&S Manual), No. 363-2134-008 (April 15, 2000), as amended and updated.

E.

For all regulated activities, implementation of the volume controls in Article IV is required.

F.

Impervious areas.

(1)

The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.

(2)

For development taking place in stages, the entire development plan must be used in determining conformance with this chapter.

(3)

For projects that add impervious area to a parcel, §§ **290-20** through **290-23** shall apply to the total impervious area within the limits of earth disturbance.

G.

Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s). Such stormwater flows shall be subject to the requirements of this chapter.

H.

All regulated activities shall include such measures as necessary to:

(1)

Protect health, safety and property.

(2)

Meet the water quality goals of this chapter by implementing measures to:

(a)

Minimize disturbance to floodplains, wetlands, and wooded areas.

(b)

Maintain or extend riparian buffers.

(c)

Avoid erosive flow conditions in natural flow pathways.

(d)

Minimize thermal impacts to waters of this commonwealth.

(e)

Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.

(3)

To the maximum extent practicable, incorporate the techniques for low-impact development practices described in the Pennsylvania Stormwater Best Management Practices Manual (BMP Manual) or the Philadelphia Stormwater Management Guidance Manual.

I.

The design of all facilities over karst shall include an evaluation of measures to minimize adverse effects.

J.

Infiltration BMPs should be spread out, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this chapter.

K.

Storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 hours and not more than 72 hours from the end of the design storm.

L.

The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, Version 3.0, U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14⁵ can be accessed at <http://hdsc.nws.noaa.gov/hdsc/pfds/>.

M.

For all regulated activities, SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this chapter and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law,

Editor's Note: See 35 P.S. § 691.1 et seq.

and the Stormwater Management Act.

Editor's Note: See 32 P.S. § 680.1 et seq.

N.

Various BMPs and their design standards are listed in the BMP Manual.

Approvals issued and actions taken under this chapter do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulation or ordinance.

§ 290-20 Groundwater recharge.

Note: Philadelphia County and Montgomery County will follow different groundwater recharge criteria.

A.

Infiltration best management practices (BMPs) shall meet the following minimum requirements unless the site qualifies for an exemption from the infiltration requirements of this chapter as listed in § **290-6B**:

(1)

Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:

(a)

A minimum soil depth of 24 inches between the bottom of the infiltration BMPs.

(b)

An infiltration rate sufficient to accept the additional stormwater load and dewater completely as determined by field tests conducted by the applicant's design professional.

(c)

All open-air infiltration facilities shall be designed to completely infiltrate the recharge (infiltration) volume (Re_v) within three days (72 hours) from the start of the design storm.

(d)

All subsurface and contained facilities such as capture-and-reuse systems must have storage available equivalent to the water quality volume within three days (72 hours) from the start of the design storm.

(e)

Pretreatment shall be provided prior to infiltration. See § **290-11** for definition.

(2)

The size of the infiltration facility shall be based upon the following volume criteria:

(a)

Montgomery County portion of the watershed.

[1]

Where practicable and appropriate, the recharge volume shall be infiltrated on site. The recharge volume shall be equal to one (1.0) inch of runoff (I) over all proposed impervious surfaces.

[2]

The Re_v required shall be computed as:

$$Re_v = (P/12) * (I)$$

Where:

Re_v = Recharge volume (cubic feet)

P = 1.0 inch

I = Impervious area within the limits of earth disturbance (square feet)

An asterisk (*) in equations denotes multiplication.

(b)

Philadelphia County portion of the watershed. The recharge volume shall be equal to one (1.0) inch of rainfall over all DCIA within the limits of earth disturbance.

$$Re_v = (P/12) * (I)$$

Where:

Re_v = Recharge volume (cubic feet)

P = 1.0 inch

I = DCIA within the limits of earth disturbance (square feet)

An asterisk (*) in equations denotes multiplication.

B.

Soils. A detailed soils evaluation of the project site shall be required to determine the suitability of infiltration facilities. The evaluation shall be performed by a qualified design professional and at a minimum address soil permeability, depth to bedrock, and subgrade stability. The general process for designing the infiltration BMP shall be:

(1)

Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of subgrade stability; infiltration may not be ruled out without conducting these tests.

(2)

Provide field tests such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate. Percolation tests are not recommended for design purposes.

(3)

Design the infiltration structure for the required retention (Re_v) volume based on field-determined capacity at the level of the proposed infiltration surface.

(4)

If on-lot infiltration structures are proposed by the applicant's design professional, it must be demonstrated to the municipality that the soils are conducive to infiltrate on the lots identified.

(5)

An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the municipality.

§ 290-21 Water quality requirements.

A.

The applicant shall comply with the following water quality requirements of this article. Note: Philadelphia County and Montgomery County will follow different water quality requirements.

B.

Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. The recharge volume computed under § **290-20** may be a component of the water quality volume if the applicant chooses to manage both components in a single facility. If the recharge volume is less than the water quality volume, the remaining water quality volume may be captured and treated by methods other than infiltration best management practices (BMPs). The required water quality volume (WQ_v) is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site.

(1)

Montgomery County portion of the watershed.

(a)

The following calculation formula is to be used to determine the water quality storage volume (WQ_v) in cubic feet for the Tookany/Tacony-Frankford Watershed in Montgomery County:

$$Re_v = (P/12) * (I)$$

Where:

Re_v = Recharge volume (cubic feet)

P = 1.0 inch

I = Impervious area within the limits of earth disturbance (square feet)

An asterisk (*) in equations denotes multiplication.

(b)

For a noninfiltrating BMP, release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall provide for protection from clogging and unwanted sedimentation.

(2)

Philadelphia County portion of the watershed. The following calculation formula is to be used to determine the WQ_v in cubic feet for the Tookany/Tacony-Frankford Watershed in Philadelphia County:

$$Re_v = (P/12) * (I)$$

Where:

Re_v = Recharge volume (cubic feet)

P = 1.0 inch

I = DCIA within the limits of earth disturbance (square feet)

An asterisk (*) in equations denotes multiplication.

§ 290-22 Stream bank erosion requirements (channel protection).

Note: Philadelphia County and Montgomery County will follow different stream bank erosion requirements. If a perennial or intermittent stream passes through the site, the applicant shall create a stream buffer extending a minimum of 50 feet to either side of the top-of-bank of the channel. The buffer area shall be maintained with and encouraged to use appropriate native vegetation [Refer to Appendix B of the Pennsylvania Stormwater Best Management Practices (BMP) Manual for plant lists.]. If the applicable rear or side yard setback is less than 50 feet, the buffer width may be reduced to 25% of the setback to a minimum of 10 feet. If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of this chapter, the existing buffer shall be maintained. [Note: The municipality may select a smaller buffer width (above) if desired, but the selected buffer may not be less than 10 feet.]. This does not include lakes or wetlands.

A.

Montgomery County portion of the watershed. Applicants shall adhere to the following stream bank erosion/channel protection requirements:

(1)

In addition to the control of water quality volume (in order to minimize the impact of stormwater runoff on downstream stream bank erosion), the primary requirement is to design a BMP to detain the proposed conditions two-year, twenty-four-hour design storm to the existing conditions one-year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) so that the proposed conditions one-year storm takes a minimum of 24 hours to drain from the facility from a point

where the maximum volume of water from the one-year storm is captured (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility).

(2)

The minimum orifice size in the outlet structure to the BMP shall be three inches in diameter where possible, and a trash rack shall be installed to prevent clogging. On sites with small drainage areas contributing to this BMP that do not provide enough runoff volume to allow a twenty-four-hour attenuation with the three-inch orifice, the calculations shall be submitted showing this condition. Orifice sizes less than three inches can be utilized, provided that the design will prevent clogging of the intake. It is recommended that the design, to accommodate maintenance, include sand or a porous media filter.

B.

Philadelphia County portion of the watershed.

(1)

Redevelopment sites with less than one acre of earth disturbance or redevelopment sites that demonstrate a twenty-percent reduction in DCIA from predevelopment conditions are exempt from this requirement.

(2)

Applicants shall adhere to the following stream bank erosion/channel protection requirements:

(a)

To meet the requirement, stormwater management practices shall retain or detain the runoff from all DCIA within the limits of earth disturbance from a one-year, twenty-four-hour Natural Resources Conservation Service (NRCS) Type II design storm in the proposed site condition such that the runoff takes a minimum of 24 hours and a maximum of 72 hours from the end of the storm event to drain the management facility.

(b)

The infiltration and water quality volumes may be incorporated into the channel protection portion of the design, provided the design meets all requirements concurrently.

(c)

In Conditional Direct Discharge Districts (District C) only (see § **290-25**), the objective is not to attenuate the storms greater than the two-year recurrence interval. This can be accomplished by configuring the outlet structure not to control the larger storms or by a bypass channel that diverts only the two-year

stormwater runoff into the basin or, conversely, diverts flows in excess of the two-year storm away from the basin.

§ 290-23 Stormwater peak rate control and management districts.

A.

The Tookany/Tacony-Frankford Watershed has been divided into stormwater management districts as shown on the Management District Map in Model Ordinance Appendix A.

(1)

In addition to the requirements specified in Table 290-23.1 below, the erosion and sedimentation control (§ **290-20**), the nonstructural project design (§ **290-21**), the groundwater recharge (§ **290-20**), the water quality (§ **290-21**), and the stream bank erosion (§ **290-22**) requirements shall be implemented.

(2)

Standards for managing runoff from each subarea in the Tookany/Tacony-Frankford Watershed for the two-, five-, ten-, twenty-five-, fifty-, and one-hundred-year design storms are shown in Table 290-23.1. Development sites located in each of the management districts must control proposed conditions runoff rates to existing conditions runoff rates for the design storms in accordance with Table 290-23.1.

Table 290-23.1 Peak Rate Control Standards by Stormwater Management District in the Tookany/Tacony-Frankford Watershed

District	Proposed Condition Design Storm(reduce to)	Existing Condition Design Storm
A	2-year	1-year
	5-year	5-year
	10-year	10-year
	25-year	25-year
	50-year	50-year
	100-year	100-year
B	2-year	1-year
	5-year	2-year
	10-year	5-year
	25-year	10-year
	50-year	25-year
	100-year	100-year
C*	Conditional Direct Discharge District	

(3)

In District C, development sites that can discharge directly to the Frankford Creek Main Channel (east of I-95) and to the Delaware River main channel or Tidal

Schuylkill River major tributary without use of city infrastructure may do so without control of proposed conditions peak rate of runoff.

(4)

Projects that are required to obtain an NPDES permit for stormwater discharges associated with construction activities are required to show no increase in peaks from existing conditions.

(5)

When adequate capacity in the downstream system does not exist and will not be provided through improvements, the proposed conditions peak rate of runoff must be controlled to the predevelopment conditions peak rate as required in District A provisions for the specified design storms. The predevelopment condition for new development is the existing condition. For redevelopment purposes, the predevelopment condition is determined according to the procedures found in the Philadelphia Stormwater Guidance Manual.

B.

General. Proposed conditions rates of runoff from any regulated activity shall not exceed the peak release rates of runoff from existing conditions for the design storms specified on the Stormwater Management District Watershed Map (Ordinance Appendix A) and this section of this chapter.

C.

District boundaries. The boundaries of the stormwater management districts are shown on an official map that is available for inspection at the municipal and county planning offices. A copy of the official map at a reduced scale is included in Ordinance Appendix A. The exact location of the stormwater management district boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the drainage plan.

D.

Sites located in more than one district. For a proposed development site located within two or more stormwater management districts, the peak discharge rate from any subarea shall meet the management district criteria in which the discharge is located.

E.

Off-site areas. Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.

F.

Site areas. Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area utilizing stormwater management measures shall be subject to the management district criteria. In other words, unimpacted areas bypassing the stormwater management facilities would not be subject to the management district criteria.

G.

Alternate criteria for redevelopment sites. For redevelopment sites, one of the following minimum design parameters shall be accomplished, whichever is most appropriate for the given site conditions as determined by Cheltenham Township:

(1)

Meet the full requirements specified by Table 290-23.1 and Subsections **A** through **F**; or

(2)

Reduce the total impervious surface on the site by at least 20% based upon a comparison of existing impervious surface to proposed impervious surface.

§ 290-24 Calculation methodology.

A.

Stormwater runoff from all development sites with a drainage area of greater than 200 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS soil cover complex method. The designer must consult with the municipality to gain approval of design methods prior to design. Table 290-24.1 summarizes acceptable computation methods, and the method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. The municipality may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain fewer than 200 acres. The Soil Complex Method shall be used for drainage areas greater than 200 acres.

Table 290-24.1 Acceptable Computation Methodologies for Stormwater Management Plans

Method	Method Developed By Applicability	
Montgomery County		
WINTR-20	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary
WINTR-55	USDA NRCS	Applicable for land development plans within limitations described in TR-55
HEC-HMS	U.S. Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary
Rational Method (or commercial computer	Emil Kuichling	For sites less than 200 acres and with time of concentration less than 60 minutes (tc less

Table 290-24.1 Acceptable Computation Methodologies for Stormwater Management Plans

Method	Method Developed By	Applicability
package based on Rational Method)	(1889)	than 60 minutes), or as approved by the municipality and/or municipal engineer
Other methods	Varies	Other computation methodologies approved by the municipality and/or municipal engineer

Philadelphia County

WINTR-20	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary
WINTR-55	USDA NRCS	Applicable for land development plans within limitations described in TR-55

* Note: Successors to the above methods are also acceptable. These successors include WinTR55 for TR-55 and WinTR20 for TR-20.

B.

If a hydrologic computer model such as HydroCAD or HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. The rainfall distribution should reference NOAA Atlas 14.

C.

For the purposes of existing conditions flow rate determination, undeveloped land shall be considered as "meadow" in good condition, unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e., forest), as listed in Table E-1 or E-2 in Appendix E of this chapter.

Editor's Note: Appendix E is on file in the Township offices.

D.

For Montgomery County only, all calculations using the Rational Method shall use rainfall intensities from the NOAA 14 Precipitation-Frequency Atlas of the United States (2004, revised 2006). 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.

E.

Runoff curve numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table E-1 in Appendix E of this chapter.

Editor's Note: Appendix E is on file in the Township offices.

F.

Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table E-2 in Appendix E of this chapter.
G.

The Manning equation is preferred for 1-D, gradually varied, open channel flow. In other cases, appropriate, applicable methods should be applied; however, early coordination with the municipality is necessary.
H.

Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this chapter using the generally accepted hydraulic analysis technique or method of the municipality.
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 200 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The municipality may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.