

Antrim Township Stormwater Technical Review Checklist  
For Preliminary and Final Plan Submissions  
(including Conceptual Preliminary Plan and Detailed Final Plan Submissions in the  
Conservation Design Overlay District)

Plan Name: \_\_\_\_\_ Antrim Township Tracking No.: \_\_\_\_\_  
Project Location: \_\_\_\_\_ Dewberry Job No.: \_\_\_\_\_  
Type of Submission: \_\_\_\_\_ Review Date: \_\_\_\_\_  
Zoning District: \_\_\_\_\_ No. of Lots: \_\_\_\_\_

126-6 - General Requirements

- Provide safe conveyance of the 100-year design storm runoff from offsite watersheds, if any.
- All pre-development calculations shall be based upon existing land uses except existing agricultural uses, which shall be based on
  - Cultivated Land with Conservation Treatment,
  - Pasture in Good Condition,
  - Meadow in Good Condition,
  - Farmstead
  - Unless ground cover generates a lower CN or c
- Use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from the Design Storm Curves of PA DOT Rainfall Curves (Figure B-3) in Exhibit 2.
- Runoff Curve Numbers (CN) for both existing and proposed shall be obtained from Table B-2 in Exhibit 2.
- Runoff coefficients (c) for both existing and proposed conditions shall be obtained from Table B-3 in Exhibit 2.
- Storm sewers, swales and other stormwater conveyance structures shall be designed to convey post development runoff from a 25-year design storm without surcharging inlets and with adequate freeboard in open drainageways.
  - 6” of freeboard shall be provided in swales carrying 14 cfs or less.
  - 1 ft. of freeboard shall be provided in drainageways designed to carry flow of 15 cfs or greater.
- The minimum pipe diameter permitted for use in storm sewer system and/or stormwater carry culverts shall be 15”.
- Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Chapter.
- The existing points of diffused or concentrated drainage that discharge onto adjacent property shall not be altered without written permission of the affected property owner(s).
- If existing diffused discharge becomes concentrated in Post Development Condition and discharges onto adjacent property, document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no E&S, flooding, or other harm will result from the concentrated discharge.

- Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses.
  - Easements shall be centered on the watercourse and have a minimum width of 20.0 ft.
  - The terms of the easement shall prohibit excavation, the placing of fill or structures and any alterations that may adversely affect the flow of stormwater within any portion of the easement.
- When it can be shown that, due to topo conditions, natural drainageways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways. Work within natural drainageways is subject to approval by DEP.
- Any SWM facilities that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by PADEP and, if applicable, the U.S. Army Corps of Engineers. When there is a question whether wetlands may be involved, it is the responsibility of the Developer or his agent to demonstrate to the applicable regulatory agencies that the land in question cannot be classified as wetlands.
- Cleanout structures for storm sewers shall be installed at the following max. spacing:
  - 15” pipe – 200 ft spacing
  - 18-36” pipe – 300 ft spacing
  - 42-60” pipe – 500 ft spacing
  - ≥ 66” pipe - unlimited
- The SWM plan shall include calculations indicating velocities of flow, grades, sizes, and capacities of water carrying structures, and retention and detention structures as well as sufficient design information to construct such facilities.
- Proposed lots or buildings adjacent to basins and significant channels shall have a finished floor elevation of 2 feet above the 100-year storm event level calculated for these facilities.
- The plans shall specify the minimum allowable finished first floor elevation for these lots or buildings.
- Stormwater runoff channels shall be designed and installed to avoid trapping excess sediment.
- E&S pollution control measures shall be required for all plans submitted and shall be in accordance with the applicable standards and specifications set forth in the latest edition of the DEP E&S Pollution Control Program Manual and all other aspects of DEP Chapter 102.
- Special provisions may be required for watersheds draining to high quality (HQ) and exceptional value (EV) waters in accordance with PADEP regs.
- Adequate erosion protection shall be provided along all open channels at all points of discharge.

#### 126-7 & 126-8 - Stormwater Management Districts

- Development sites in Antrim Township must control post-development runoff rates to pre-development runoff rates for each of the specified design storms as follows:
  - District A:    2-yr post to 1-yr pre  
                  5-yr post to 5-yr pre

- 10-yr post to 10-yr pre
  - 25-yr post to 25-yr pre
  - 100-yr post to 100-yr pre
- District B:
  - 2-yr post to 1-yr pre
  - 5-yr post to 2-yr pre
  - 10-yr post to 5-yr pre
  - 25-yr post to 10-yr pre
  - 100-yr post to 50-yr pre
- District C: Provisional Direct Discharge – Sites which can discharge directly to the Conococheague Creek main channel or indirectly to the main channel through an existing or proposed man-made stormwater drainage system may, at the discretion of the Township Engineer and Supervisors, do so without control of post development peak rate of runoff.
  - If the post-development runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the increased peak flows or will be provided with improvements to furnish the required capacity.
  - Otherwise, peak control must be provided according to the requirements of District A.
- The exact location of the SWM District boundaries using the 2-foot topo contours provided as part of the Drainage Plan.
- For proposed development located in 2 or more Districts, the allowable post-development peak discharge rate shall be determined based on the location of the point(s) of discharge from the site.

#### 126-9 - Design Criteria for Stormwater Management Storage Facilities

- Release rates from storage structures shall be based on the runoff from the 1-yr thru 100-yr pre-development storm events.
- Embankment Material Criteria
  - Free of organic material, ash cinders, and demolition debris.
  - Well-graded particle size distribution.
  - Plasticity index less than 10, liquid limit less than 30.
  - Less than 15% by weight rock fragments larger than 3", less than 30% by wt. larger than 3/4" and less than 30% smaller than No. 200 sieve.
- Embankment slopes shall not be steeper than 3:1.
- Top width of basin embankments shall not be less than 6 ft.
- E-spillways in berms or earthen embankments shall be designed to convey the 100-yr design storm with 1 ft freeboard, assuming that the principal spillway is completely blocked.
- Proper erosion control measures shall be provided to protect the spillway and embankment against the erosive effects of accelerated discharge.
- All embankments shall incorporate a compacted clay core and cutoff key trench meeting the criteria for embankment materials well as the following:
  - Soil shall be relatively impermeable and meet the following USCS classification groups as determined by ASTM D2487/D2488: CL and/or CL-ML.

- Top width of clay core shall be min. 2 ft with a top elev. equal to the 25-yr storm peak water storage elev. or higher. The bottom width of clay key trench shall be a min. of 2 ft into virgin, undisturbed soil below the topsoil layer.
- Antiseep collars shall be installed on all basin outlet pipes. The required size and spacing of the collars shall be confirmed through calculations.
- Basins shall be kept in a maintainable condition with a min. bottom slope of 1% sloped toward the principal outlet structure. If paved low flow channels are used, then the basin bottom slope can be reduced to 0.5%. Paved low flow channels shall have a min. width of 4 ft and be constructed of 4" thick concrete over 4" of compacted PennDOT No. 2A stone.

#### 126-10 - Ground Water Recharge (Infiltration/Recharge/Retention)

- Soils used for the construction of infiltration basins shall have low-erodibility factors ("K" factors).
- Recharge volume shall be directed to the most permeable HSG available, if feasible.
- Size of recharge facility shall be based upon the following equation:
  - $Rev = [(S)(Rv)(A)]/12$ 
    - Where:
      - Rev = Recharge Vol (ac-ft)
      - S = Soil specific recharge factor (in)
      - Rv = volumetric runoff coeff =  $0.05 + .009 (I)$
      - A = Site area contributing to the recharge facility (ac)
      - I = percent impervious area
- S obtained from table below
  - HSG A – 0.38 in
  - HSG B – 0.25 in
  - HSG C – 0.13 in
  - HSG D – 0.06 in
- Detailed soils evaluation required to determine suitability of recharge facilities
- Field test to determine appropriate soil percolation rates: 0.55 to 8.25 in/hr.
- Testing shall be performed at the location of each proposed infiltration BMP at the bottom elevation of the proposed facility.
- A plan including the frequency and locations of soil tests shall be submitted to the Township for review and approval when infiltration BMPs are proposed.
- Infiltration BMPs shall be capable of completely infiltrating the collected runoff vol within 2 days.
- Infiltration BMP bottoms shall be separated by min. 36" vertically from seasonal high water table and/or bedrock layer.
- Infiltration BMPs receiving only roof runoff from single family dwelling, a 24" vertical separation distance may be permitted at the discretion of the Township.
- Infiltration BMPs shall not be located laterally within 50 ft. of carbonate bedrock formations that occur within 36-inches of the ground surface.
- Infiltration BMPs shall be constructed in virgin soil, not fill, after all site work is completed and the contributing drainage area has received final stabilization. Recharge/infiltration facilities shall not be used as sediment basins at any time.

- Specific requirements shall be included on the plans to protect infiltration BMPs from compaction by equipment and to prevent sediment from entering infiltration BMPs during construction.
- Infiltration BMPs shall be at least 20 ft down-gradient or 100 ft up-gradient from on-site and/or offsite building foundations.
- Infiltration BMPs shall be lined with a geotextile filter fabric, having a replaceable top liner surface.
- Infiltration BMPs shall be at least 100 ft from any water supply well where runoff is from commercial or industrial pervious parking areas. For all other applications a min. distance of 50 ft shall be used.
- Infiltration BMPs shall not be located within 50 ft of septic systems and/or septic drain fields.
- All infiltration BMPs shall incorporate a conveyance and control for overflow runoff.
- Waiver of any or all of these requirements may be granted at the discretion of the Township only upon written request and explanation of the reasons that these requirements should not apply provided by a Qualified Design Professional.
- The design of all facilities over limestone formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation.
- 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.
  - The design of all facilities over limestone formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation.
  - The infiltration requirement in the High Quality/Exceptional Value waters shall be subject to DEPs Chapter 93 and Antidegradation Regulations.
  - The Township may require the installation of an impermeable liner in detention basins located in strip mine or limestone areas.
  - All sinkhole and groundwater contamination prevention provisions shall be stated and shown on the plan with details provided for each.
  - Use of infiltration BMPs which result in significant increases (more than 100% increase) in the predevelopment rate of infiltration per unit area should be avoided in carbonate areas, unless a detailed geologic evaluation demonstrates that the potential for sinkhole formation is minimal.
  - Stormwater runoff from significant pollutant producing sources (industrial, gas stations, fast food and other commercial uses generating large numbers of vehicle trips, and other uses at the determination of the Township) shall be filtered and/or pre treated using a water quality BMP before being discharged in carbonate areas.
- Where pervious pavement is permitted for parking lots, recreational facilities, non-dedicated streets, or other areas, pavement construction specifications and maintenance schedules shall be noted on the plan.

#### 126-11 - Water Quality Requirements

- Water quality volume shall be based upon the following equation:
  - $WQ_v = [(P)(R_v)(A)]/12$

Where:

$WQ_v$  = Water Quality Vol (ac-ft)

P = Rainfall amount (Exhibit 2, Table B-5)

Rv = volumetric runoff coeff =  $0.05 + .009 (I)$

A = Area (ac)

I = percent impervious area

- Water quality volume shall be designed as part of a SWM facility which incorporates water quality BMPs as a primary benefit of using that facility, in accordance with design specifications contained in “PA Handbook of BMPs for Developing Areas.”

#### 126-12 - Stream Bank Erosion Requirements

- Storage facilities shall be designed to release the 1-yr post development storm runoff volume over a min. duration of 24-hrs.

#### 126-16 - Roof Drains

- When it is more advantageous to connect directly to streets or storm sewers, connections of roof drains to streets or roadside ditches may be permitted by the Municipality

#### 126-17 - Content

- Complete hydrologic and hydraulic structural computations for all SWM facilities. Structural computations can be requested at the discretion of the Twp and their Engineer.
- Runoff calcs and related design comps of the total drainage areas necessary to substantiate the proposed temporary and permanent SWM facilities.
  - Tc
  - C value
  - CN
  - Drainage areas
  - Intensity
  - 24-hour rainfall
- Maps of the project area on 24'x36" sheets
  - A map showing extent of entire watershed contributing runoff to the site including offsite watershed, if any.
  - Construction details, sections and specifications for stormwater facilities with sufficient info and dimensions for construction interpretation that will provide the developer and constructor with sufficient info to meet the requirements of this Chapter.
  - Access easements around all SWM facilities that would provide ingress and egress from a public ROW and prohibit structure and other obstructions from being placed in areas intended and required for SWM.
  - Access easements shall have a min. width of 20.0 ft and be centered on the facility (pipe, swale) to which access is being provided
  - Access easements for storage, retention and infiltration facilities shall conform substantially to the size, shape and configuration of such facility.
  - Staging and implementation schedule for constructing the proposed SWM facilities.

126-19 - Program Provisions (Ownership and Maintenance Program)

- Clearly set forth the ownership and maintenance responsibility of all permanent SWM facilities.
  - Description of maintenance requirements and outline of routine maintenance actions and schedules necessary to ensure proper operation
  - Establishment of suitable easements for access to all facilities from public ROW. Twp shall have the right to enter easement areas where stormwater management and E&S control facilities are located for the purpose of inspecting said facilities.
  - Identification of the responsible party or entity for ownership and maintenance of both temporary and permanent SWM and E&S control facilities.
    - First priority – facilities should be incorporated within individual lots so that respective lot owners will own and be responsible for maintenance in accordance with this section and recorded deed restrictions.
    - Second priority – ownership and maintenance shall be responsibility of a Homeowner’s Association. The stated responsibilities of the Homeowner’s Association in terms of owning and maintaining the SWM facilities shall be submitted with final plans for determination of their adequacy. Plans shall contain a condition that it shall be mandatory for the owner or owners of said lot to be members of said Homeowner’s Association.
    - Municipal ownership shall not be permitted.
  - Signed Stormwater Facilities Maintenance and Monitoring Agreement is required prior to final approval of SWM Plan.
  - When ownership will be the responsibility of a Homeowner’s Association, an agreement shall be provided to the Township by the applicant defining the terms and conditions under which ownership and maintenance responsibilities will be transferred to the Homeowner’s Association.