

### Article III — Stormwater Management Standards\

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## Article III — Stormwater Management Standards

### § 25-301 General Requirements.

(a) **SWM Site Plan.** For all Regulated Activities, unless preparation of an SWM Site Plan is specifically exempted in § 25-104.1:

(1) Preparation and implementation of an approved SWM Site Plan is required; and

(2) No Regulated Activities shall commence until the Borough issues written approval of an SWM Site Plan which demonstrates compliance with the requirements of this Chapter.

(b) **Plans Available On Site.** The SWM Site Plans approved by the Borough, in accordance with § 25-408, shall be on site throughout the duration of the Regulated Activity.

(c) **Erosion and Sedimentation Control.** For all Regulated Earth Disturbance Activities, erosion and sediment control 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 (relating to Environmental Protection) and the Clean Streams Law, 35 PA. STAT. ANN. § 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, as amended and updated. See reference 3 at § 25-901.

**(d) 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, the total impervious area on the parcel is subject to the requirements of this Chapter; *except that* the volume controls in §25-301.6 and the peak rate controls of § 25-302 do not need to be retrofitted to existing impervious areas that are not being altered by the proposed Regulated Activity.

**(e) Flows Onto Adjacent Property.** Stormwater flows onto adjacent property shall not be created, increased, relocated, or otherwise altered without written notification to the adjacent property owner(s). Such stormwater flows shall be subject to the requirements of this Chapter.

**(f) Protection of the Public Interest.** 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) Incorporate methods described in the *Pennsylvania Stormwater Best Management Practices Manual* (BMP Manual). See reference 4 at § 25-901. If methods other than green infrastructure and LID methods are proposed to achieve the volume and rate controls required under this Chapter, the SWM Site Plan must include a statement that the developer considered the use of LID and green infrastructure methods, and an explanation why the developer determined that such methods were not reasonable or practicable for the particular project.

**(g) Karst Areas.** The design of all facilities over karst shall include an evaluation of measures to minimize adverse effects.

**(h) Infiltration BMPs.** 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.

**(i) Time to Drain Storage Facilities.** Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than twenty-four (24) and not more than seventy-two (72) hours from the end of the design storm.

**(j) Design Storm Volumes.** The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the latest version of the Precipitation-Frequency Atlas of the United States, National Oceanic and Atmospheric Administration (NOAA), National

Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14 can be accessed at: <http://hdsc.nws.noaa.gov/hdsc/pfds/>. See reference 5 at § 25-901.

**(k) Requirements for BMPs.** 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 (relating to Environmental Protection), the Clean Streams Law, 35 PA. STAT. ANN. § 691.1 *et seq.*, and the Storm Water Management Act, Act of October 4, 1978, Pa. Laws 864, No. 167, as amended, 32 PA. STAT. ANN. § 680.1 *et seq.*

**(l) Types of BMPs; Standards.** Various BMPs and their design standards are listed in the BMP Manual. See reference 4 at § 25-901.

**(m) Storm Drainage Systems Required.** Storm drainage systems shall be provided to permit unimpeded flow of natural watercourses except as modified by stormwater detention facilities, pipe systems, or open channels consistent with this Chapter.

**(n) Points of Concentrated Drainage Discharge.** The existing points of concentrated drainage discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).

**(o) Areas of Existing Diffused Drainage Discharge.** Areas of existing diffused drainage discharge onto adjacent property shall be managed such that, at minimum, the peak diffused flow does not increase in the general direction of discharge, except as otherwise provided in this Chapter. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the developer must document that there are adequate downstream conveyance facilities to safely transport the concentrated discharge to the point of pre-development flow concentration or to the stream reach, or otherwise prove that no harm will result from the concentrated discharge. Areas of existing diffused drainage discharge shall be subject to any applicable release rate criteria in the general direction of existing discharge whether they are proposed to be concentrated or maintained as diffused drainage areas.

**(p) Watercourses Which Traverse a Site.** Where a site is traversed by watercourses other than those for which a 100-year floodplain is defined by the Borough, drainage easements shall be provided conforming substantially with the line of such watercourses. The width of any easement shall be adequate to provide for unimpeded flow of storm runoff based on calculations made in conformance with § 25-304 for the 100-year return period runoff, and to provide a freeboard allowance of one-half (0.5) foot above the design water surface level. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations which may adversely affect the flow of stormwater within any portion of the easement. Also, periodic maintenance of the easement to ensure proper runoff conveyance shall be required. Watercourses for which the 100-year floodplain is formally defined are subject to the applicable Borough floodplain regulations (*see* Chapter 24 (relating to Floodplain Management)).

**(q) Construction of Open Channels.** When it can be shown that, due to topographic conditions, natural drainage swales on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage swales. Capacities of open channels shall be calculated using the Manning equation.

(r) **Minimization of Erosion.** Post-construction BMPs shall be designed, installed, operated, and maintained to meet the requirements of the Clean Streams Law, 35 PA. STAT. ANN. § 691.1 *et seq.*, and implementing regulations, including the established practices in 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control), and the specifications of this Chapter, so as to prevent accelerated erosion in watercourse channels and at all points of discharge.

(s) **Low Impact Development Practices.** Techniques described in Appendix ¶ 25-M (which is incorporated herein by reference) are encouraged because they reduce the costs of complying with the requirements of this Chapter and the State Water Quality Requirements.

(t) **Infiltration.** Infiltration for stormwater management is encouraged where soils and geology permit, consistent with the provisions of this Chapter, and, where appropriate, the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock set forth in Appendix ¶ 25-H (which is incorporated herein by reference). Infiltration is encouraged for capturing and treating the Water Quality Volume (as calculated in § 25-301.3(c)), any part of the Water Quality Volume, or for otherwise meeting the purposes of this Chapter.

### § 25-301.1 Permit Requirements by Other Government Entities.

The requirements set forth in this Chapter are in addition to all other requirements of law applicable to activities regulated by this Chapter, whether imposed by statute, regulation, rule, ordinance, resolution, court order, or otherwise. For example, the following permit requirements apply to certain Regulated Activities or Earth Disturbance Activities, and must be met prior to the commencement of those Regulated Activities or Earth Disturbance Activities, as applicable:

(a) All Regulated Activities or Earth Disturbance Activities subject to permit requirements by DEP under regulations at 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control);

(b) Work within natural drainageways subject to permit by DEP under 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control);

(c) Any stormwater management facility that would be located in or adjacent to surface waters of the Commonwealth, including wetlands, subject to permit by DEP under 25 PA. CODE Chapter 105 (relating to Dam Safety and Waterway Management);

(d) Any stormwater management facility that would be located on a State highway right-of-way or require access from a State highway shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT);

(e) Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area, and any facility which may constitute a dam, subject to permit by DEP under 25 PA. CODE Chapter 105 (relating to Dam Safety and Waterway Management).

### § 25-301.2 Erosion and Sediment Control.

(a) **Erosion and Sediment Control Plan.**



(1) No Regulated Earth Disturbance Activities within the Borough shall commence until an Erosion and Sediment Control Plan for construction activities is approved by the Borough, DEP, or the Lehigh County Conservation District.

(2) DEP regulations require an Erosion and Sediment Control Plan for any Earth Disturbance Activity that disturbs 5,000 square feet or more of land, and also for certain Earth Disturbance Activities that disturb less than 5,000 square feet of land. (*See* 25 PA. CODE § 102.4 (relating to Erosion and Sediment Control Requirements).)

(b) **NPDES Permit.** A DEP NPDES Stormwater Discharges Associated with Construction Activities Permit is required for certain Regulated Earth Disturbance Activities under 25 PA. CODE Chapter 92a (relating to National Pollutant Discharge Elimination System Permitting, Monitoring and Compliance).

(c) **Evidence of Permits.** Evidence of any necessary permit(s) for Earth Disturbance Activities from the appropriate DEP regional office or Lehigh County Conservation District must be provided to the Borough before the commencement of an Earth Disturbance Activity.

(d) **Availability of Plan and Permits.** A copy of the Erosion and Sediment Control Plan and any permit required by DEP regulations shall be available at the project site at all times.

### § 25-301.3 Post-Construction Water Quality Criteria.

(a) **SWM Site Plan.** No Regulated Earth Disturbance Activities within the Borough shall commence until after the Borough approves an SWM Site Plan (*see* Article IV) which demonstrates compliance with this Chapter, unless the project qualifies for an exemption under § 25-104.1. DEP has determined that this Chapter meets State Water Quality Requirements as of January 19, 2005. Therefore, any approvals under this Chapter would satisfy the post-construction stormwater management requirements (as in effect on January 19, 2005) associated with an NPDES Permit for Stormwater Discharges Associated with Construction Activities.

(b) **Capture and Treatment Required.** The entire WQv for the site area of a Regulated Activity shall be captured and treated. However, if the project qualifies for an exemption under § 25-104.1 and DEP allows a waiver or modification of any or all of the requirements of this § 25-301.3 in that situation, then the Borough may so waive or modify those requirements as allowed by DEP.

#### (c) Calculation of Water Quality Volume.

(1) **In General.** The Water Quality Volume (WQv) of a Regulated Activity shall be the *larger* of the formula amount calculated under paragraph (2) *or* the difference amount calculated under paragraph (3), *except that* in no case shall be WQv be permitted to exceed 1.25 inches of runoff over the site area.

(2) **Formula Amount.** The formula amount WQv under this paragraph shall be calculated as follows:

$$WQ_v = \frac{(c)(P)(A)}{12},$$



where “WQv” represents water quality volume in acre-feet, “c” is the Rational Method post-development runoff coefficient for the 2-year storm (*see* Appendix J 25-F), “P” is 1.25 inches (0.104167 feet), and “A” represents area in acres of proposed Regulated Activity.

(3) **Difference Amount.** The difference amount WQv under this paragraph shall be calculated as the difference in runoff volume from pre-development to post-development for the 2-year return period storm. The effect of closed depressions on the site shall be considered in this calculation.

(4) **Drainage Directions.** The WQv shall be calculated for each post-development drainage direction on a site for sizing BMPs.

(5) **Unaffected Areas.** Site areas having no impervious cover and no proposed disturbance during development may be excluded from the WQv calculations and do not require treatment.

(d) **Treatment Methods.** Any stormwater runoff from the site as a result a Regulated Activity must either be treated with infiltration or *two* acceptable BMPs such as those listed in Appendix J 24-J (which is incorporated herein by reference).

(e) **Investigation and Use of Infiltration.**

(1) **Preliminary Site Investigation.** For each proposed Regulated Activity in the watershed, the applicant shall conduct a Preliminary Site Investigation on the portion of the site that is judged to be the best candidate hydrogeologically for possible infiltration, including gathering data from published sources, a field inspection of the site, a minimum of one test pit, and a minimum of two percolation tests, as outlined in § 25-301.5(a). This investigation will determine depth to bedrock, depth to the seasonal high water table, soil permeability, and location of Special Geologic Features, if applicable. The location(s) of Special Geologic Features shall be verified by a Qualified Geotechnical Professional.

(2) **Bedrock Types.** The applicant shall document the bedrock type(s) present on the site from published sources. Any apparent boundaries between carbonate and non-carbonate bedrock shall be verified through more detailed site evaluations by a Qualified Geotechnical Professional.

(3) **Entirely Non-Carbonate Sites.**

(A) **In General.** For entirely non-carbonate sites, the WQv shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the WQv for reasons of seasonal high water table, permeability rate, soil depth, or isolation distances, or except as provided in § 25-301.4 (relating to Alternative Water Quality Methods). If it is not feasible to infiltrate the full WQv, the applicant shall infiltrate that portion of the WQv that is feasible based on the site characteristics.

(B) **Feasibility Determination.** The Preliminary Site Investigation described in paragraph (1) shall continue on different areas of the site until a suitable infiltration location is found or the entire site is determined to be infeasible for infiltration. For proposed infiltration areas, the Additional Site Investigation and Testing as outlined in § 25-301.5(b) shall be completed. The Borough may determine infiltration to be infeasible if there are known existing conditions or problems that may be worsened by the use of infiltration.

**(C) Conditions Suitable for Infiltration.** The following conditions are suitable for infiltration in non-carbonate areas:

- (I)** Depth to bedrock below the invert of the BMP greater than or equal to two (2) feet;
- (II)** Depth to seasonal high water table below the invert of the BMP greater than or equal to three (3) feet. (If the depth to bedrock is between two (2) and three (3) feet and the evidence of the seasonal high water table is not found in the soil, no further testing to locate the depth to seasonal high water table is required.);
- (III)** Soil permeability greater than or equal to one-half (0.5) inches per hour and less than or equal to twelve (12) inches per hour;
- (IV)** Setback distances or buffers as follows:
  - (i)** One hundred (100) feet from water supply wells;
  - (ii)** Ten (10) feet downgradient or one hundred (100) feet upgradient from building foundations;
  - (iii)** Fifty (50) feet from septic system drainfields;
  - (iv)** Fifty (50) feet from a geologic contact with carbonate bedrock, unless a Preliminary Site Investigation is done in the carbonate bedrock to show the absence of Special Geologic Features within fifty (50) feet of the proposed infiltration area;
  - (v)** One hundred (100) feet from the property line, unless documentation is provided to show that all setbacks from wells, foundations, and drainfields on neighboring properties will be met;
  - (vi)** Not within any Zone I Wellhead Protection radius as provided in subsection (f)(6); and
  - (vii)** Not within twenty-five (25) feet of any percolation test hole with a fast percolation rate as provided in § 25-301.5(a)(6) (relating to Fast Percolation Rates).

**(4) Entirely Carbonate Sites.**

**(A) Further Investigation.** In entirely carbonate areas, in addition to the testing required in paragraph (1), the Preliminary Site Investigation shall include an assessment of the remainder of the site for possible infiltration based on required isolation distances from Special Geologic Features and the likely soil depth and permeability based on published data or other site data available. the WQv shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the WQv for reasons of seasonal high water table, permeability rate, soil depth, or isolation distances, or except as provided in § 25-301.4 (relating to Alternative Water Quality Methods). If it is not feasible to infiltrate the full WQv, the applicant shall infiltrate that portion of the WQv that is feasible based on the site characteristics.

**(B) Infiltration Not Required.** Applicants are not required to use infiltration BMPs on a carbonate site even if the site falls in the “Recommended” range on the Recommendation Chart in Appendix § 25-H. If infiltration is not proposed, the WQv shall be treated by *two* acceptable BMPs, as specified in Appendix § 25-J (which is incorporated herein by reference). (If Capture/Reuse is used to treat the entire WQv, then only that one BMP is required because of its superior water quality performance.)

(C) **Conditions Required for Infiltration.** In addition to the recommendation from the Recommendation Chart in Appendix J 25-H, *all* of the conditions set forth in paragraph (3)(C) (except clause (IV)(iv)) are required for infiltration in carbonate areas.

(5) **Site With Both Carbonate and Non-Carbonate Areas.** If a site has both carbonate and non-carbonate areas, the applicant shall investigate the ability of the non-carbonate portion of the site to fully meet the requirements of this Chapter to control runoff for the whole site through infiltration. If that proves infeasible, the applicant shall perform the Preliminary Site Investigation for the carbonate area to determine the appropriate design strategy. No infiltration structure in the non-carbonate area shall be located within fifty (50) feet of a boundary with carbonate bedrock, except when a Preliminary Site Investigation has been done showing the absence of Special Geologic Features within fifty (50) feet of the proposed infiltration area.

(f) **Special Rules for Infiltration BMPs.**

(1) **Carbonate Areas.** If infiltration BMPs are proposed in carbonate areas, the post-development 2-year runoff volume leaving the site shall be eighty percent (80%) or more of the pre-development runoff volume for the carbonate portion of the site to prevent infiltration of volumes far in excess of the pre-development infiltration volume.

(2) **Fill.** Infiltration BMPs shall not be constructed on fill.

(3) **Protection from Disturbance and Compaction.** Site areas proposed for infiltration shall be protected from disturbance and compaction except as necessary for construction of infiltration BMPs.

(4) **Hot Spot Land Uses.** The use of infiltration BMPs is prohibited on Hot Spot Land Use areas.

(5) **Special Geologic Features.** Stormwater infiltration BMPs shall not be placed in or on a Special Geologic Feature(s). Additionally, stormwater runoff shall not be discharged into existing on-site sinkholes.

(6) **Wellhead Protection.** Applicants shall request, in writing, Public Water Suppliers to provide the Zone I Wellhead Protection radius, as calculated by the method outlined in the Pennsylvania Department of Environmental Protection Wellhead Protection regulations (*see* 25 PA. CODE Chapter 109 (relating to Safe Drinking Water)), for any public water supply well within four hundred (400) feet of the site. In addition to the setback distances specified in subsection (e)(3)(C)(IV), infiltration is prohibited in the Zone I radius as defined and substantiated by the Public Water Supplier in writing. If the applicant does not receive a response from the Public Water Supplier, the Zone I radius is assumed to be one hundred (100) feet.

(g) **Other Treatment Methods.** If infiltration of the entire WQv is not proposed, the remainder of the WQv shall be treated by *two* acceptable BMPs in series for each discharge location. Sheet flow draining across a pervious area can be considered as one BMP. Sheet flow across impervious areas and concentrated flow shall flow through two BMPs. If sheet flow from an impervious area is to be drained across a pervious area as one BMP, the length of the pervious area must be equal to or greater than the length of the impervious area. In no case may the same BMP be employed consecutively to meet this requirement. Acceptable BMPs are listed in Appendix J 25-J, along with the recommended reference for design. (If Capture/Reuse is used to treat the entire WQv, then only that one BMP is required because of its superior water quality performance.)

**(h) Hot Spot Land Uses.**

**(1) Pretreatment Required.** Stormwater runoff from Hot Spot Land Uses shall be pre-treated. In no case may the same BMP be employed consecutively to meet this requirement and the requirement in subsection (g). Acceptable methods of pre-treatment are listed in Appendix J 25-K (which is incorporated herein by reference). Design references for the pre-treatment methods, as necessary, are listed in Appendix J 25-L (which is incorporated herein by reference).

**(2) Classification.** The applicant may demonstrate that due to the site characteristics a land use is not a Hot Spot Land Use.

**(i) Protection from Thermal Impacts.** If an applicant is proposing to use a wet pond, constructed wetland, or other BMP that ponds water on the land surface and may receive direct sunlight, the discharge from that BMP must be treated by infiltration, a vegetated buffer, filter strip, bioretention, vegetated swale, or other BMP that provides a thermal benefit to protect the High Quality waters of the Little Lehigh Creek from thermal impacts.

**(j) Protection from Physical Degradation of Receiving Waters.** The volume and rate of the net increase in stormwater runoff from the Regulated Activities must be managed to prevent the physical degradation of receiving waters from such effects as scour and stream bank destabilization, to satisfy State Water Quality Requirements.

**§ 25-301.4 Alternative Water Quality Methods.**

**(a) In General.** The Borough may, after consultation with DEP, approve alternative methods for meeting the State Water Quality Requirements other than those in this Chapter, *provided* they meet the minimum requirements of and do not conflict with State law, including but not limited to the Clean Streams Law, 35 PA. STAT. ANN. § 691.1 *et seq.* Any such methods shall be adopted by ordinance and added to this § 25-301.4.

**§ 25-301.5 Site Investigation and Testing.**

**(a) Preliminary Site Investigation.**

**(1) Required Data and Site Information.** The following data shall be gathered utilizing standard testing procedures, including all of the procedures set forth in paragraphs (2) through (5), as part of a Preliminary Site Investigation:

**(A) Bedrock composition** — Any apparent boundaries between carbonate and non-carbonate bedrock must be verified by a Qualified Geotechnical Professional;

**(B) Bedrock structure geology** — This includes the possible presence of faults and mapping of conspicuous fracture traces or lineaments;

**(C) Overburden and soil mantle composition and thickness;**

**(D) Permeability of the soil;**

**(E) Depth to the seasonal high water table;**

(F) Presence of Special Geological Features — This includes sinkholes, closed depressions, fracture traces, lineaments, and geologic contacts between carbonate and non-carbonate bedrock.

(2) **Review of Available Data, Maps, and Reports.** Some of the required information listed in paragraph (1) can be found in existing published data. Suggested resources include the following:

- (A) Geologic maps and references for the development area;
- (B) The Little Lehigh Creek Basin Carbonate Prototype Area Closed Depression Map — available at the Lehigh Valley Planning Commission;
- (C) USGS topographic maps;
- (D) Lehigh and Berks County soil survey maps;
- (E) Aerial photographs from the Lehigh Valley Planning Commission or other sources;

(F) Relevant Pennsylvania Geologic Survey Open File Reports (Kochanov 1987a, 1987b) that provide maps of sinkholes and Karst features for Lehigh and Berks counties.

(3) **Field Inspections.** In addition to gathering data from published sources, a field inspection of the proposed site is required. A field inspection can provide additional information relating to site features, such as carbonate bedrock features, indicators of seasonal high stream-level or water table levels, streams, springs, etc.

(4) **Soil Test Pit and Percolation Test Requirements.** A minimum of one (1) test pit and a minimum of two (2) percolation tests are required for every site. A test pit is a two-to-three (2-3) foot wide, eight (8) foot deep trench excavated with a backhoe for observing subsurface conditions. The test pits will be used to describe soil depth and quality, including soil horizons, and testing of permeability or percolation rates.

(5) **Method of Conducting Percolation Tests.** Percolation tests are to be conducted as follows (adapted from 25 PA. CODE § 73.15 (relating to Percolation Tests)):

(A) The percolation tests shall be made in separate holes uniformly spaced over the possible infiltration area.

(B) An “Initial Presoak” should not be performed.

(C) Percolation holes located within the possible infiltration area shall be used in the calculation of the average percolation rate.

(D) Holes having a uniform diameter of six (6) to ten (10) inches shall be bored or dug as follows:

- (I) To the depth of the bottom of the possible infiltration BMP;
- (II) Alternate depths if the test pits/auger holes indicate that the soils are more suitable at a different depth (*i.e.*, if a clay horizon is identified and more suitable soils are located beneath the horizon, and infiltration test should be performed in the suitable horizon).

(E) The bottom and sides of the hole shall be scarified with a knife blade or sharp-pointed instrument to completely remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Loose material shall be removed from the hole. Two

(2) inches of coarse sand or fine gravel shall be placed in the bottom of the hole to protect the soil from scouring and clogging of the pores.

(F) Immediately before the percolation test, as a final presoak, water shall be placed in the hole to a minimum depth of six (6) inches over the gravel and readjusted every thirty (30) minutes for one (1) hour.

(G) The drop in the water level during the last thirty (30) minutes of the final presoaking period shall be applied to the following standard to determine the time interval between readings for each percolation hole:

(I) If water remains in the hole, the interval for readings during the percolation test shall be thirty (30) minutes.

(II) If no water remains in the hole, the interval for readings during the percolation test may be reduced to ten (10) minutes.

(H) After the final presoaking period, water in the hole shall again be adjusted to approximately six (6) inches over the gravel and readjusted when necessary after each reading.

(I) Measurement to the water level in the individual percolation holes shall be made from a fixed reference point and shall continue at the interval determined from subparagraph (G) above for each individual percolation hole until a minimum of eight (8) readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of one-quarter ( $1/4$ ) inch or less of drop between the highest and lowest readings of four (4) consecutive readings.

(II) The drop that occurs in the final period in percolation test holes, expressed as inches per hour, shall be used to calculate the average percolation rate.

(III) When the rate of drop in a percolation test is too slow to obtain a measurable rate, the rate one one-quarter (0.25) inches per hour shall be assigned to that hole for use in calculating the average percolation rate. The infiltration area may be placed over holes with no measurable rate when the average percolation rate for the possible infiltration area is within the acceptable range.

**(6) Fast Percolation Rates.** When a percolation test hole yields a percolation rate of greater than twelve (12) inches per hour, the proposed infiltration area may not be designed or installed within twenty-five (25) feet of this hole, unless the Borough determines that a testing anomaly caused the fast percolation rate and a retest of the area yields acceptable percolation rates. This percolation rate limit is established to protect groundwater quality and to minimize the risk of subsidence.

**(b) Additional Site Investigation and Testing When Infiltration Is Proposed.** When infiltration is proposed after a Preliminary Site Investigation, the following additional investigation and testing is required:

**(1) Soil Pit Test Requirements.** The required number of test pits varies with Effective Soil Thickness. As risk factors increase, the number of test pits increases. A minimum of two (2) test pits, uniformly spaced within the proposed infiltration area (*e.g.*, the two (2) pits should be centered on each half of the proposed infiltration area), are required for any site proposing infiltration, unless the applicant can demonstrate that one (1) test pit is adequately representative of the area proposed for infiltration. For larger infiltration areas, multiple test pits shall be developed at the densities listed in the table in paragraph (4).



**(2) Soil Auger Testing Requirements for Carbonate Areas.** Because soil depth is not uniform in many carbonate areas, test pits will not be sufficient to accurately determine the depth to bedrock. Augering provides this essential data as inexpensively as possible. Track-rig rotary soil auger test drilling allows relatively inexpensive, qualitative determination of the presence of overburden voids and will generally penetrate to the top of bedrock. Augers typically extend to depths of twenty (20) feet. Special augers extend to as much as fifty (50) feet. Augers do not extend into the bedrock. Auger testing should be performed in a grid pattern across the proposed infiltration area, spaced as indicated in the table in paragraph (4).

**(3) Percolation Testing Requirements.** A minimum of six (6) percolation tests shall be conducted in accordance with the procedures set forth in subsection (a)(5), unless the applicant can demonstrate that fewer tests accurately represent the percolation rate of the proposed infiltration area. Additional testing shall be required if the initial test results show significant variability in percolation rate. For larger infiltration areas, percolation tests shall be conducted at the densities listed in the table in paragraph (4).



## (4) Testing Table.

Effective Soil Thickness (ft.)	Test Pit Density (per acre of proposed infiltration area)*	Percolation Tests (per acre of proposed infiltration area)**	Auger Grid Spacing (feet on-center)
8	4	8	50
4 to 8	6	12	35
2 to 4	8	16	25

\* Number of Test Pits required = Infiltration sq. ft./43,560 sq. ft. x test pit density from chart, rounded up to the nearest whole number.

\*\* Number of Percolation Tests required = Infiltration sq. ft./43,560 sq. ft. x percolation tests from chart, rounded up to the nearest whole number.

### § 25-301.6 Volume Controls.

The green infrastructure and low impact development practices provided in the BMP Manual (*see* reference 4 at § 25-901) should be utilized for all Regulated Activities when reasonable and practicable. Water volume controls shall be implemented using the Design Storm Method in subsection (a) or the Simplified Method in subsection (b) below. For Regulated Activity areas equal or less than one acre that do not require hydrologic routing to design the stormwater facilities, this Chapter establishes no preference for either methodology; therefore, the applicant may select either methodology on the basis of economic considerations, the intrinsic limitations on applicability of the analytical procedures associated with each methodology, and other factors.

**(a) Design Storm Method.** The Design Storm Method (CG-1 in the BMP Manual, *see* reference 4 at § 25-901) is applicable to any size of Regulated Activity. This method requires detailed modeling based on site conditions.

(1) Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year 24 hour duration precipitation.

(2) For modeling purposes:

(A) Existing (predevelopment) non-forested pervious areas must be considered meadow in good condition.

(B) Twenty percent (20%) of existing impervious area, when present, shall be considered meadow in good condition in the model for existing conditions.

**(b) Simplified Method.** The Simplified Method (CG-2 in the BMP Manual, *see* reference 4 at § 25-901) provided below is independent of site conditions and should be used if the Design Storm Method is not followed. This method is not applicable to Regulated Activities greater than one acre or for projects that require design of stormwater storage facilities. For new impervious surfaces:

(1) Stormwater facilities shall capture at least the first two (2) inches of runoff from all new impervious surfaces.

(2) At least the first one (1) inch of runoff from new impervious surfaces shall be permanently removed from the runoff flow, *i.e.*, it shall not be released into the surface waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.

(3) Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first one-half (0.5) inch of the permanently removed runoff should be infiltrated.

(4) This method is exempt from the requirements of § 25-302 (relating to Rate Controls):

## § 25-302 Rate Controls.

(a) **In General.** The entire Borough is covered by a release rate map from an approved Act 167 Stormwater Management Plan. For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storm events, the post-development peak discharge rates will follow the applicable approved release rate maps. For any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the pre-development discharge rates.

(a.1) **Stormwater Management Districts.** To implement the provisions of the Little Lehigh Creek Stormwater Management Plan, the Borough is hereby divided into Stormwater Management Districts consistent with the Little Lehigh Creek Release Rate Map presented in the Stormwater Management Plan. The boundaries of the Stormwater Management Districts are shown on Plate I of the Storm Water Management Plan, which is incorporated herein by reference. The Borough is encompassed by portions of subareas 25, 27, 112, 118, and 120 under the Stormwater Management Plan. A copy of the Alburtis portion of Plate I of the Stormwater Management Plan at a reduced scale, showing the subarea boundaries, is included as Appendix J 25-A for general reference. See § 25-303(b) for the method of determining the exact location of the Stormwater Management District boundaries.

(b) **District Requirements.** Two types of Stormwater Management Districts are provided under the Stormwater Management Plan, namely Conditional No Detention Districts and Dual Release Rate Districts. There are only Dual Release Rate Districts within the Borough. Within Dual Release Rate Districts, the 2-year post-development peak runoff must be controlled to thirty percent (30%) of the pre-development 2-year runoff peak. Further, the 10-year, 25-year, and 100-year post-development peak runoff must be controlled to the stated percentage of the pre-development peak as set forth below and on Plate I of the Storm Water Management Plan, which varies from 50% to 100% depending upon location in the watershed:

<u>Subarea</u>	<u>10/25/100 Year Release Rate</u>
25	50%
27	50%
112	80%
118	80%
120	60%

### § 25-303 Rate Controls Implementation Provisions.

(a) **Hydrograph Analysis Required.** Applicants shall provide a comparative pre- and post-construction stormwater management hydrograph analysis for each direction of discharge and for the site overall to demonstrate compliance with the provisions of this Chapter.

(a.1) **Satisfaction of Release Rate Requirements.** Any stormwater management controls required by this Chapter and subject to dual release rate criteria shall meet the applicable release rate criteria (*see* § 25-302(b)) for each of the 2-, 10-, 25-, and 100-year return period runoff events, consistent with the calculation methodology specified in § 25-304.

(b) **Determination of District Boundaries.** 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 (2') topographic contours provided as part of the SWM Site Plan. The District boundaries as originally drawn coincide with topographic divides or, in certain instances, are drawn from the intersection of the watercourse and a physical feature such as the confluence with another watercourse or a potential flow obstruction (*e.g.*, road, culvert, bridge, etc.). The physical feature is the downstream limit of the subarea and the subarea boundary is drawn from that point up slope to each topographic divide along the path perpendicular to the contour lines.

(c) **Criteria for Downstream Capacity Analyses.** Any downstream capacity analysis conducted in accordance with this Chapter shall use the following criteria for determining adequacy for accepting increased peak flow rates:

(1) **Channels or Swales: 2-year event.** Natural or man-made channels or swales must be able to convey the increased runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion.

(2) **Channels or Swales: 25-year event.** Natural or man-made channels or swales must be able to convey the increased 25-year return period runoff peak without creating any hazard to persons or property.

(3) **Other Facilities.** Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with the DEP Chapter 105 regulations, 25 PA. CODE Ch. 105 (relating to Dam Safety and Waterway Management) (if applicable) and, at a minimum, pass the increased 25-year return period runoff.

(d) **Development in One Release Rate Category Subarea.** For a proposed development site located within one release rate category subarea, the total runoff from the site shall meet the applicable release rate criteria. For development sites with multiple directions of runoff discharge, individual drainage directions may be designed for up to a 100% release rate so long as the total runoff from the site is controlled to the applicable release rate.

(e) **Development in Multiple Release Rate Category Subareas.** For a proposed development site located within two or more release rate category subareas, the peak discharge rate from any subarea shall be the pre-development peak discharge for that subarea multiplied by the applicable release rate. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the preceding portions of this subsection (e) may be granted by the Borough if discharges from multiple subareas recombine in

proximity to the site. In that case, peak discharges in any direction may be a 100% release rate provided that the overall site discharge meets the weighted average release rate.

**(f) Development in Release Rate Subarea and Conditional No Detention Subarea.** For a proposed development site located partially within a release rate category subarea(s) and partially within a conditional no detention subarea(s), a significant portion of the site area subject to the release rate control may not be drained to the discharge point(s) located in the no detention area except as part of a “No Harm” or hardship waiver procedure.

**(f.1) Regrading Between Little Lehigh Creek Watershed and Adjacent Watersheds.** No portion of a site may be regraded between the Little Lehigh Creek Watershed and any adjacent watershed except as part of a “No Harm” or hardship waiver procedure.

**(g) Drainage to Closed Depressions.** Within a release rate category area, for a proposed development site which has areas which drain to a closed depression(s), the design release from the site must be the *lesser* of—

- (1) the applicable release rate flow assuming no closed depressions; or
- (2) the existing peak flow actually leaving the site.

In cases where paragraph (2) would result in an unreasonably small design release, the design discharge of less than or equal to the release rate will be determined by the available downstream conveyance capacity to the main channel calculated using § 25-303(c) and the minimum orifice criteria.

**(h) Effect of Off-Site Flows.** Off-site areas which 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 using the capacity criteria in § 25-303(c) and the detention criteria in § 25-304.

**(i) Phased Developments.** For development sites proposed to take place in phases, all detention ponds shall be designed to meet the applicable release rate(s) applied to all site areas tributary to the proposed pond discharge direction. All site tributary areas will be assumed as developed, regardless of whether all site tributary areas are proposed for development at that time. However, for sites with multiple detention ponds in series, only the downstream pond must be designed to the stated release rate.

**(j) Sites Where Development Impact Area is Significantly Smaller Than the Total Site Area.** Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area shall be subject to the release rate criteria. The impact area includes any proposed cover or grading changes.

**(k) No Change to Both the Rate and Volume of Runoff Discharged.** Development proposals which, through groundwater recharge or other means, do not increase either the rate or volume of runoff discharged from the site compared to the pre-development condition are not subject to the release rate provisions of this Chapter.

**(l) “No Harm” Water Quantity Option.**

**(1) In General.** For any proposed development site not located in a conditional no detention district, the developer has the option of using a less restrictive runoff control (including

no detention) if the developer can prove that special circumstances exist for the development site and that “no harm” would be caused by discharging at a higher runoff rate than that specified by the Stormwater Management Plan and this Chapter. For purposes of this paragraph (1), “special circumstances” shall mean any hydrologic or hydraulic aspects of the development itself not specifically considered in the development of the Stormwater Management Plan runoff control strategy. Proof of “no harm” must be shown from the development site through the remainder of the downstream drainage network to the confluence of the Little Lehigh Creek with the Lehigh River. Proof of “no harm” must be shown using the capacity criteria specified in § 25-303(c) if downstream capacity analysis is a part of the “no harm” justification.

**(2) Analysis Considerations.** Attempts to prove “no harm” based upon downstream peak flow versus capacity analysis shall be governed by the following provisions:

**(A) Peak Flow Values.** The peak flow values to be used for downstream areas for the design return period storms (2-, 10-, 25- and 100-year) shall be the values from the calibrated WATERSHED model for the Little Lehigh Creek Watershed, or as calculated by an applicant using an alternate method acceptable to the Borough. The flow values from the WATERSHED model are reproduced in Appendix J 25-I, which is incorporated herein by reference.

**(B) Allocation of Available Downstream Capacity.** Any available capacity in the downstream conveyance system as documented by a developer may be used by the developer only in proportion to his development site acreage relative to the total upstream undeveloped acreage from the identified capacity (*i.e.*, if his site is 10% of the upstream undeveloped acreage, he may use up to 10% of the documented downstream available capacity).

**(C) Increased Flow Rates at Problem Areas.** Developer-proposed runoff controls which would generate increased peak flow rates at storm drainage problem areas are, by definition, precluded from successful attempts to prove “no harm,” except in conjunction with proposed capacity improvements for the problem areas consistent with § 25-303(n).

**(3) Submission.** Any “no harm” justifications shall be submitted by the developer as part of the SWM Site Plan submission per Article IV.

**(m) Regional Detention Alternatives.** For certain areas within the Little Lehigh Creek Watershed, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective developers. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined based on the required release rate at the point of discharge.

**(n) Capacity Improvements.**

**(1) Local Drainage Network Capacity Deficiency.** In certain instances, primarily within the conditional no detention areas, local drainage conditions may dictate more stringent levels of runoff control than those based upon protection of the entire watershed. In these instances, if the developer can prove that it is feasible to provide capacity improvements to relieve the capacity deficiency in the local drainage network, then the capacity improvements may be provided by the developer in lieu of runoff controls on the development site. Peak flow calculations are to be made assuming that the local watershed is in the existing condition and then assuming that the local watershed is developed per current zoning and using the specified runoff controls.

Any capacity improvements must be designed using the *larger* of the above peak flows and the capacity criteria specified in § 25-303(c). All new development in the entire subarea(s) within which the proposed development site is located shall be assumed to implement the developer's proposed discharge control, if any.

(2) **Other Circumstances.** Capacity improvements may also be provided as necessary to implement any regional detention alternatives or to implement a modified "no harm" option which proposes specific capacity improvements to provide that a less stringent discharge control will not create any harm downstream.

## § 25-304 Calculation Methodology.

(a) **Approved Methodologies.** Stormwater runoff from all development sites shall be calculated using either the rational method or the soil-cover-complex methodology.

(a.1) **Calculation Methodology for Infiltration BMPs in Carbonate Bedrock.** The following calculation methods shall be employed in utilizing the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix J 25-H:

(1) **Loading Rate Percentages.** Infiltration BMP loading rate percentages shall be calculated as follows:

$$\left( \frac{\text{Area Tributary to infiltration BMP}}{\text{Base area of infiltration BMP}} \right) * 100\%.$$

(2) **Weighting Factors.** For purposes of paragraph (1), the area tributary to the infiltration BMP shall be weighted as follows:

All disturbed areas to be made impervious ..... weight at 100%

All disturbed areas to be made pervious ..... weight at 50%

All undisturbed pervious areas ..... weight at 0%

All existing impervious areas ..... weight at 100%.

(3) **Soil Thickness.** Soil thickness is to be measured from the bottom of any proposed infiltration system. The effective soil thickness in the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix J 25-H is the measured soil thickness multiplied by the thickness factor based on soil permeability, as follows:

Permeability Range*	Thickness Factor
6.0 to 12.0 inches/hour	0.8
2.0 to 6.0 inches/hour	1.0
1.0 to 2.0 inches/hour	1.4
0.75 to 1.0 inches/hour	1.2
0.5 to 0.75 inches/hour	1.0



\* If the permeability rate falls on a break between two thickness factors, the smaller thickness factor shall be used.

Sites with soil permeability greater than 12.0 inches/hour or less than 0.5 inches/hour are not recommended for infiltration.

**(b) Verification of Detention Basin Design.** The design of any detention basin intended to meet the requirements of this Chapter shall be verified by routing the design storm hydrograph through the proposed basin using the storage indication method or other methodology demonstrated to be more appropriate. For basins designed using the rational method technique, the design hydrograph for routing shall be either the Universal Rational Hydrograph or the modified rational method trapezoidal hydrograph which maximizes detention volume. Use of the modified rational hydrograph shall be consistent with the procedure described in Section “PIPE.RAT” of the Users’ Manual for the Penn State Urban Hydrograph Method (1987).

**(b.1) Storage or Infiltration BMPs.** BMPs designed to store or infiltrate runoff and discharge to surface runoff or pipe flow shall —

- (1) be routed using the storage indication method; and
- (2) provide storage volume for the full WQv below the lowest outlet invert.

**(b.2) Wet Detention Ponds.** Wet Detention Ponds designed to have a permanent pool for the WQv shall assume that the permanent pool volume below the primary outlet is full at the beginning of design event routing for the purposes of evaluating peak outflows.

**(c) Freeboard.** All stormwater detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the 2- through 25-year runoff events. A 0.5 foot freeboard shall be provided above the maximum pool elevation of the 100-year runoff event. The freeboard shall be measured from the maximum pool elevation to the invert of the emergency spillway. The 2- through 100-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each basin shall be designed to pass the 100-year return frequency storm peak basin inflow rate with a minimum 0.5 foot freeboard measured to the top of the basin. The freeboard criteria shall be satisfied considering any offsite areas tributary to the basin as developed, as applicable. If this detention facility is considered to be a dam under the DEP Chapter 105 regulations, 25 PA. CODE Ch. 105 (relating to Dam Safety and Waterway Management), the design of the facility must be consistent with those regulations, and may be required to pass a storm greater than the 100-year event.

**(d) Circular Orifice Diameter.** The minimum circular orifice diameter for controlling discharge rates from detention facilities shall be three (3) inches. Designs where a lesser size orifice would be required to fully meet release rates shall be acceptable *provided* that as much of the site runoff as practical is directed to the detention facilities.

**(e) Rainfall Calculations.**

**(1) Soil-Cover-Complex Method.** Runoff calculations using the soil-cover-complex method shall use the NRCS Type II 24-hour rainfall distribution. (A graphic and tabular presentation of the NRCS Type II 24-hour rainfall distribution is reproduced in Appendix J 25-C, which



is incorporated herein by reference.) The 24-hour rainfall depths for the various return periods to be used consistent with this Chapter shall be taken from NOAA Atlas 14, Volume 2.

(2) **Rational Method.** Runoff calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration and return periods and the Intensity-Duration-Frequency Curves presented in Appendix J 25-D, which is incorporated herein by reference.

(f) **Runoff Calculations.**

(1) **Soil-Cover-Complex Method.** Runoff Curve Numbers (CN's) to be used in the soil-cover-complex method shall be based upon the matrix presented in Appendix J 25-E, which is incorporated herein by reference.

(2) **Rational Method.** Runoff coefficients for use in the Rational Method shall be based upon the table presented in Appendix J 25-F, which is incorporated herein by reference.

(g) [RESERVED]

(h) **Time of Concentration Calculations.**

(1) **Flow Types.** All time of concentration calculations shall use a segmental approach, which may include one or all of the following flow types:

(A) **Overland Flow.** Sheet Flow (overland flow) calculations shall use either the NRCS average velocity chart (Figure 3-1 of Technical Release-55, 1975) or the modified kinematic wave travel time equation (equation 3-3, NRCS TR-55, June 1986). If using the modified kinematic wave travel time equation, the sheet flow length shall be limited to 50 feet for designs using the Rational Method, and limited to 150 feet for designs using the soil-cover-complex method.

(B) **Shallow Concentrated Flow.** Shallow Concentrated Flow travel times shall be determined from the watercourse slope, type of surface, and the velocity from Figure 3-1 of NRCS TR-55, June 1986.

(C) **Open Channel Flow.** Open Channel Flow travel times shall be determined from velocities calculated by the Manning Equation. Bankfull flows shall be used for determining velocities. Manning 'n' values shall be based on the table presented in Appendix J 25-G, which is incorporated herein by reference.

(D) **Pipe Flow.** Pipe Flow travel times shall be determined from velocities calculated using the Manning Equation, assuming full flow and the Manning 'n' values from Appendix J 25-G.

(2) **Common Time of Concentration.**

(A) **Pre-Development.** If using the Rational Method, all pre-development calculations for a given discharge direction shall be based on a common time of concentration, considering both on-site and any off-site drainage areas.

(B) **Post-Development.** If using the Rational Method, all post-development calculations for a given discharge direction shall be based on a common time of concentration, considering both on-site and any off-site drainage areas.

(i) **Capacity of Watercourses.** The Manning Equation shall be used to calculate the capacity of watercourses. Manning 'n' values used in the calculations shall be consistent with the table presented in Appendix J 25-G, or other appropriate standard engineering 'n' value resources. Pipe capacities shall be determined by methods acceptable to the Borough.

(j) **DEP Dam Safety and Waterway Management Regulations.** DEP's Chapter 105 regulations, 25 Pa. Code Ch. 105 (relating to Dam Safety and Waterway Management), apply to the construction, modification, operation, and/or maintenance of both existing and proposed dams, water obstructions, and encroachments throughout the watershed. Criteria for design and construction of stormwater management facilities according to this Chapter may not be the same criteria that are used in the permitting of dams under the Dam Safety Program. The requirements of both this Chapter and the DEP Chapter 105 regulations must be satisfied where both are applicable.

### § 25-305 Riparian Buffers.

(a) **Riparian Buffer Easement.** In order to protect and improve water quality, a Riparian Buffer Easement shall be created and recorded as part of any subdivision or land development that encompasses a Riparian Buffer, unless deemed unnecessary by the Borough.

(b) **Width.** Except as otherwise required by DEP's Chapter 102 regulations, 25 PA. CODE Ch. 102 (relating to Erosion and Sediment Control), the Riparian Buffer Easement shall be measured to be the *greater* of the limit of the one hundred (100) year floodplain or a minimum of thirty-five (35) feet from the top of the streambank (on each side).

(c) **Minimum Management Requirements for Riparian Buffers.**

(1) Existing native vegetation shall be protected and maintained within the Riparian Buffer Easement.

(2) Whenever practicable, invasive vegetation shall be actively removed and the Riparian Buffer Easement shall be planted with native trees, shrubs and other vegetation to create a diverse native plant community appropriate to the intended ecological context of the site.

(d) **Enforcement; Recording.** The Riparian Buffer Easement shall be enforceable by the Borough and shall be recorded in the Lehigh County Recorder of Deeds Office, so that it shall run with the land and shall limit the use of the property located therein. The easement shall allow for the continued private ownership and shall count toward the minimum lot area required by zoning, unless otherwise specified in Chapter 21 of the Alburis Codified Ordinances (relating to Zoning).

(e) **Uses Within the Easement.** Any permitted use within the Riparian Buffer Easement shall be conducted in a manner that will maintain the extent of the existing one hundred (100) year floodplain, improve or maintain the stream stability, and preserve and protect the ecological function of the floodplain.

(f) **Recreation Trails.** The following conditions shall apply when public and/or private recreation trails are permitted within Riparian Buffers:

(1) Trails shall be for non-motorized use only.

(2) Trails shall be designed to have the least impact on native plant species and other sensitive environmental features.

(g) **Sewage Issues.** Septic drainfields and sewage disposal systems shall not be permitted within the Riparian Buffer Easement and shall comply with setback requirements established under 25 PA. CODE Chapter 73 (relating to Standards for Onlot Sewage Treatment Facilities).