

SECTION 5 – STORM WATER MANAGEMENT

I. GENERAL

5.1 DEFINITIONS

1. Acre – A measurement of area equaling 43,560 square feet.
2. Architect – An individual who has been registered to perform the practices of architecture in the State of Ohio in accordance with all applicable laws.
3. Best Management Practices (BMPs) – Also STORMWATER CONTROL MEASURE (SCMs). Schedules of activities, prohibitions of practices, operation and maintenance procedures, treatment requirements, and other management practices (both structural and non-structural) to prevent or reduce the pollution of water resources and to control stormwater volume and rate. This includes practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. For guidance, please see U.S. EPA's National Menu of BMPs at <http://water.epa.gov/polwaste/npdes/swbmp/index.cfm>.
4. Community – Throughout this regulation, this shall refer to the City of Hudson, its designated representatives, board or commissions.
5. Comprehensive Stormwater Management Plan – The written document and plans meeting the requirements of this regulation that sets forth the plans and practices to minimize stormwater runoff from a development area, to safely convey and temporarily store and release post-development runoff at an allowable rate to minimize flooding and stream bank erosion, and to protect or improve stormwater quality and stream channels.
6. Curve Number – Also known as runoff curve number or CN number. Developed by the USDA National Resources Center, the CN number is a value used hydrology calculations for predicting direct runoff or infiltration from rainfall excess.
7. Design Year - The frequency with which a storm of a specific intensity and duration will be experienced over an infinite period of time. Therefore, it signifies the probability of a storm with a specific intensity occurring within one year.

$$\text{Probability} = 1/\text{Design Year}$$

Examples: 1/25 year = 4% probability of occurring every year

Typical design year events are the 1, 2, 5, 10, 25, 50 and 100 year storms.

8. Detention Basin - A storm water facility whose purpose is to detain storm water from a specific drainage area prior to discharging the runoff downstream. For the purpose of these requirements a detention basin will be considered to be “dry” prior to a rain event.

9. Development Area - A parcel or contiguous parcels owned by one person or persons, or operated as one development unit, and used or being developed for commercial, industrial, residential, institutional, or other construction or alteration that changes runoff characteristics.

10. Disturbed Area - An area of land subject to erosion due to the removal of vegetative cover and/or soil disturbing activities.

11. Drainage - (1) The area of land contributing surface water to a specific point. (2) The removal of excess surface water or groundwater from land by surface or subsurface drains.

12. Erosion and Sediment Control - The control of soil, both mineral and organic, to minimize the removal of soil from the land surface and to prevent its transport from a disturbed area by means of wind, water, ice, gravity, or any combination of those forces.

13. Erosion - The process by which the land surface is worn away by the action of wind, water, ice, gravity, or any combination of those forces.

14. Final Stabilization - All soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of at least 80% coverage for the area has been established or equivalent stabilization measures, such as the use of mulches or geotextiles, have been employed.

15. Landscape Architect - an individual who has been registered to perform the practices of landscape architecture in the State of Ohio in accordance with all applicable laws.

16. Larger Common Plan of Development or Sale - A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

17. Long Term Maintenance Agreement (LTMA) - a document that is customized to each development project that lists the specific best management practices (BMPs) to control post-construction sediment and erosion and lists each BMPs inspection, maintenance, funding and maintenance conditions that are the responsibility of the developer or owner, and accepted by the City.

18. Major Flood Path - A system that conveys and temporarily stores runoff from rarer storms, such as the 25-through 100-year events. The major flood path is utilized whenever the capacity of the street gutters, storm sewers and inlets is exceeded. The major flood path components consist of the following:

- Streets
- Swales
- Detention basins - multipurpose
- Manmade channels - open and closed
- Natural Creeks, streams, wetlands and rivers

19. Maximum Extent Practicable - The level of pollutant reduction that site owners of small municipal separate storm sewer systems regulated under 40 C.F.R. Parts 9, 122, 123, and 124, referred to as NPDES Storm Water Phase II, must meet.

20. NPDES: National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

21. One Hundred (100) Year Floodplain – Under the Federal Emergency Management Agency’s (FEMA) National Flood Insurance Program (NFIP), the 100-Year flood plain or “Special Flood Hazard Area” (SFHA) is the area of land that would be inundated by the base flood. The 100-year flood plain or SFHA is delineated on maps provided to each community by FEMA. It is the area where the floodplain management regulations must be enforced by the Community as a condition of participation in the NFIP and the area where the mandatory flood insurance purchase requirement applies.

22. Owner/Operator - Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof that is responsible for the overall site construction.

23. Parcel - A tract of land occupied or intended to be occupied by a use, building or group of buildings and their accessory uses and buildings as a unit, together with such open spaces and driveways as are provided and required. A parcel may contain more than one contiguous lot individually identified by a ‘Permanent Parcel Number’ assigned by the Summit County Auditor’s Office.

24. Person - Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof.

25. Phasing - A specific period, stipulated in a plan, contract or specification during which the contractor must complete construction, subject to the conditions of the contract which may including the clearing a parcel of land in distinct sections, with the stabilization of each section before the clearing of the next.

26. Professional Engineer - an individual who has been registered to perform the practices of engineering in the State of Ohio in accordance with all applicable laws.

27. Qualified Inspection Personnel - A person knowledgeable in the principles and practice of erosion and sediment controls, who possess the skill to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measure selected to control the quality of storm water discharges from the construction activity.

28. Rainwater and Land Development - Ohio's standards for storm water management, land development, and urban stream protection. The most current edition of these standards shall be used with this regulation.

29. Retention Basin - A storm water facility whose purpose is to detain storm water from a specific drainage area, prior to discharging the runoff downstream. For the purpose of these requirements a retention basin will be considered to contain water at all times.

30. Runoff - The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and is eventually conveyed to water resources or wetlands.

31. Sediment - The soils or other surface materials that are transported or deposited by the action of wind, water, ice, gravity, or any combination of those forces, as a product of erosion.

32. Sedimentation - The deposition or settling of sediment.

33. Setback - The minimum or maximum distance a building, structure or parking area shall be required to be situated from an adjacent lot line as defined in the Hudson Land Development Code or a designated transition area around water resources or wetlands that is left in a natural, usually vegetated, state so as to protect the water resources or wetlands from runoff pollution. Soil disturbing activities in this area are restricted by this regulation.

34. Soil & Water Conservation District - An entity organized under Chapter 1515 of the Ohio Revised Code referring to either the Soil and Water Conservation District Board or its designated employee(s). Hereafter referred to as Summit SWCD.

35. Soil Disturbing Activity - Clearing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and that may result in, or contribute to, erosion and sediment pollution.

36. Stabilization - The use of BMPs, such as seeding and mulching, that reduce or prevent soil erosion by water, wind, ice, gravity, or a combination of those forces.

37. Stormwater Control Measure (SCM) - Also Best Management Practice (BMP). Schedule of activities, prohibitions of practices, operation and maintenance procedures, treatment requirements, and other management practices (both structural and non-structural) to prevent or reduce the pollution of water resources and to control stormwater volume and rate. This includes practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. For guidance, please see U.S. EPA's National Menu of BMPs at <http://water.epa.gov/polwaste/npdes/swbmp/index.cfm>.

38. Stormwater Pollution Prevention Plan (SWP3) - The written document that sets forth the plans and practices to be used to meet the requirements of this regulation during and after the land development.

39. Surface Waters of the State - All streams, lakes, reservoirs, marshes, wetlands, or other waterways situated wholly or partly within the boundaries of the state, except those private waters which do not combine or affect a junction with surface water. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the Ohio Revised Code are not included

40. Unstable Soils - A portion of land that is identified by the City of Hudson Engineer, or designated representative, as prone to slipping, sloughing, or landslides, or is identified by the U.S. Department of Agriculture Natural Resource Conservation Service methodology as having low soil strength.

41. Water Resource - Any public or private body of water including lakes and ponds, as well as any brook, creek, river, or stream having banks, a defined bed, and a definite direction of flow, either continuously or intermittently flowing.

42. Wetland - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas (40 CFR 232, as amended).

II. DEVELOPMENT OF COMPREHENSIVE STORMWATER MANAGEMENT PLANS

This regulation requires that the owner develop a Comprehensive Stormwater Management Plan that complies with the standards and requirements set forth in this regulation. Approvals issued in accordance with this regulation do not relieve the owner of responsibility for obtaining all other necessary permits and/or approvals from other federal, state and/or county agencies. The plan shall be developed and implemented for:

All commercial and industrial site development, all soil disturbing activities disturbing one (1) or more acres of total land, or less than one (1) acre if part of a larger common plan of development or sale disturbing one (1) or more acres of total land, land that exceeds the Maximum Impervious Surface Coverage as defined in Hudson Land Development Code section 1207.01, and on which any regulated activity of Section 1421.01(a) is proposed. The City Engineer reserves the right to require a comprehensive stormwater management plan on sites disturbing less than one (1) acre if the development may result in, or contribute to, erosion and sediment pollution or if the development may adversely impact storm water runoff related to a documented storm water related problem. The development of the Comprehensive Storm Water Management Plan includes re-development of existing sites that have no storm water management controls.

The City shall administer this regulation, shall be responsible for determination of compliance with this regulation, and shall issue notices and orders as may be necessary. The City may consult with “Summit SWCD”, state agencies, private engineers, stormwater districts and other technical experts in reviewing the Comprehensive Stormwater Management Plan.

5.2 APPLICATION PROCEDURES

A. Pre-Application Meeting: The applicant shall attend a pre-application meeting with the City Engineer to discuss the proposed project, review the requirements of this regulation, identify unique aspects of the project that must be addressed during the review process, and establish a preliminary review and approval schedule.

B. Preliminary Comprehensive Stormwater Management Plan: In either hard copy or digital copy, the applicant shall submit a preliminary comprehensive stormwater management plan and the applicable fees to the City Engineer. The preliminary plan shall show the proposed property boundaries, setbacks, dedicated open space, public roads, water resources, stormwater control facilities, and easements in sufficient detail and engineering analysis to allow the City Engineer to determine if the site is laid out in a manner that meets the intent of this regulation and if the proposed SCMs are capable of controlling runoff from the site in compliance with this regulation. The applicant shall submit two (2) sets of the Preliminary Plan and applicable fees as follows:

1. For subdivisions: In conjunction with the submission of the preliminary subdivision plan.
2. For other construction projects: In conjunction with the application for a zoning certificate.
3. For general clearing projects: In conjunction with the application for a zoning certificate.

C. Final Comprehensive Stormwater Management Plan: In either hard copy or digital copy, the applicant a Final Comprehensive Stormwater Management Plan to the City Engineer in conjunction with the submittal of the final plat, improvement plans, or application for a zoning certificate for the site. The Final Plan shall meet the requirements of this regulation and shall be approved by the City Engineer prior to approval of the final plat and/or before issuance of a Zoning Certificate.

D. Review and Comment: The City Engineer shall review the Preliminary and Final Plans submitted, and shall approve or return for revisions and comments and recommendations for revisions. A Preliminary or Final Plan rejected because of deficiencies shall receive a narrative report stating specific problems and the procedures for filing a revised Preliminary or Final Plan.

E. Approval Necessary: Land clearing and soil-disturbing activities shall not begin and zoning certificates shall not be issued without an approved Comprehensive Stormwater Management Plan.

5.3 COMPREHENSIVE STORMWATER MANAGEMENT STANDARDS

A. MAJOR FLOOD PATH

The intent of planning, designing, constructing, and maintaining a major flood path is to ensure that the storm water runoff, which exceeds the capacity of the storm sewer and other conveyance systems, shall have a route to follow which will not cause a loss of property or life.

The combination of the major flood path and sewer/ditch system shall have the capacity to carry runoff from a 100-year frequency storm. Where the street is designated as the major drainage way, the depth of flow shall not exceed 8 inches at the face of the curb. When the major drainage way is located outside a street right-of-way, utility and floodway easements shall be provided and a grading plan is to be submitted with detailed elevations showing the flood being contained in this area.

The existing downstream stormwater system or flood path shall be checked and certified by the developer's or owner's design engineer and shown to have sufficient capacity to convey the designed, 100-year frequency storm.

Minimum garage, first floor and minimum window opening and/or window well elevations along all one hundred (100) year flood routes are to be set by the design engineer. These elevations are to be a minimum of eighteen inches (18") above the one hundred (100) year water elevation at the nearest point of the opening. These elevations are to be clearly labeled on the plans and the subdivision plat. In addition, all lots along the major flood path shall have the Building "Envelope" established by the Engineer.

Since streets may be used as the major flood path, the major system must be taken into account in the initial design of the development. It shall be designed in such a manner as to direct the storm water into the detention or retention area. Calculations indicating the capacity of the Major Flood Path and the excess storm water runoff from the sewer/ditch system shall be provided with the final design.

No trees, shrubs or other hardscape landscape features shall be permitted within the major flood path.

The maintenance responsibilities and requirements to preserve the approved design of the Major Flood Path shall be identified in the development's, City-approved Long Term Maintenance Agreement (LTMA).

III. DETENTION/RETENTION FACILITIES

5.4 DESIGN CRITERIA

The peak discharge shall be designed and controlled by reducing the 25-year post-developed peak discharge to the 2-year pre-developed peak discharge over the same area. The design engineer shall also verify that the 100-year post developed peak discharge is reduced to the 10-year pre-developed discharge. Both criteria shall be met. ~~The~~The City may require the use of a 1-year pre-developed storm as the limiting storm, as determined by the City Engineer for cases in which documented, downstream storm water conveyance issues exist.

For developments which satisfy the criteria established in Section 5.9 “Alternative Detention Facilities,” the peak rates of runoff and volumes shall be controlled using the “Critical Storm Method”. This method is used to determine the design frequencies utilized in the design of the detention/retention structures for the development.

The pre-developed curve number used for all calculations shall be calculated from the historic site conditions (within the past 10 years) yielding the lowest curve number (CN) value. This does not apply to re-development sites. For all site development, the maximum, pre-developed CN value shall be no greater than 75, unless otherwise approved by the City Engineer.

“Critical Storm Method”;

1. The peak rate of runoff from a Critical Storm (as determined below) and all more frequent storms occurring on the development area shall not exceed the peak rate of runoff from a 2-year frequency storm over the same area under pre-development conditions.
2. Storms of less frequent occurrence than the Critical Storm, up to the 100-year storm, shall have peak runoff rates no greater than peak runoff rates from equivalent size storms under pre-development conditions.

The Critical Storm for a specific development area is determined as follows:

- A) Determine by appropriate hydrologic methods the total volume of runoff from a 2-year frequency, 24-hour storm occurring over the development area before and after development.
- B) From the volumes determined in (2-A), determine the percentage increase in volume of runoff due to development, and using this percentage, select the 24 hour Critical Storm from the following table:

<u>(at least)</u>	% Increase in Volume of Runoff	“Critical Storm” Discharge Limitation
	<u>(but less than)</u>	<u>Year</u>
0	20	2
20	50	5
50	100	10
100	250	25
250	500	50
500	or more	100

For detention/retention structures located “off-line” (receive runoff from a portion of the site or is not in the direct flow path of storm water system) storage volume does not have to be provided for runoff from off-site upstream areas. Upstream runoff shall be conveyed through or around the site in accordance with the current runoff conditions and shall not cause an increase in the probability of upstream or downstream flooding. Detention/retention structures located “in-line” (receive runoff from off-site areas), shall be designed as regional detention/retention facilities. Post-construction hydrographs shall be developed for the entire watershed assuming full development of upstream areas according to current zoning requirements. The post-construction hydrographs shall be routed through the basin and shall not exceed the allowable release rates according to the applicable design criteria. The design criteria for a regional basin shall be as described herein under Critical Storm method by considering the percent increase in runoff from the entire watershed assuming full development of upstream areas, unless otherwise approved by the City.

The requirements of this Section for runoff rates and volumes shall be satisfied at each location where runoff leaves the development area.

~~For areas less than 5 acres, the modified rational method shall be used to develop the inflow hydrographs.~~ Hydrographs and corresponding storage criteria shall be developed using the Natural Resources Conservation Service (NRCS) methods. Storm intensities shall be taken from the Intensity-Duration-Frequency (IDF) relationships given in the NOAA (National Oceanic and Atmospheric Administration) Atlas 14, Volume 2, plus 20%, or the most recent version of the NOAA Atlas. The IDF values from this atlas are currently available on the NOAA's on-line Precipitation Frequency Data Server found at <https://hdsc.nws.noaa.gov/hdsc/pfds>. ~~For areas between 5 and 20 acres, the modified rational and technical release 55 (TR-55) methods are acceptable.~~ Any development over 20 acres shall use the TR-55 method or USGS Regression Equation as approved by the City Engineer. Hydrographs shall be calculated using rainfall depths from the NOAA Atlas 14, Volume 2, plus 20%, which are also currently available on the NOAA's on-line Precipitation Frequency Data Server. A latitude of 41.24° N and longitude of 81.44° W shall be used for location identification.

Routing calculations and their corresponding inflow and outflow hydrographs shall be provided for the 1, 2, 5, 10, 25, 50 and 100-year storms along with the pre-developed hydrographs which establish the allowable release rates. The results shall be tabulated and included in the drainage calculations. The table shall include

allowable outflow, peak inflow, peak outflow, maximum water surface elevation and other additional information as required. Copy of the Table shall be placed on the improvement plans for the development.

<u>Recurrence</u>	<u>Peak Inflow (cfs)</u>	<u>Allowable Outflow (cfs)</u>	<u>Peak Outflow (cfs)</u>	<u>Max Water Surface Elevation (ft.)</u>
<u>1</u>				
<u>2</u>				
<u>5</u>				
<u>10</u>				
<u>25</u>				
<u>50</u>				
<u>100</u>				

5.5 DOWNSTREAM ANALYSIS

The purpose of the storm water management design criteria is to protect downstream properties from flood increases due to upstream development. Due to peak flow timing and runoff volume effects, some structural controls fail to reduce downstream peak flows to pre-developed levels. Therefore, a downstream analysis is required to ensure no adverse impacts to downstream properties, structures, buildings, culverts, or storm sewer systems. The downstream analysis shall consist of a hydrologic model of the larger watershed which includes the area draining to the site and shall include key detention structures existing in the watershed. The watershed shall be divided into an appropriate number of sub-areas with homogeneous hydrologic characteristics, and peak flows shall be determined in the downstream channel or system by combining the hydrographs generated for the applicable sub-areas. The analysis must begin at a point downstream of the site where the watershed is at least 10 times larger than the site area. The analysis must show that the post-developed 100-year peak flow does not exceed the pre-developed 100-year peak flow in the downstream channel or system at all critical points in the downstream system including stream confluences, major storm sewer outfalls, and any other locations which experience a significant change in flow as directed by the City. A drainage map of the watershed with the critical locations identified shall be submitted to the City for review prior to proceeding with the downstream analysis.

The downstream analysis will be performed by City of Hudson consultant's and paid for by owner or developer in areas where the City has previously developed a watershed model. The design engineer may be requested to submit additional information or calculations for the site being developed to update the City's

watershed model. The design engineer shall contact the City to determine if models for the watershed in which the development is being proposed is available before proceeding with the downstream analysis.

5.6 DETENTION BASIN

A. Allowable Side Slope - The grading of the detention basin shall be such that it reflects the surrounding topography. The embankment slopes for the detention basin should be 4' horizontal to 1' vertical (4:1) preferred or at a maximum of 3' horizontal to 1' vertical (3:1).

B. Outlet/Overflow Structure - The outlet structure shall be a multi-staged structure, consisting of a catch basin (2' x 2' or larger) with a primary outlet (typically an orifice) at the invert. The primary outlet shall be designed to pass the Critical Storm or 25-year storm and shall be a minimum of 4" in diameter. All orifices less than or equal to 6" shall have screening to prevent clogging. The catch basin grate/windows shall be set at an elevation equal to 0.5' (minimum) above the Critical Storm or 25-year storm pond elevation and/or shall be designed to pass the 100-year storm including off-site runoff without utilizing the emergency spillway. See figure 5.5.1. Safe access to the entire outlet structure shall be provided and shall follow current OSHA Standards. If the water quality outlet is less than 4" in diameter, the normal water surface elevation of the basin shall be assumed to be the bottom of the primary outlet for purposes of the routing analysis unless otherwise approved by the City.

The primary outlet control structure and pipe shall be made of reinforced concrete in accordance with the City of Hudson Engineering Standards for Infrastructure Construction, latest edition.

C. Emergency Spillway - The Emergency Spillway elevation shall be set at an elevation equal to 0.5' (minimum) above the 100-year water surface elevation and at least 0.5 feet below the top of the basin embankment. See figure 5.5.1. The design of the spillway shall be as follows:

- Primary outlet orifice diameter less than or equal to 15" – The spillway shall be designed to pass the 100-year storm assuming the primary outlet is completely clogged. The spillway depth shall be determined such that the water surface from this calculation is below the top of the embankment. The spillway width shall be no more than 10 feet unless otherwise approved by the City.
- Primary outlet orifice diameter greater than 15" - The spillway width shall be 10 feet and set at an elevation 1 foot below the top of the embankment.

Permanent erosion control measures at the spillway may be required by the City based on potential erosion at the site.

The emergency spillway shall discharge to a natural stream, creek, lake or other natural drainage system or directly to a public storm water conveyance system, or as approved by the City Engineer.

D. Low Flow Channel - Detention Structures shall be graded to drain to the outlet structure. The minimum grade in the pond shall be 4%. Paved gutters shall not be used as the low flow channel.

E. Landscaping on Basin Embankments – Trees and brush placed on or near basin embankments shall comply with the Ohio Department of Natural Resources Division of Water fact sheet Dam Safety: Trees and Brush (Fact Sheet 94-28 or latest version). Landscaping (including trees) shall not be placed on or near basin embankments unless approved by the City. When permitted by the City, all landscaping (including trees) shall conform to Chapter 1419 Section 9 – Landscaping and Street Trees.

5.7 RETENTION BASIN

A. Allowable Side Slope - The grading of the Retention basin shall be such that it reflects the surrounding topography. The embankment slopes for the Retention basin shall be 4' horizontal to 1' vertical (4:1) leading to the pond. All ponds shall have a 10 foot wide bench around the entire pond. The bench shall be set at an elevation 1 foot below the normal water surface elevation of the pond.

B. Outlet/Overflow Structure - The outlet structure shall be designed following the guidelines in Section 5.6.B except for the following:

- The primary structure used to pass the critical storm may be other than an orifice.
- The invert of the primary structure shall be set at an elevation such that the depth of the pond shall be between 3 feet and 5 feet as approved by the City Engineer.
- The primary outlet control structure and pipes shall be made of reinforced concrete in accordance with the City of Hudson Engineering Standards for Infrastructure Construction, latest edition.
- Anti-seep collars shall be provided for all outlet pipes.

C. Emergency Spillway - Refer to Section 5.6.C.

D. Miscellaneous - Retention basins shall have a minimum of 10 acres draining to the pond or as approved by the City.

Soil borings may be required by the City to verify the suitability of the soils at the site. If soils are highly permeable a 6" clay liner may be required.

E. Landscaping on Basin Embankments - Refer to Section 5.6.E.

5.8 STORM WATER QUALITY

Federally or State funded transportation projects which replace or rehabilitate an existing facility shall provide Best Management Practices (BMPs) for storm water quality that meet the requirements of the Ohio Department of Transportation, Location & Design Manual, Volume II, latest edition. Storm water quality calculations for transportation projects shall be reviewed by the City and/or the Summit Soil and Water Conservation District.

Subdivision development and site improvements shall provide BMPs that meet the requirements of the Ohio Environmental Protection Agency Construction General Permit, latest edition. The design of these BMPs

are to follow the guidelines shown in “Rainwater and Land Development, Ohio’s Standards for Storm Water Management, Land Development and Urban Stream Protection”. Copies are available from the ~~ODNR, Division of Soil and Water Conservation~~Ohio Environmental Protection Agency. The storm water quality calculations shall be submitted along with the plans to the Summit County Soil & Water Conservation District for review and approval. The plant materials used in the BMPs shall be coordinated with the City.

5.9 ALTERNATIVE DETENTION FACILITIES

In certain applications, alternative detention facilities, may be permitted on a ~~case-by-case~~case-by-case basis. Alternative detention facilities consist of the following:

- Infiltration Basin or Infiltration Trench (in compliance with latest Ohio EPA General Construction Permit)
- Underground Detention

All requests for alternative detention facilities shall be submitted to the City with appropriate design standards. After review of the request, if approval is granted, soil borings shall be required for an infiltration basin.

6.0 DETENTION FACILITIES ON SMALL SITES

Smaller developments (typically facilities that have a drainage area of 0.5 acres or less) may have difficulty providing the storm water management required, as described above. Maintenance problems arise when the outlet for common detention structures becomes small (less than 4” exclusive of water quality outlets). Where the required outlet structure is less than 4” in diameter the following options shall be considered to decrease the peak rate of runoff, as approved by the City Engineer:

- The Critical Storm Method shall be used to establish the design criteria for the detention/retention facility.
- Provide detention in parking areas utilizing catch basins with the orifice exiting from the bottom of the basins to the sewer. If a parking lot, catch basin or storm sewer system is utilized for storage, the storm sewer system shall still be designed to convey the 10-year through 100-year storm events and all other design criteria of the City’s storm sewers and storm water management regulations shall still apply.
- Provide a reduction in peak flows with the use of Best Management practices (BMP). These include the use of grass swales and filter strips. To utilize these BMP’s the proposed

parking areas and roof drains should discharge into these structures which will detain the peak flow by increasing the flow time across the site. Information on these structures is contained in "CONTROLLING URBAN RUNOFF: A Practical Manual for Planning and Designing Urban BMP's", which can be obtained by contacting the Metropolitan Washington Council of Governments.

- Provide detention using a drywell or other infiltration device approved by the City Engineer with an overflow.
- If the primary outlet for the control structure is less than 4" in diameter, a separate non-clogging overflow shall be incorporated.
- Maximum impervious surface coverage shall meet Hudson Land Development Code Section 1207.01.

IV. DETENTION BASIN EASEMENTS

Refer to Hudson Land Development Code Section 1207.07(d)(5) – Stormwater management/drainage/erosion control.