WAYNE COUNTY STORMWATER CONTROL ADMINISTRATIVE RULES

Revised August 19, 2021 (Resolution No. 2021-526b)

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Chapter 1 GENERAL PROVISIONS

Rule 101 Purpose

These administrative rules are declared necessary for the protection of the health, safety, and welfare of the citizens of Wayne County and to protect the environment against pollution and other adverse effects from stormwater runoff. The purpose of these rules is to provide for the administration and implementation of a stormwater control program in Wayne County; and to provide performance and design standards for stormwater control systems.

Rule 102 Title

These administrative rules shall be known and may be cited as the “Wayne County Stormwater Control Administrative Rules.”

Rule 103 Effective Date

These administrative rules are effective September 3, 2021.

Chapter 2 DEFINITIONS

Rule 201 General

All terms in these administrative rules shall have the meaning ascribed to them in the Wayne County Stormwater Control Ordinance, unless otherwise specified herein.

Rule 202 Terms

As used in these rules: *Best management practice*, or BMP, means a practice or combination of practices that have been determined by the County to be the preferred method of preventing, minimizing, or reducing pollution and other effects of stormwater and stormwater runoff.

Bioretention area means a component of a stormwater control system that is comprised of a depressed land area that contains specific soil, plant materials, and other features and is used as a pretreatment system.

Bridge means a structure, including supports, built to carry a feature over a surface water or watercourse, with a clear span of more than 20 feet measured along the center of feature being carried.

Buffer strip means a zone that is used for filtering direct stormwater and stormwater runoff into a stormwater control system and for providing maintenance access to a stormwater control system.

Catch basin means a structure designed to collect water from the surface and convey it into a

closed conduit.

CFS means cubic feet per second.

Channel Protection Rate Control means controlling the stormwater runoff generated by a 1.9-inch rainfall event via extended detention.

Channel Protection Volume Control means controlling the stormwater generated by a 1-inch rainfall event via infiltration or other means of onsite retention.

Closed conduit means an enclosed conveyance designed to carry stormwater runoff such that the surface of the water is not exposed to the atmosphere, including without limitation storm sewers, culverts, closed County drains, and pipes.

Constructed wetland means an open detention basin that uses a variety of water depths and wetland plants to provide pollutant removal.

County road shall include roads and road rights-of-way within the jurisdiction of the County.

Culvert means a structure, including supports, built to carry a feature (i.e. roadway) over a surface water or watercourse, with a clear span of less than 20 feet measured along the center of the feature being carried.

Design storm means a rainfall event of specified size and return interval that is used to calculate the water volume and peak flow rate that must be handled by a stormwater control system.

Design water level means the peak water surface elevation in a detention system at which the storage volume in the system (above the permanent pool water level, if any) equals the required storage volume.

Detention or *Detain* means the temporary storage of stormwater and stormwater runoff to control peak flow rates and/or provide pollutant removal before discharging the water to a surface water or closed conduit.

Detention system means a component of a stormwater control system, either aboveground or below ground, that detains stormwater and stormwater runoff. Detention systems may include, without limitation, open detention basins and underground detention systems.

Detention time means the amount of time that a volume of water will be detained in a detention system.

Drainage area means the entire upstream land area from which stormwater runoff drains to a particular location, including any off-site drainage area.

Emergency spillway means a depression in the embankment of an open detention basin or retention basin that is used to pass flows in excess of the overflow structure capacity.

Extended Detention means the storage and gradual release of stormwater from a detention system over a period of not less than 48 hours.

First flush means stormwater runoff that occurs during the early stages of a storm as a result of the washing effect of stormwater runoff on pollutants that have accumulated on the surface of the drainage area. For purposes of these rules, the first flush at a particular location within a stormwater control system consists of runoff from the 90th percentile annual non-exceedance stormover the entire drainage area upstream of that location. The 90th percentile annual non-exceedance storm is the storm where 90 percent of the runoff-producing storm rainfalls are equal to or less than the specified value. This value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

Floodplain means for a given flood event, that area of land adjoining a continuous watercourse that has been covered temporarily by water.

Flood Control Storage Volume (Detention System) means the detention system volume necessary to control the 100-year peak flow to the allowable discharge rate while providing adequatefreeboard.

Flood Control Storage Volume (Retention System) means the retention system volume necessary to store the volume from two consecutive 100-year storm events while providing adequate freeboard.

Flow restrictor means a structure, feature, or device in a detention system or pretreatment system that is used to restrict the discharge from the system for specified design storm(s).

Forebay means a component of a stormwater control system that is comprised of surface water that is used as a pretreatment system.

Freeboard means the vertical distance from the design water level to the top of the embankment of an open detention basin or retention basin.

Manhole means a structure that allows access into a closed conduit or other underground component of a stormwater control system.

Manning's Formula means a technique for estimating the hydraulic capacity of a closed conduit, watercourse, or other means of conveyance of stormwater and stormwater runoff.

Manning's Roughness Coefficient ("n") means a coefficient used in Manning's Formula to describe the resistance to flow due to the roughness of a conveyance.

Manufactured treatment system means a component of a stormwater control system that is comprised of a manmade device or structure that is used as a pretreatment system.

Open detention basin means a component of a stormwater control system that is comprised of a surface water that is used as a detention system.

Ordinance means the Wayne County Stormwater Control Ordinance.

Outflow rate means the rate of discharge in volume per unit time.

Overflow structure means a structure designed to allow unrestricted discharge from a component of a stormwater control system when the water level exceeds the design water level.

Peak flow rate means the maximum instantaneous rate of flow at a particular location within a stormwater control system, usually in reference to a specific design storm event.

Permanent pool means a pool in an open detention system or forebay that provides additional removal of pollutants through settling and biological uptake.

Pollutant means any substance introduced into the environment that may adversely affect the public health, safety, welfare, or the environment, or the usefulness of a resource.

Pretreatment system means a structure, feature, or appurtenance, or combination thereof, either aboveground or belowground, that is used as a component of a stormwater control system to remove incoming pollutants from stormwater and stormwater runoff. Pretreatment systems may include, without limitation, forebays, manufactured treatment systems, and bioretention areas.

Rational Method Formula means a technique for estimating peak flow rates at a particular location within a stormwater control system, based on the rainfall intensity, watershed time of concentration, and a runoff coefficient.

Regulated wetland means any wetland protected by federal, state, or local laws or regulations.

Retention or Retain means the storage of stormwater and stormwater runoff to provide gravity settling of pollutants and to promote infiltration into the soil, rather than to discharge the stormwater or

stormwater runoff to a surface water or closed conduit.

Retention basin means a component of a stormwater control system that retains stormwater and stormwater runoff with no outlet.

Return interval (or *recurrence interval*) means the length of time during which a rainfall depth is predicted to be exceeded one time. For instance, a 10-year return interval rainfall depth has a 10 percent change of being exceeded in any given year. A 100-year return interval rainfall depth as a 1 percent chance of being exceeded in any given year.

Riprap means a combination of large stone, cobbles, and boulders used to line watercourses, stabilize banks, reduce runoff velocities, or filter out sediment.

Runoff coefficient means the ratio of the volume of stormwater runoff from a given drainage area over a given time period, to the total volume of precipitation that falls on the same drainage area over the same time period.

Time of concentration means the time duration that is required for stormwater runoff from the most remote area of the watershed to reach a given location in a stormwater control system.

Total suspended solids ("TSS") means particles or other solid material suspended in stormwater or stormwater runoff. TSS is commonly expressed in concentration (milligrams per liter or parts per million).

Underground detention system means one or more underground pipes and/or other structures that are utilized as a detention system.

Watershed means the complete area or region draining into a watercourse, surface water, or closed conduit.

Weir means a structure that extends across the width of a surface water, watercourse or closed conduit and is used to impound or restrict the flow of water.

Wetted perimeter means the length of the perimeter of a watercourse or closed conduit cross-section that is submerged and thereby causes resistance to flow.

Chapter 3 GENERAL REQUIREMENTS FOR STORMWATER CONTROL SYSTEMS

Rule 301 General

Except as provided in Rule 302, a person who applies for a stormwater construction approval shall:

(A) Incorporate the minimum performance and design standards prescribed by Chapters 5, 6 and 7 of these rules into the selection and design of a stormwater control system;

(B) Demonstrate that the stormwater control system shall be maintained in perpetuity pursuant to Chapter 10 of these rules; and

(C) Incorporate such other requirements as may be deemed necessary by the County to satisfy the requirements of the Ordinance.

Rule 302 Alternative Performance and Design Standards

(A) Notwithstanding any other provision in these rules, the County may approve a stormwater control system that does not satisfy the performance or design standards set forth in Chapters 5, 6 and 7 of these rules if the following conditions are met:

(1) request for approval of a stormwater control system that incorporates alternative performance or design standards is submitted to the County in conjunction with an application for stormwater construction approval;

(2) the applicant demonstrates to the satisfaction of the County that the alternative performance or design standards are adequate to control and prevent flooding, erosion, pollution, and other effects of stormwater runoff, consistent with the Ordinance; and

(3) the alternative performance or design standards are sufficiently described and documented to enable the County to assess their effectiveness.

(B) Notwithstanding any other provision in these rules, when necessary to address unique flood control or water resources protection issues at a development site, on adjacent properties, or downstream of a development site, the County may require additional performance or design standards than set forth in these rules as a condition of granting a stormwater construction approval. Such additional requirements may be required when necessary to satisfy the requirements of the Ordinance or to ensure that stormwater runoff from the development site does not create negative impacts to downstream property owners or water resources.

(C) Approval of a stormwater control system that incorporates alternative performance or design standards pursuant to this rule is within the discretion of the County.

(D) The approval by the County of a stormwater control system that meets alternative

performance or design standards according to the requirements of this rule shall not reduce, abate, alter, modify, amend, or affect the applicant's responsibility to comply with other provisions of the Ordinance, these rules, or an approval issued hereunder.

(E) The County shall approve alternative performance or design standards pursuant to this rule only if the alternative performance or design standards meet or exceed applicable requirements for stormwater control systems that are imposed by the state or a political subdivision within the County.

Rule 303 Best Management Practices and Design Standards

The County may establish best management practices for controlling stormwater runoff and detailed design criteria for stormwater control systems. These practices and criteria shall be established in writing and made available to interested persons. Applicants for stormwater construction approvals shall consider these practices and design criteria when designing stormwater control systems.

Chapter 4 STORMWATER CONSTRUCTION APPROVALS

Rule 401 Application Requirements

(A) Applications for stormwater construction approval, with supporting documentation and all required fees, shall be submitted to the Permit Office. Applications for stormwater construction approval shall be made in a form and manner approved by the County. The County may establish requirements, guidelines, and forms for submitting such applications.

(B) All proposed modifications to the approved stormwater control system shall be submitted to and approved by the County. All supporting documentation shall be submitted with any proposal to modify the stormwater control system. A person shall not commence regulated construction activity associated with a proposed modification without the approval of the County.

Rule 402 Review Procedures

(A) The Permit Office shall approve, deny, or require modification of a stormwater control system proposed in an application for stormwater construction approval. The Permit Office shall notify the applicant of the approval, denial, or request for modification by first class mail or transmitted via email from a County representative. If the application is denied, then the Permit Office shall advise the applicant in writing of its reasons for denial and conditions required for approval.

(B) The Permit Office shall issue a stormwater construction approval only if it determines that

an applicant has satisfied the requirements of the Ordinance and these rules. An approval given to the applicant either in person, by first-class mail or transmitted via email from a County representative constitutes approval of an application for stormwater construction.

Chapter 5 PERFORMANCE STANDARDS FOR STORMWATER CONTROL SYSTEMS

Rule 501 Flood Control

(A) Except as otherwise provided in these rules, stormwater control systems shall be designed and constructed to meet or exceed the minimum performance standards for flood control set forth in this Rule 501. Designing a stormwater control system to meet these minimum performance standards shall be the responsibility of the applicant or its designee, subject to the County's approval.

(B) Flood Control Performance Standards

(1) For stormwater control systems that have drainage areas equal to or greater than one hundred (100) acres, the peak flow rate of stormwater runoff leaving the development site shall not exceed 0.15 cfs/acre for a 100-year storm.

(2) For stormwater control systems that have drainage areas less than 100 acres, the peak flow rate of stormwater runoff leaving the development site shall be determined based on a variable release rate curve for the 100-year recurrence interval storm, equal to 0.15 cfs/acre for 100-acre developments, gradually increasing to 1.0 cfs/acre for developments 2 acres or smaller. See the Wayne County Stormwater Standards Manual for the variable release rate curve equation.

Rule 502 Water Resources Protection

(A) Except as otherwise provided in these rules, stormwater control systems shall be designed and constructed to meet or exceed the performance standard for water resources protection set forth in this Rule 502. Designing a stormwater control system to meet these performance standards shall be the responsibility of the applicant or its designee, subject to the County's approval.

(B) Standard for Water Resources Protection. Stormwater control systems shall be designed and constructed to remove eighty percent (80%) or more of the total suspended solids load from the development site, as determined on an annual average basis or to a discharge concentration less than or

equal to 80 mg/L.

Chapter 6 GENERAL DESIGN STANDARDS

Rule 601 Determination of Peak Flow Rate

(A) Except as provided in Rule 601(B), the peak flow rate at a particular location within stormwater control systems shall be calculated in accordance with the Rational Method Formula. The Rational Method Formula shall be expressed as follows**:**

$$Q = C \times I \times A$$

where Q = peak flow rate (cfs)

C = runoff coefficient

I = rainfall intensity (in/hr)

A = drainage area (acres)

(1) For purposes of calculating peak flow rate at a particular location using the Rational Method Formula, the runoff coefficient *(C)* shall be a weighted average that is based on the percentage of different surface types within the drainage area. Runoff coefficients shall be consistent with those listed in Chapter 6 of the Wayne County Stormwater Standards Manual.

(2) For purposes of calculating peak flow rate at a particular location using the Rational Method Formula, rainfall intensity *(I)* shall be calculated in accordance with the point precipitation/duration frequency tables from NOAA Atlas14 or the intensity equations listed in Chapter 6 of the Wayne County Stormwater Standards Manual.

(3) For purposes of determining rainfall intensity at a given location in accordance with Rule 601(A)(2), the time of concentration *(t)* shall be determined in accordance with the methodology detailed in Chapter 6 of the Wayne County Stormwater Standards Manual..

(B) The County, in its sole discretion, may require the peak flow rate to be calculated in accordance with an alternative runoff hydrograph prediction method when necessary to satisfy the requirements of the Ordinance and these rules. Acceptable alternative methods are: US Army Corps of Engineers HEC-HMS, Soil Conservation Service WinTR-20 or WinTR-55, U.S. EPA's Stormwater

Management Model (SWMM), HydroCAD, StormCAD or approved equivalent. These methods must be based on the SCS Type II 24-hour rainfall distribution with Antecedent Moisture Condition II (AMC II).

(C) For purposes of calculating the peak flow rate for a given development site, it shall be assumed that off-site drainage areas are developed consistent with any applicable master land use plan, stormwater standards and stormwater master plan enacted by the local unit(s) of government in which the stormwater control system is located, and the County's stormwater control program.

Rule 602 General Design Standards for Flood Control

(A) Except as otherwise provided in these rules, stormwater control systems designed and constructed to satisfy the general design standards for flood control set forth in this Rule 602 satisfy the applicable flood control performance standard of Rule 501(B).

(B) The stormwater control system shall include a detention system and/or retention basin that is designed and constructed in accordance with this Rule 602(B).

(1) Detention Systems

(a) Flood Control Storage Volume. The variables in the relationships in this Rule 602(B)(1) shall have the following values:

Q_{allow}	=	maximum allowable peak flow rate from the detention system per acre of development (cfs/acre)
Q_o	=	maximum allowable peak flow rate (cfs)
V_s	=	maximum volume of water stored in the detention system (ft^3)
V_r	=	total 100-year developed site runoff volume (ft^3)
A	=	total site drainage area (acres)
C	=	runoff coefficient
P_{100}	=	current 100-year, 24-hour rainfall depth (in); this value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

(i) The flood control storage volume (V_s) of detention systems that have a drainage area of one hundred (100) acres or less shall be determined based on the following relationships for the 10-year storm:

$$Q_{allow} = 1.1055 - 0.207\ln(A)$$

Q_o = Q_{allow} x A

V_S = V_r x [0.206 - 0.15ln(Q_o/Q_i)]

V_r = A x C x (P_{100} x 3,630)

(ii) The flood control storage volume (V_s) of detention systems that have a drainage area greater than one hundred (100) acres shall be determined based on the following relationships for the 100-year storm:

Q_{allow} = 0.15 cfs/acre

Q_o = Q_{allow} x A

V_S = V_r x [0.206 - 0.15ln(Q_o/Q_i)]

V_r = A x C x (P_{100} x 3,630)

(b) Detention systems shall include a flow restrictor that restricts outflow from the system such that the maximum outflow rate at the design water level will not exceed the maximum allowable outflow rate (Q_o).

(2) Flood Control Storage Volume for Retention Basins. Retention basins shall be designed to retain the volume of stormwater equal to the runoff from two consecutive 100-year storm events (V_r), as determined in accordance with the following relationship:

$$V_s = 2 \times (P_{100} \times 3{,}630) \times A \times C$$

where V_s = flood control storage volume of retention basin (ft^3)

A = drainage area tributary to inlet (acres)

C = runoff coefficient

P_{100} = current 100-year, 24-hour rainfall depth (inches); this value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

(C) Adequate Outlet. Except as provided below, the stormwater control system shall include an adequate stormwater outlet.

(1) At a minimum, a stormwater outlet shall be deemed inadequate if its capacity exceeds its

reasonable share of the maximum capacity of the downstream watercourse or closed conduit, as determined by the County in its sole reasonable discretion.

(2) If the County determines that a proposed detention system does not include an adequate stormwater outlet, the applicant may be required to design and construct improvements to the downstream County drain, watercourse or closed conduit. The County shall determine the extent to which downstream improvements may be required.

(3) Stormwater control systems that include only retention basins for flood control shall not be required to satisfy this Rule 602(C).

(D) Floodplain Restrictions. Stormwater control systems shall not be constructed within a 100-year floodplain unless the stormwater control system satisfies the additional requirements of this Rule 602(D).

(1) The stormwater control systems shall not diminish the net storage capacity of the floodplain. Compensatory storage shall be required for any reduction in floodplain storage capacity.

(2) The stormwater control system shall not negatively alter the conveyance of the watercourse.

(3) During a design storm event, the storage capacity of the stormwater control system shall remain available for detention of stormwater and stormwater runoff from the development site.

(4) The stormwater control system shall minimize disruption to the riparian habitat of the floodplain by developing and implementing a plan for minimizing disturbance that is acceptable to the County.

(E) Additional Requirements

(1) To the fullest extent possible, stormwater control systems shall follow the natural drainage pattern of the land within the development site and within the watershed in which the site is located.

(2) Stormwater control systems that include surface water components shall not be located within pre-existing surface water.

Rule 603 General Design Standards for Water Resources Protection

(A) Except as otherwise provided in these rules, stormwater control systems designed and constructed to satisfy the general design standards for water resources protection set forth in this Rule 603

satisfy the water resources protection performance standard of Rule 502(B).

(B) Pretreatment System. Stormwater control systems shall include a pretreatment system at each inlet to each detention system and/or retention basin. The pretreatment system shall satisfy either or both of the following requirements:

(1) Removal Rate. The pretreatment system(s) shall be designed and constructed such that the stormwater control system achieves the pollutant removal rate required by Rule 502(B).

(2) First Flush

(a) The pretreatment system(s) shall be designed and constructed to provide treatment for the first flush.

(b) If a mechanical separation device is used to satisfy the first flush treatment requirement, refer to the peak flow and vendor certification requirements in Chapters 6 and 8 of the Wayne County Stormwater Standards Manual.

(i) The pretreatment system storage (sediment forebay) volume necessary to capture the first flush shall be determined based on the following relationship:

$$V_{ff} = (545 \times P_{ff}) \times A \times C$$

where V_{ff} = first flush storage volume (ft^3)

A = drainage area tributary to inlet (acres)

C = runoff coefficient

P_{ff} = 90th percentile annual non-exceedance event (inches); this value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

(ii) The pretreatment system(s) shall include a flow restrictor that restricts outflow to gradually release the first flush storage volume over a period of twenty-four (24) hours. The 24-hour average allowable outflow rate shall be determined in accordance with the following relationship:

$$Q_{avg\ ff} = V_{ff} / 86400$$

where $Q_{avg\ ff}$ = 24-hour average allowable outflow rate (cfs)

V_{ff} = first flush storage volume (ft^3)

(C) Channel Protection Volume Control (CPVC). Except as provided below, the stormwater control system shall capture and infiltrate total runoff volume from the channel protection volume to the

maximum extent practicable.

(1) The volume necessary to capture and infiltrate the channel protection volume to satisfy the requirement of this Rule 603(C) shall be determined in accordance with the following relationship:

$$V_{CPVC} = (P_{CPVC} \times 3{,}630) \times A \times C$$

where V_{CPVC} = required CPVC volume (ft^3)

A = total site drainage area (acres)

C = runoff coefficient

P_{CPVC} = 90th percentile annual non-exceedance event (inches); this value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

(2) The CPVC control requirement is waived only when the applicant clearly demonstrates that site conditions will not accommodate infiltration BMPs. Refer to Chapter 6 of the Wayne County Stormwater Standards Manual for conditions that can result in a CPVC infiltration waiver:

(D) Channel Protection Rate Control (CPRC). The stormwater control system shall capture the equivalent to the volume of rainfall retained on a presettlement site with well-drained soils during a 2-year, 24-hour event based on the following equation:

$$V_{CPRC} = (P_{CPRC} \times 3{,}630) \times A \times C$$

where:

V_{CPRC} = required CPRC storage volume (ft^3)

A = total site drainage area (acres)

C = runoff coefficient

P_{CPRC} = 2-year, 24-hour retained rainfall on pre-settlement conditions (inches); this value may change over time; the equations in the Stormwater Standards Manual will be updated to reflect current rainfall statistics.

(3) The stormwater control system shall include a flow restrictor that restricts outflow from the system to gradually release the CPRC volume over a period of forty-eight (48) hours. The 48-hour average allowable outflow rate shall be determined in accordance with the following relationship:

$$Q_{avg\ CPRC} = V_{CPRC} / 172{,}800$$

where Q_{CPRC} = 48-hour average allowable outflow rate (cfs)

V_{CPRC} = channel protection rate control storage volume (ft^3)

(4) Stormwater control systems that include only retention basins for flood control shall not be required to satisfy the requirements of this Rule 603(C).

(D) Additional requirements. Stormwater control systems that include surface waters as components of the system shall satisfy the following additional requirements.

(1) A buffer strip shall be established and/or preserved around each surface water on the development site (except for bioretention areas and vegetated swales).

(a) The minimum width of a buffer strip shall be 25 feet. Along watercourses, the width of a buffer strip shall be measured from the top of bank of the watercourse. Around other surface waters, the width of the buffer strip shall be measured from the minimum freeboard elevation of the surface water.

(b) Construction activities, paving, and chemical application, except for construction activities needed to create or establish the buffer strip, are prohibited in the buffer strip.

(c) The ground slope of a buffer strip shall not be steeper than 1:6.

(d) A buffer strip shall not be required around bioretention areas or vegetated swales.

(2) An applicant for stormwater construction approval shall submit a landscape plan with the application for stormwater construction approval. The plan shall depict landscaping elements that function as part of the stormwater control system, including the buffer strip.

(a) The landscape plan shall include, at a minimum, specifications for the soils and plant materials that the applicant proposes to include in the landscape; and a description of the methods and planting techniques that the applicant proposes to utilize during landscape installation.

(b) The installation and maintenance of the landscaping described in the landscape plan shall be included as regulated construction activity for which the County may require financial assurance.

Chapter 7 SPECIFIC DESIGN STANDARDS

Rule 701 Design Standards for Open Detention Basins

Open detention basins used as components of stormwater control systems shall satisfy the additional requirements of this Rule 701.

(A) Outlets

(1) Flow restrictors in open detention basins shall be placed near or within the embankment of the system to provide ready maintenance access. Flow restrictors shall be constructed of materials that minimize future maintenance requirements.

(2) Open detention basins shall include an overflow structure to allow discharge when the water level in the basin exceeds the design water level. The overflow structure and its outlet pipe shall be designed to convey the peak flow rate tributary to the basin for the 100-year design storm.

(3) Open detention basins shall include an emergency spillway with a defined downstream drainage path to allow discharge when flows exceed the capacity of the overflow structure. The emergency spillway elevation shall be 6 inches below the top of freeboard elevation. The spillway shall be protected with riprap to prevent erosion.

(B) Other Requirements

(1) The design water level of an open detention basin shall not exceed five (5) feet above the permanent pool water level.

(2) The open detention basin may have a minimum four (4) foot deep permanent pool. Permanent pools shall not be required for constructed wetlands except when the County determines that a permanent pool is necessary to satisfy the performance standards of Chapter 5 of these rules. The volume of the permanent pool shall not satisfy any portion of the flood control storage volume required by Rule 602(B).

(3) Side slopes for open detention basins shall not be steeper than 1:6.

(4) A minimum of one (1) foot of freeboard is required above the design water level of an open detention basin.

Rule 702 Design Standards for Retention Basins

Retention basins used as components of stormwater control systems shall satisfy the additional requirements of this Rule 702.

(A) Percolation Rate. Soils beneath the proposed location of the retention basin shall have a minimum in-situ infiltration rate of 1.0 inch/hour, as confirmed by a geotechnical report. Calculations and soil boring results showing the percolation rate of soils shall be submitted to the County with an application for stormwater construction approval and shall be certified by a licensed Professional Engineer.

(B) Prevailing Groundwater. The prevailing groundwater level must be at least four (4) feet below the proposed pond bottom elevation, as confirmed by a geotechnical report. The groundwater level/depth shall be submitted to the County with an application for stormwater construction approval and shall be certified by a licensed Professional Engineer.

(C) Emergency Spillway. Retention basins shall include an emergency spillway with a defined downstream drainage path to allow discharge when flows exceed the design water level. The emergency spillway elevation shall be 6 inches below the top of freeboard elevation. The spillway shall be armored to prevent erosion.

(D) Outlet Feasibility. Prior to County approval of a Retention Basin design, it shall be demonstrated that a gravity-based outlet is infeasible. A schematic and cost estimate of a pond outlet shall be provided to demonstrate whether a conventional detention pond (with a gravity outlet) is feasible. The County reserves the right to accept or reject a proposed Retention Basin based on its review of this information.

(E) Other Requirements

(1) Side slopes for retention basins shall not be steeper than 1:6.

(2) A minimum of one (1) foot of freeboard is required above the design water level of a retention basin.

(3) Maximum storage depth shall be six (6) feet, as measured from the basin bottom to the peak design storage elevation.

Rule 703 Design Standards for Underground Detention Systems

Underground detention systems used as components of stormwater control systems shall satisfy the additional requirements of this Rule 703.

(A) Underground detention systems shall confine stormwater and stormwater runoff to the interior of the detention system, and shall not release the water except through an approved outlet.

(B) The County may restrict the types of materials and methods of construction for underground detention systems. At a minimum, an applicant must demonstrate that materials and construction methods for underground detention systems conform to applicable ASTM standards, AASHTO standards, and local standards adopted by the County.

Rule 704 [Reserved]

Rule 705 [Reserved]

Rule 706 Design Standards for Forebays

Forebays used as a component of a stormwater control system shall satisfy the additional requirements of this Rule 706.

(A) Flow restrictors. Flow restrictors in forebays shall be placed near or within the embankment of the forebay to provide ready maintenance access and shall be constructed of materials that minimize future maintenance requirements.

(B) Weir. The forebay shall include a weir to allow discharge from the forebay into the detention system or retention basin when the forebay water level exceeds the top of the forebay storage volume. The weir shall be designed to convey the peak flow rate tributary to the forebay for the 100-year design storm.

(C) The total forebay storage volume (above the permanent pool, if any) may be used to satisfy both a portion of the flood control storage volume required by Rule 602(B) and the bank full flood storage volume required by Rule 603(C).

Rule 707 Design Standards for Bioretention Areas

Bioretention areas used as components of stormwater control systems shall satisfy the additional requirements of this Rule 707.

(A) Underdrain. The bioretention area design may include an underdrain system to prevent excess pooling of water. Underdrains shall not be required where the applicant demonstrates that the infiltration rate of soil within the bioretention area is sufficient to prevent excess pooling.

(1) The underdrain shall be installed over a gravel layer that consists of at least six (6) inches of gravel.

(2) The underdrain shall include an adequate outlet into a detention system, retention basin, storm sewer, or watercourse.

(3) The hydraulic capacity of the underdrain shall be greater than the infiltration rate of the soil within the bioretention area.

(4) The underdrain shall be perforated along its entire length, except that no perforations shall be permitted within five (5) feet of a connection between the underdrain system and a storm sewer structure.

(5) The underdrain shall include a cleanout well to provide access for cleaning the underdrain system.

(B) Other requirements

(1) The pooling water depth for bioretention areas shall not exceed a depth that results in water accumulating on the surface of the bioretention area for greater than twenty-four (24) hours.

(2) Applicants that propose to include a bioretention area as a component of a stormwater control system shall submit a grading plan for the development site that identifies the location of the bioretention area and the routes for construction and other vehicular traffic to demonstrate that soils and other subsurface media in or around the bioretention area will not be over compacted during construction.

Rule 708 Design Standards for Manufactured Treatment Systems

Manufactured treatments systems used as components of stormwater control systems shall satisfy the additional requirements of this Rule 708.

(A) Manufactured treatment systems shall accumulate and store incoming solids so as to prevent re-suspension of captured solids.

(B) The removal efficiency of manufactured treatment systems shall be based on the documented performance of the system in full-scale independent studies over a range of storm sizes.

(C) Manufactured treatment systems shall incorporate a water-lock feature to prevent the release of trapped oil and floatable contaminants during storm events.

(D) The County may restrict the types of materials and methods of construction for manufactured treatment systems. At a minimum, an applicant must demonstrate that materials and construction methods for manufactured treatment systems conform to applicable ASTM standards, AASHTO standards, and local standards adopted by the County.

Rule 709 [Reserved]

Rule 710 [Reserved]

Rule 711 Design Standards for Stormwater Conveyances

Conveyances used as components of stormwater control systems shall satisfy the minimum requirements of this Rule 711.

(A) Watercourses

(1) Natural watercourses shall be preserved whenever possible. The County shall not approve modifications to natural watercourses unless the modification is required to protect the public health, safety, or welfare, or the environment.

(2) The flow capacity of each reach of a watercourse that is a component of a stormwater control system shall be equal to or greater than the peak flow rate for a 10-year storm, as determined using the method described in Rule 601.

(3) The flow capacity of a watercourse shall be calculated in accordance with the following relationship (the "Manning Formula").

$$Q = (1.486 \times A \times R^{2/3} \times S^{1/2}) / n$$

where Q = flow capacity (cfs)

A = cross-sectional flow area (ft^2)

n = Manning's coefficient of roughness

P = wetted perimeter (feet)

R = hydraulic radius (A/P in feet)

S = hydraulic gradient (ft/ft)

(B) Closed Conduits

(1) The flow capacity of each reach of a closed conduit that is a component of a stormwater control system shall be equal to or greater than the peak flow rate for a 10-year storm, as determined using the method described in Rule 601.

(2) The flow capacity of a closed conduit shall be calculated using the Manning Formula described in Rule 711(A)(3).

(3) The invert elevation of each closed conduit entering a forebay with a permanent pool shall

be equal to or greater than the permanent pool elevation.

(4) Hydraulic gradients for closed conduits shall meet both of the following requirements:

(a) The hydraulic gradient shall be calculated based on 10-year storm flows, starting with the crown elevation at the outlet, and shall be at least 1.0 feet below the rim elevation at any upstream manhole location.

(b) The rim elevation at any manhole location along a closed conduit upstream of a detention/retention system shall be at least one (1) foot above the design water level of the detention/retention system.

(5) The minimum allowable flow velocity in a closed conduit shall be 2.5 feet per second. The maximum allowable flow velocity in a closed conduit shall be 8.0 feet per second. The applicant may design a closed conduit that exceeds the maximum allowable flow velocity only if the applicant demonstrates that special provisions in the design dissipate energy.

(6) The maximum distance between manholes, catch basins, and inlets in a closed conduit shall be in accordance with Table 4.

Table 4: MAXIMUM DISTANCES BETWEEN MANHOLES, CATCH BASINS, AND INLETS

Diameter of closed conduit (inches)	Maximum distance (feet)
36 and smaller	300
greater than 36	300 plus 100 feet for each additional 12 inches in diameter greater than 36 inches

(7) Manholes or junction chambers shall be constructed at all junctions and angle points within closed conduits and at all changes in conduit size or slope.

(8) Closed conduit inlets and outlets shall have an end treatment and soil erosion protection, and may be required to have a grate over the inlet/outlet.

(C) Bridges and Culverts: The following requirements apply to bridges and culverts:

(1) General

(a) The hydraulic capacities of culverts and bridges shall be calculated using a method approved by the County.

(b) All bridges and culverts shall be designed and constructed with adequate soil erosion protection.

(2) Bridges

(a) Bridges that convey a watercourse under a County Road shall be designed and constructed to pass the peak flow rate for a 100-year storm with no harmful increase in backwater elevations.

(b) The 100-year storm elevation upstream of a bridge shall be at least one (1) foot below the lowest elevation of either the bridge deck or the approach pavements to the structure.

(3) Culverts

(a) Culverts that convey a watercourse under a County Road with a drainage area less than 640 acres (1 square mile) shall be designed and constructed to convey at least the peak flow rate for a 10-year storm, as determined using the methods described in Rule 601. Culverts that convey a watercourse under a County Road with a drainage area equal to or greater than 640 acres (1 square mile) shall be designed and constructed to convey at least the peak flow rate for a 100-year storm, as determined using the methods described in Rule 601.

(b) Culverts that will be inundated by storms larger than the design storm established by the Michigan Department of Transportation or Michigan Department of Environment, Great Lakes and Energy shall be designed and constructed with soil erosion protection that is adequate for the inundated condition.

(c) Culverts that are located in a FEMA mapped floodplain shall be designed to convey at least the peak flow from a 100-year recurrence interval event with no adverse impact to the 100-year flood profile. In cases where the official floodplain is shown to be significantly changed as a result of the development or road project, the County may require that a Conditional Letter of Map Revision (CLOMR) or a Letter of Map Revision (LOMR) application be submitted to and approved by FEMA prior to approval of a development plan.

Rule 712 [Reserved]

Chapter 8 ADDITIONAL REQUIREMENTS

Rule 801 Wetlands

The natural drainage pattern of the land within the development site shall not be altered in any way that may cause adverse effects to existing wetland areas. Untreated stormwater shall not be permitted to outlet directly into a natural or mitigation wetland. At a minimum, stormwater discharged into a natural or mitigation wetland shall pass through a pretreatment system designed to satisfy the water resources protection performance standards set forth in Rule 502(B).

Rule 802 County Park Property

The County may establish additional or alternative requirements for stormwater control systems that are located on County park property or that outlet within County park property.

Rule 803 County Roads

(A) The minimum diameter of closed conduits beneath County Roads shall be 12-inches.

(B) Stormwater runoff from improved property abutting a County Road shall not be discharged into the stormwater drainage system for the County Road without the County's prior approval.

(C) The County may establish additional or alternative requirements for stormwater control systems in County Roads.

Chapter 9 FINANCIAL ASSURANCE

Rule 901 General Requirements

(A) Before commencing construction of a stormwater control system, the applicant shall provide financial assurance pursuant to Section 95-43 of the Ordinance. The stormwater construction approval shall include the form and amount of the financial assurance to be provided and, if appropriate, may define temporal limits on the financial assurance. Stormwater construction approval shall not be issued by the County unless and until the applicant provides proof of financial assurance to the County.

(B) If an application for stormwater construction approval is submitted by more than one person, only one (1) person is required to demonstrate financial assurance; however, all parties are liable in the event of noncompliance.

Rule 902 Amount of Financial Assurance

(A) Financial assurance shall be provided in an amount at least equal to the current estimate

of the cost of constructing the stormwater control system to ensure proper construction, oversight and administration of the same and in the form of a deposit, performance bond or letter of credit as outlined herein ("financial assurance mechanism").

(B) When the current estimate of the cost of constructing the stormwater control system increases to an amount more than the amount of the financial assurance mechanism, the applicant, within 28 days after the increase, either shall cause the financial assurance mechanism to be increased to an amount at least equal to the current construction cost estimate and submit evidence of such increase to the County, or shall obtain other financial assurance for the difference. When the current estimate of the cost of constructing the stormwater control system decreases, the amount of financial assurance may be reduced to the amount of the construction cost estimate following written approval of the County.

Rule 903 Deposits or Performance Bonds

(A) Applicants may satisfy the financial assurance requirements of the Ordinance and these rules by: (1) depositing the required funds via cashier's or certified check or (2) posting an unconditional irrevocable letter of credit, each with the County as directed by the Permit Office or (3) obtaining a performance bond that is executed on a form approved by the County and that conforms to the requirements of this rule.

(B) The performance bond shall guarantee that the applicant will construct the stormwater control system in accordance with the Ordinance, these rules, and the stormwater construction approval issued by the County.

(C) Under the terms of the bond, the surety shall become liable on the bond obligation when the Permit Holder fails to perform as guaranteed by the bond when required to do so, and the County provides the Permit Holder (1) notice of the failure, and (2) at least seven (7) days to cure the failure after the date of said notice.

(D) The sum of the bond shall be in an amount at least equal to the current estimate of the cost of constructing the stormwater control system.

(E) Under the terms of the bond, the surety may cancel the bond by sending notice of cancellation, by certified mail, to the Permit Holder and the County at least forty-five (45) days prior to cancellation. Cancellation shall not occur, however, during the ninety (90) days beginning on the date of

receipt of the notice of cancellation by both the applicant and the County, as evidenced by the return receipts. Within thirty (30) days of receipt of a notice of cancellation of the bond from the surety, the Permit Holder shall obtain alternate financial assurance approved by the County.

(F) The Permit Holder may cancel the bond if the County has given prior written consent. The County shall provide such written consent when either of the following occurs: (1) the Permit Holder substitutes alternative financial assurance as specified in these rules; or (2) the County releases the Permit Holder from the financial assurance requirements of these rules pursuant to Rule 905.

(G) The Director or her or his designee may draw on the deposit or bond to correct violations and complete construction after:

(1) Notifying the Permit Holder that the Permit Holder has failed to construct the stormwater control system in accordance with the stormwater construction appro val and other requirements of this Ordinance and these rules when required to do so; and

(2) The expiration of the appeal period outlined in Section 95-111 of the Ordinance.

Rule 904 Letters of Credit

(A) An applicant may satisfy the financial assurance requirements of these rules by obtaining an unconditional irrevocable letter of credit that conforms to the requirements of this rule and that is executed on a form approved by the County. The issuing institution shall be a bank or financial institution that has the authority to issue letters of credit, whose letter of credit operations are regulated and examined by a federal or state agency, and that has an office in Wayne County.

(B) The letter of credit shall be unconditional and irrevocable and shall be issued for a period of at least one (1) year. The letter of credit shall provide that the expiration date will be automatically extended for a period of at least one (l) year unless, not less than 90 days before the current expiration date, the issuing institution notifies both the applicant and the County by certified mail of a decision not to extend the expiration date. Under the terms of the letter of credit, the 90 days shall begin on the date when both the applicant and the County have received the notice, as evidenced by the return receipts.

(C) If the applicant does not establish alternate financial assurance as specified in these rules and obtain written approval of such alternate assurance from the County within 90 days after receipt by both the applicant and the County of a notice from the issuing institution that it has decided not to extend

the letter of credit beyond the current expiration date, the County may draw on the letter of credit. The County may delay the drawing if the issuing institution grants an extension of the term of the credit. During the last 30 days of any such extension, the County shall draw on the letter of credit if the applicant has failed to provide alternate financial assurance as specified in these rules and obtain written approval of such assurance from the County.

(D) The Director may draw on the letter of credit to correct violations and complete construction after doing both of the following:

(1) Notifying the applicant that the applicant has failed to construct the stormwater control system in accordance with the stormwater construction approval and other requirements of this Ordinance and these rules when required to do so; and

(2) Providing the owner or operator with advance notice of at least seven (7) calendar days.

Rule 905 Release of the Financial Assurance Mechanism

(A) The financial assurance for the construction of the stormwater control system shall only be released in accordance with the Ordinance and these rules.

(B) If the County has reason to believe that the stormwater control system has not been constructed in accordance with the Ordinance, these rules, or the stormwater construction approval, the County shall provide the Permit Holder with a detailed written statement of any such reason. The County shall not be required to release the financial assurance mechanism provided by the Permit Holder until the County is satisfied, in its reasonable discretion, that the stormwater control system has been constructed in accordance with the Ordinance, these rules, and the stormwater construction approval.

(C) If the Permit Holder (or another party designated in writing by the Permit Holder to the County to receive the deposit or bond) fails to claim, in writing, his or her deposit or bond within one (1) year after notice from the County that the financial assurance is no longer required, the amount on deposit at that time, less any costs or expenses deducted by the County, shall be forfeited to the County and deposited into the County's road fund by the County.

Rule 906 Recordkeeping

Applicants must maintain evidence of all financial assurance mechanisms used to demonstrate financial responsibility under the Ordinance or these rules until released from the financial responsibility

requirements in accordance with Rule 905. Records maintained at any location other than the development site must be made available upon request of the County.

Chapter 10 LONG-TERM MAINTENANCE

Rule 1001 General Requirement

(A) An applicant shall submit a long-term maintenance plan as part of an application for stormwater construction approval. At a minimum, the long-term maintenance plan shall set forth:

(1) the preventative maintenance activities necessary to ensure that the stormwater control system will function properly as designed;

(2) a schedule describing the frequency with which preventative maintenance activities shall occur;

(3) the manner in which the applicant shall assure, through a legally binding instrument, that the stormwater control system shall be maintained in perpetuity;

(4) the requirement and procedure for submitting on an annual basis the maintenance records for the stormwater control system to the local unit(s) of government in which the stormwater control system is located and the County; and

(5) the physical limits of the stormwater control system and the party responsible for maintaining each system component.

(B) Long-term maintenance shall include site monitoring and inspection to ensure that a stormwater control system is functioning properly as designed; maintenance of structural and vegetative BMPs installed and implemented to meet the performance standards; remedial actions necessary to repair, modify, or reconstruct the system in the event the system does not function properly as designed at any time; notification to subsequent owners of limitations or restrictions on the property; actions necessary to enforce the terms of restrictive covenants or other instrument applicable to the property pursuant to the Ordinance and these rules and such other actions as may be set forth in the Ordinance or these rules promulgated hereto.

(C) As a condition of final approval of the stormwater control system, an applicant for stormwater construction approval shall demonstrate to the County that the stormwater control system shall be maintained in perpetuity.

Rule 1002 Responsibility for Long-Term Maintenance

The M-Permit Holder(s) shall be responsible for its long-term maintenance and shall be the Permit Holder under the Long-Term Maintenance Permit. The local unit(s) of government in which the stormwater control system is located or other public entity approved by the County, shall guarantee the long term maintenance of stormwater control systems that require a County stormwater construction approval in accordance with a long term maintenance plan and schedule approved by the County.

Rule 1003 Long-Term Maintenance Permits and Resolutions

The County may establish requirements for the form and substance of instruments that meet the requirements of this rule.

ADOPTED BY THE WAYNE COUNTY COMMISSION _____