



GLOSSARY

Glossary of Stormwater Management Terms and Acronyms

AASHTO - American Association of State and Highway Transportation Officials

Adsorption - The process by which a solute is attracted to a solid surface. Adsorption is the process utilized in stormwater management BMPs to enhance the removal of soluble pollutants.

Anti-seep collar - A device constructed around a pipe or other conduit and placed into a dam, levee, or dike for the purpose of reducing seepage losses and piping failures along the conduit it surrounds.

Anti-vortex device - A device placed at the entrance to a pipe conduit structure to help prevent swirling action and cavitation from reducing the flow capacity of the conduit system.

Aquatic bench - A 10- to 15-foot wide bench around the inside perimeter of a permanent pool that ranges in depth from zero to 12 inches. Vegetated with emergent plants, the bench augments pollutant removal, provides habitats, protects the shoreline from the effects of water level fluctuations, and enhances safety.

Aquifer - A porous, water bearing geologic formation generally restricted to materials capable of yielding an appreciable supply of water.

As-built (drawing) - Drawing or certification of conditions as they were actually constructed.

Atmospheric Deposition - The process by which atmospheric pollutants reach the land surface either as dry deposition or as dissolved or particulate matter contained in precipitation.

Average land cover condition - The percentage of impervious cover considered to generate an equivalent amount of phosphorus as the total combined land uses within the Chesapeake Bay watershed at the time of the Chesapeake Bay Preservation Act adoption, assumed to be 16%. Note that a locality may opt to calculate actual watershed specific values for the average land cover condition based upon 4VAC 3-20-101.

Baffle - Guides, grids, grating or similar devices placed in a pond to deflect or regulate flow and create a longer flow path from the inlet to the outlet structure.

Bankfull flow - Condition where flow fills a stream channel to the top of bank and at a point where the water begins to overflow onto a floodplain.

Barrel - Closed conduit used to convey water under or through an embankment, part of the principal spillway.

Base flow - Discharge of water independent of surface runoff conditions, usually a function of groundwater levels.

Basin - A facility designed to impound stormwater runoff.

Best Management Practice (BMP) - Structural or nonstructural practice which is designed to minimize the impacts of changes in land use on surface and groundwater systems. Structural BMP refers to basins or facilities engineered for the purpose of reducing the pollutant load in stormwater runoff, such as Bioretention, constructed stormwater wetlands, etc. Nonstructural BMP refers to land use or development practices which are determined to be effective in minimizing the impact on receiving stream systems, such as preservation of open space and stream buffers, disconnection of impervious surfaces, etc.

Biochemical Oxygen Demand (BOD) - An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

Biological Processes - A pollutant removal pathway in which microbes break down organic pollutants and transform nutrients.

Bioretention basin - Water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil, and sand bed (optional), and into the in-situ material. Also called rain gardens.

Bioretention filter - A bioretention basin with the addition of a sand layer and collector pipe system beneath the planting bed.

CBLAD - Chesapeake Bay Local Assistance Department (Virginia state agency).

COE - United States Army Corps of Engineers

Catch Basin - An inlet chamber usually built at the curb line of a street or low area, for collection of surface runoff and admission into a sewer or subdrain. These structures commonly have a sediment sump at its base, below the sewer or subdrain discharge elevation, designed to retain solids below the point of overflow.

Channel - A natural or manmade waterway.

Channel stabilization - The introduction of natural or manmade materials placed within a channel so as to prevent or minimize the erosion of the channel bed and/or banks.

Check dam - Small dam constructed in a channel for the purpose of decreasing the flow velocity, minimize channel scour, and promote deposition of sediment. Check dams are a component of grassed swale BMPs.

Chemical Oxygen Demand (COD) - A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chute - A high velocity, open channel for conveying water to a lower level without erosion.

Compaction - The process by which soil grains are rearranged so as to decrease void space and bring them in closer contact with one another, thereby reducing the permeability and increasing the soils unit weight, and shear and bearing strength.

Conduit - Any channel intended for the conveyance of water, whether open or closed.

Constructed stormwater wetlands - Areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

Contour - A line representing a specific elevation on the land surface or a map.

Cradle - A structure usually of concrete shaped to fit around the bottom and sides of a conduit to support the conduit, increase its strength and, in dams, to fill all voids between the underside of the conduit and soil.

Crest - The top of a dam, dike, spillway or weir, frequently restricted to the overflow portion.

Curve number (CN) - A numerical representation of a given area's hydrologic soil group, plant cover, impervious cover, interception and surface storage derived in accordance with Natural Resource Conservation Service methods. This number is used to convert rainfall depth into runoff volume. Sometimes referred to as Runoff Curve Number.

Cut - A reference to an area or material that has been excavated in the process of a grading operation.

Dam - A barrier constructed for the purpose of confining or impounding water.

DCR - Virginia Department of Conservation and Recreation.

DEQ - Virginia Department of Environmental Quality.

Design Storm - A selected rainfall hyetograph of specified amount, intensity, duration and frequency that is used as a basis for design.

Detention - The temporary impoundment or holding of stormwater runoff.

Detention Basin - A stormwater management facility which temporarily impounds runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility's design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during nonrainfall periods. See MS 3.08.

Dike - An embankment, usually linear, to confine or direct water.

Discharge - Flow of water across the land surface or within the confines of a natural or manmade channel, or stream.

Dissolved Oxygen - A form of oxygen found in water that is essential to the life of aquatic species.

Disturbed area - An area in which the natural vegetative soil cover or existing surface treatment has been removed or altered and, therefore, is susceptible to erosion.

Diversion - A channel or dike constructed to direct water to areas where it can be used, treated, or disposed of safely.

Drainage basin - An area of land that contributes stormwater runoff to a designated point. Also called a drainage area or, on a larger scale, a watershed.

Drop structure - A manmade device constructed to transition water to a lower elevation.

Duration - The length of time over which precipitation occurs.

EPA - The United States Environmental Protection Agency.

Embankment - A man-made deposit of soil, rock or other material used to form an impoundment.

Emergency Spillway - A channel, usually an open channel constructed adjacent to an embankment, which conveys flows in excess of the design capacity of the principal spillway.

Energy dissipator - A device used to reduce the velocity or turbulence of flowing water.

Erosion - The wearing away of the land surface by running water, wind, ice or other geological agents.

Accelerated erosion - erosion in excess of what is presumed or estimated to be naturally occurring levels and which is a direct result of human activities.

Gully erosion - erosion process whereby water accumulates in narrow channels and removes the soil to depths ranging from a few inches to 1 or 2 feet to as much as 75 to 100 feet.

Rill erosion - erosion process in which numerous small channels only several inches deep are formed.

Sheet erosion - spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may subsequently be removed by surface runoff.

Eutrophication - The process of over-enrichment of water bodies by nutrients often typified by the presence of algal blooms.

Extended detention basin - A stormwater management facility which temporarily impounds runoff and discharges it through a hydraulic outlet structure over a specified period of time to a downstream conveyance system for the purpose of water quality enhancement or stream channel erosion control. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility's design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during nonrainfall periods.

Extended detention basin-enhanced - An extended detention basin modified to increase pollutant removal by providing a shallow marsh in the lower stage of the basin.

Exfiltration - The downward movement of runoff through the bottom of a stormwater facility and into the soil.

Fill - A reference to an area or material that has been placed by mechanical equipment in the process of a grading operation.

Filter bed - The section of a constructed filtration device that houses the filtering media.

Filter Strip - An area of vegetation, usually adjacent to a developed area, constructed to remove sediment, organic matter, and other pollutants from runoff in the form of sheet flow.

First flush - The first portion of runoff, usually defined as a depth in inches, considered to containing the highest pollutant concentration resulting from a rainfall event.

Flooding - When the volume or rate flow exceeds the capacity of the natural or manmade conveyance system and overflows onto adjacent lands, causing or threatening damage.

Floodplain - For a given flood event, that area of land adjoining a continuous water course which has been covered temporarily by water.

Flow splitter - An engineered hydraulic structure designed to divert a portion of storm flow to a BMP located out of the primary channel, or to direct stormwater to a parallel pipe system, or to bypass a portion of baseflow around a BMP.

Forebay - Storage space, commonly referred to as a sediment forebay, located near a stormwater BMP inlet that serves to trap incoming coarse sediments before they accumulate in the main treatment area.

Freeboard - Vertical distance between the surface elevation of the design high water and the top of a dam, levee, or diversion ridge.

French drain - A type of drain consisting of an excavated trench filled with pervious material such as coarse sand, gravel or crushed stone, through whose voids water percolates and exfiltrates into the soil.

Frequency (design storm frequency) - The recurrence interval of storm events having the same duration and volume. The frequency of a specified design storm can be expressed either in terms of exceedence probability or return period.

Exceedence probability - The probability that an event having a specified volume and duration will be exceeded in one time period, usually assumed to be one year. If a storm has a one percent chance of occurring in any given year, than it has an exceedence probability of 0.01.

Return period - The average length of time between events having the same volume and duration. If a storm has a one percent chance of occurring in any given year, than it has a return period of 100 years.

GIS - Geographic Information System. A method of overlaying spatial land and land use data of different kinds. The data are referenced to a set of geographical coordinates and encoded in a computer software system. GIS is used by many localities to map utilities and sewer lines and to delineate zoning areas.

Gabion - A flexible woven wire basket composed of rectangular cells filled with large cobbles or riprap. Gabions may be assembled into many types of structures such as revetments, retaining walls, channel liners, drop structures, diversions, check dams, and groins.

Grade - The slope of a specific surface of interest such as a road, channel bed or bank, top of embankment, bottom of excavation, or natural ground. Grade is commonly measured in percent (unit of measurement per one hundred units) or a ratio of horizontal to vertical distance.

Grassed swale - An earthen conveyance system which is broad and shallow with check dams and vegetated with erosion resistant and flood tolerant grasses, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil.

Green Alleys - A network of bioretention basins, infiltration trenches or bioretention filters that provide both redundant water quality management and stormwater conveyance.

HEC-1 - Hydraulic Engineering Circular - 1; a rainfall-runoff event simulation computer model sponsored by the U.S. Corps of Engineers.

Head - The height of water above any plane or object of reference; also used to express the energy, either kinetic or potential, measured in feet, possessed by each unit weight of a liquid.

Hydraulics - The physical science and technology of the static and dynamic behavior of fluids.

Hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrodynamic structure - An engineered flow through structure which uses gravitational settling to separate sediments and oils from stormwater runoff.

Hydrograph - A plot showing the rate of discharge, depth or velocity of flow versus time for a given point on a stream or drainage system.

Hydrologic cycle - A continuous process by which water is cycled from the oceans to the atmosphere to the land and back to the oceans.

Hydrologic Soil Group (HSG) - SCS classification system of soils based on the permeability and infiltration rates of the soils. 'A' type soils are primarily sandy in nature with a high permeability while 'D' type soils are primarily clayey in nature with a low permeability.

Hydrology - Science dealing with the distribution and movement of water.

Hyetograph - A graph of the time distribution of rainfall over a watershed.

Impervious cover - A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.

Impoundment - An artificial collection or storage of water, as a reservoir, pit, dugout, sump, etc.

Industrial Stormwater Permit - NPDES permit issued to a commercial industry for regulating the pollutant levels associated with industrial stormwater discharges. The permit may specify on-site pollution control strategies.

Infiltration facility - A stormwater management facility which temporarily impounds runoff and discharges it via infiltration through the surrounding soil. While an infiltration facility may also be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions. Since an infiltration facility impounds runoff only temporarily, it is normally dry during nonrainfall periods. Infiltration basin, infiltration trench, infiltration dry well, and porous pavement are considered infiltration facilities.

Initial abstraction - The maximum amount of rainfall that can be absorbed under specific conditions without producing runoff. Also called initial losses.

Intensity - The depth of rainfall divided by duration.

Invert - The lowest flow line elevation in any component of a conveyance system, including storm sewers, channels, weirs, etc.

Karst topography - Regions that are characterized by formations underlain by carbonate rock and typified by the presence of limestone caverns and sinkholes.

Kjeldahl Nitrogen (TKN) - A measure of the ammonia and organic nitrogen present in a water sample.

Lag time - The interval between the center of mass of the storm precipitation and the peak flow of the resultant runoff.

Land development - A manmade change to, or construction on, the land surface that changes its runoff characteristics. Certain types of land development are exempted from stormwater management requirements as provided in the Stormwater Management Act, § 10.1-603.8 B of the Code of Virginia.

Landscaping - The placement of vegetation in and around stormwater management BMP's.

Linear development project - A land development project that is linear in nature such as , but not limited to, (i) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; and (iii) highway construction projects.

Locality - A county, city, or town.

Low Impact Development (LID) - Hydrologically functional site design with pollution prevention measures to reduce impacts and compensate for development impacts on hydrology and water quality.

Manning's formula - Equation used to predict the velocity of water flow in an open channel or pipeline.

Marsh - A wet area, periodically inundated with standing or slow moving water, that has grassy or herbaceous vegetation and often little peat accumulation; the water may be salt, brackish or fresh.

Micropool - A smaller permanent pool which is incorporated into the design of larger stormwater ponds to avoid resuspension of particles, provide varying depth zones, and minimize impacts to adjacent natural features.

Modified Rational Method - A variation of the rational method used to calculate the critical storage volume whereby the storm duration can vary and does not necessarily equal the time of concentration.

Mulch - Any material such as straw, sawdust, leaves, plastic film, loose soil, wood chips, etc. that is spread or formed upon the surface of the soil to protect the soil and/or plant roots from the effects of raindrops, soil crusting, freezing, evaporation, etc.

Municipal Stormwater Permit - NPDES permit issued to municipalities to regulate discharges from municipal separate storm sewers for compliance with EPA regulations and specify stormwater control strategies.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, monitoring and enforcing permits under Sections 307, 402, 318 and 405 of the Clean Water Act.

Nonpoint source pollution - Contaminants such as sediment, nitrogen and phosphorous, hydrocarbons, heavy metals, and toxins whose sources cannot be pinpointed but rather are washed from the land surface in a diffuse manner by stormwater runoff.

Normal depth - Depth of flow in an open conduit during uniform flow for the given conditions.

Off-line - Stormwater management system designed to manage a portion of the stormwater which has been diverted from a stream or storm drain. A flow splitter is typically used to divert the desired portion of the flow.

On-line - Stormwater management system designed to manage stormwater in its original stream or drainage channel.

Outfall - Place where effluent is discharged into receiving waters.

Peak discharge - The maximum rate of flow at associated with a given rainfall event or channel.

Percolation rate - The velocity at which water moves through saturated, granular material.

pH - An expression of the intensity of the basic or acidic condition of a liquid. Natural waters usually have a pH range between 6.5 and 8.5.

Phosphorus - An element found in fertilizers and sediment runoff which can contribute to the eutrophication of water bodies. It is the keystone pollutant in determining pollutant removal efficiencies for various BMP's as defined by the Virginia Stormwater Management Regulations.

Planning area - A designated portion of the parcel on which a land development project is located. Planning areas must be established by delineation on a master plan. Once established, planning areas must be applied consistently for all future projects.

Point Source - The discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, container, concentrated animal feeding operation, landfill leachate collection system from which pollutants may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Porosity - The ratio of pore or open space volume to total solids volume.

Post-development - Refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land.

Pre-development - Refers to the conditions that exist at the time that plans for the land development of a tract of land are approved by the plan approval authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being approved or permitted establishes the pre-development conditions.

Pretreatment - The techniques employed in a stormwater management plan to provide storage or filtering to help trap coarse materials before they enter the stormwater BMP. Pretreatment is required on some BMPs to help avoid costly maintenance.

Principal spillway - The primary spillway or conduit for the discharge of water from an impoundment facility; generally constructed of permanent material and designed to regulate the rate of discharge.

Rational method - Means of computing peak storm drainage flow rates based on average percent imperviousness of the site, mean rainfall intensity, and drainage area.

Recharge - Replenishment of groundwater reservoirs by infiltration and transmission of water through permeable soils.

Redevelopment - Any construction, alteration, or improvement on existing development.

Retention - Permanent storage of stormwater.

Retention basin - A stormwater management facility which includes a permanent impoundment, or normal pool of water, for the purpose of enhancing water quality and, therefore, is normally wet, even during nonrainfall periods. Storm runoff inflows may be temporarily stored above this permanent impoundment for the purpose of reducing flooding, or stream channel erosion.

Rip-rap - Broken rock, cobbles or boulders placed on earth surfaces such as the face of a dam or the bank of a stream for the protection against erosive forces such as flow velocity and waves.

Riser - A vertical structure which extends from the bottom of an impoundment facility and houses the control devices (weirs/orifices) to achieve the desired rates of discharge for specific designs.

Roughness coefficient - A factor in velocity and discharge formulas representing the effect of channel roughness on energy losses in flowing water. Manning's 'n' is a commonly used roughness coefficient.

Routing - A method of measuring the inflow and outflow from an impoundment structure while considering the change in storage volume over time.

Runoff - The portion of precipitation, snow melt or irrigation water that runs off the land into surface waters.

Runoff coefficient - The fraction of total rainfall that appears as runoff. Represented as *C* in the rational method formula.

SCS - Soil Conservation Service (now called Natural Resource Conservation Service, NRCS), a branch of the U.S. Department of Agriculture.

Safety bench - A flat area above the permanent pool and surrounding a stormwater pond designed to provide a separation to adjacent slopes.

Sand filter - A contained bed of sand which acts to filter the first flush of runoff. The runoff is then collected beneath the sand bed and conveyed to an adequate discharge point or infiltrated into the in-situ soils.

Sediment - Material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water or wind. Sediment piles up in reservoirs, rivers and harbors, destroying wildlife habitat and clouding water so that sunlight cannot reach aquatic plants.

Sediment Forebay - A settling basin or plunge pool constructed at the incoming discharge points of a stormwater facility.

Sedimentation (or settling) - A pollutant removal method to treat stormwater runoff in which gravity is utilized to remove particulate pollutants. Pollutants are removed from the stormwater as sediment settles or falls out of the water column. An example of a BMP utilizing sedimentation is a detention basin.

Shallow marsh - A zone within a stormwater extended detention basin that exists from the surface of the normal pool to a depth of six to 18 inches, and has a large surface area and, therefore, requires a reliable source of baseflow, groundwater supply, or a sizeable drainage area, to maintain the desired water surface elevations to support emergent vegetation.

Silviculture - A branch of forestry dealing with the development and care of forests.

Site - The parcel of land being developed, or a designated planning area in which a land development project is located.

Soil science - Science dealing with soils as a natural resource on the surface of the earth including soil formation, classification, mapping; physical, chemical, biological, and fertility properties of soils per se; and these properties in relation to the use and management of soils.

Soil test - Chemical analysis of soil to determine the need for fertilizers or amendments for species of plant being grown.

Soil texture - Relative proportion of the physical components of any given soil. For instance, clay is defined as soil having >40% clay, <45% sand and <40% silt.

Stage - Water surface elevation above any chosen datum.

State Project - Any land development project which is undertaken by any state agency, board, commission, authority or any branch of state government, including state supported institutions of higher learning.

Storm Sewer - A system of pipes, separate from sanitary sewers, that only carries runoff from buildings and land surfaces.

Stormwater Filtering (or filtration) - A pollutant removal method to treat stormwater runoff in which stormwater is passed through a filter media such as sand, peat, grass, compost, or other materials to strain or filter pollutants out of the stormwater.

Stormwater Hot spot - An area where the land use or activities are considered to generate runoff with concentrations of pollutants in excess of those typically found in stormwater.

Stormwater management facility - A device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

Stormwater management plan - A document containing material for describing how existing runoff characteristics will be affected by a land development project and methods for complying with the requirements of the local program or this chapter.

Stream buffers - The zones of variable width which are located along both sides of a stream and are designed to provide a protective natural area along a stream corridor.

Surcharge - Flow condition occurring in closed conduits when the hydraulic grade line is above the crown of the sewer. This condition usually results localized flooding or stormwater flowing out the top of inlet structures and manholes.

SWMM (Storm Water Management Model) - Rainfall-runoff event simulation model sponsored by the U.S. Environmental Protection Agency.

Technical Release No. 20 (TR-20) - Project Formulation - Hydrology. SCS watershed hydrology computer model that is used to compute runoff volumes and route storm events through stream valleys and/or impoundments.

Technical Release No. 55 (TR-55) - Urban Hydrology for Small Watersheds. SCS watershed hydrology computation model that is used to calculate runoff volumes and provide a simplified routing for storm events through stream valleys and/or ponds.

Time of concentration - The time required for water to flow from the hydrologic most distant point (in time of flow) of the drainage area to the point of analysis (outlet). This time will vary, generally depending on the slope and character of the surfaces.

Total Suspended Solids (TSS) - The total amount of particulate matter which is suspended in the water column.

Trash rack - A structural device used to prevent debris from entering a spillway or other hydraulic structure.

Travel time - The time required for water to flow from the outlet of a drainage sub-basin to the outlet of the entire drainage basin being analyzed. Travel time is normally concentrated flow through an open or closed channel.

Turbidity - Cloudiness of a liquid, caused by suspended solids; a measure of the suspended solids in a liquid.

Ultimate condition - Full watershed build-out based on existing zoning.

Ultra-urban - Densely developed urban areas in which little pervious surface exists.

Urban runoff - Stormwater from city streets and adjacent domestic or commercial properties that carries nonpoint source pollutants of various kinds into the sewer systems and receiving waters.

VDOT - The Virginia Department of Transportation.

VESCH - The Virginia Erosion and Sediment Control Handbook, latest edition.

Water quality standards - State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water quality volume - The volume equal to the first ½ inch of runoff multiplied by the impervious surface of the land development project as defined by the Virginia Stormwater Management Regulations.

Water surface profile - Longitudinal profile assumed by the surface of a stream flowing in an open channel; hydraulic grade line.

Water table - Upper surface of the free groundwater in a zone of saturation.

Watershed - A defined land area drained by a river, stream, or drainage way, or system of connecting rivers, streams, or drainage ways such that all surface water within the area flows through a single outlet.

Weir - A wall or plate placed in an open channel to regulate or measure the flow of water.

Wet weather flow - Combination of dry weather flows and stormwater runoff.

Wetted perimeter - The length of the wetted surface of a natural or manmade channel.