

GLOSSARY OF COMMON DRAINAGE TERMS

This glossary provides a list of words and terms common in drainage issues, many used in this manual. It is not intended to be a complete reference; other sources should be sought for additional information. Definitions presented were obtained from existing references such as the *Highway Drainage Guidelines, Model Drainage Manual 1991* and *Water and Wastewater Control Engineering, Third Edition*.

- ABSTRACTION:** That portion of rainfall that does not run off, including interception, infiltration, and storage in a depression.
- ABSORPTION:** The taking up of one substance into the body of another.
- ACCRETION:** A process of natural or artificial accumulation of silt, sand, etc. resulting in a buildup of land.
- ACRE-FOOT:** The quantity of water required to cover one acre of land to a depth of one foot, equally a quantity of 43,560 cubic feet or 326,000 gallons.
- ACT OF GOD:** Under the law, a direct, sudden, irresistible action of natural forces, that could not have reasonably been foreseen or prevented.
- AERATION:** The bringing about of intimate contact between air and a liquid by one or more of the following methods: spraying, bubbling, and/or agitating.
- AEROBIC:** The state of requiring, or not being harmed by, the presence of free elemental oxygen.
- AGGRADATION:** A general and progressive buildup of the longitudinal profile of a stream or channel from the deposit of sediment.
- ALKALINE:** The condition of water, wastewater, or soil which contains a sufficient amount of alkali substances to raise the pH above 7.0.
- ALLUVIAL:** Relating to material deposited by flowing water.
- ANAEROBIC:** A condition where no free oxygen is present. A state not requiring or destroyed by the absence of free oxygen.
- ANGLE OF REPOSE:** The greatest angle to the horizontal assumed by any unsupported granular material. Also called the natural slope.
- AQUIFER:** A porous, water-bearing geologic formation, generally restricted to materials capable of yielding an appreciable supply of water.
- ARTESIAN:** Pertains to groundwater or things associated with groundwater, such as wells, where water under pressure will rise to a higher elevation if allowed to do so.
- AUGMENTED FLOW:** The increased volume of water entering a channel or permitted to flow overland from the diversion of surface flow of water from another stream or watershed or from waters withdrawn or collected upstream and then released after use.
- AVULSION:** A sudden change in a channel course that occurs when a stream breaks from its banks usually during a flooding event.
- BACKWATER:** Water backed up or retarded relative to natural flow conditions due to obstructions in the channel such as structures or another stream at a higher stage.
- BASIN:** A natural or artificially created space or structure on the surface or underground, which exhibits a shape and character of confining material that enables the holding of water.
- BASIN, DETENTION:** A stormwater management facility that temporarily stores run-off, discharging flow through an outlet structure, designed to attenuate peak flow volume.
- BERM:** A horizontal strip or shelf built on or cut into an embankment to break the continuity of a long slope, usually to reduce erosion or increase the size of the embankment.

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CATCHMENT AREA: The intake area of an aquifer and all adjacent areas that contribute surface water to that area or the area tributary to a lake, stream, sewer, or drain. Also called a catchment basin.

CHANNEL: A natural or artificial waterway where a stream of water flows periodically or continuously or forms a connecting link between bodies of water. Also a conduit such as a pipe that conveys water.

CHECK DAM: A relatively low, fixed dam or weir across a drainage channel to retard or divert flow from a channel, ditch, or canal, generally for the purpose of reducing erosion and scour.

CIVIL LAW: The system of jurisprudence established by a nation or state to regulate ordinary private matters. Civil laws regarding the management of naturally occurring waters establish the rights or easements, favorable and restrictive, of riparian owners individually and with respect to others. Generally are directed toward equitable use and continuation of natural drainage conditions.

CIVIL LAW DOCTRINE OR RULE: A rule of law pertaining to the disposal of drainage waters, under which the owner of higher ground has the right or easement to dispose of surplus or excess waters to the lower lands, unobstructed by the downstream owners.

CODE OF FEDERAL REGULATION (CFR): Federal regulations currently in force, codified, and published at least annually. The CFR is kept current by the *Federal Register*.

COMMON ENEMY DOCTRINE OR RULE: A common law precept recognized in some states holding that surplus or excess waters are a “common enemy” from which a land owner has a right to protect property without regard to harm possibly caused to others.

COMMON LAW: A body of unwritten law based on long-standing usages and customs. Court deci-

sions and decrees may recognize, affirm, and enforce these customs and usages.

COMPLAINT: A written statement that is filed with a court and that asks for relief from some injustice described in the complaint. The filing of a complaint formally initiates a lawsuit.

CONDENSATION: The process whereby a substance changes from a vaporous state to a liquid or solid.

CONFINED AQUIFER: An aquifer which is surrounded by formations of less permeable or impermeable materials.

CONTAMINATION: The introduction of microorganisms, chemicals, or wastewater in such concentrations that water is made unfit for use.

CONTOUR: A line of equal elevation above a specified level.

CONVERTED WETLAND: Wetland that has been drained, dredged, filled, leveled, or otherwise manipulated (including any activity that results in impairing or reducing the flow, circulation, or reach of water) for making the production of an agriculture commodity possible, if production would not have been possible but for this action, and before this action the land was wetland, and neither highly erodible land nor highly erodible cropland.

The term converted wetland does not apply if production of an agricultural commodity on the land during a crop year is possible as a result of a natural condition, such as drought, and is not assisted by an action of the producer that destroys natural wetland characteristics.

COST-BENEFIT RATIO: The ratio of the costs of a regulatory action or engineering improvement to the economic value of the benefits achieved.

COVER: The vertical thickness of soil above the crown of a tile, pipe, or culvert.

CULVERT: A closed conduit or structure used to convey surface drainage through an embankment such as a roadway. In highway usage, a culvert has a span less than 20 feet.

DAM: A barrier constructed across a waterway to confine or raise water for storage or diversion.

DEBRIS: Material transported by a stream either floating or submerged such as logs, brush, suspended sediment, or trash that may lodge against or plug a structure.

DEGRADATION: General and progressive lowering of the profile of a stream, channel or earth surface due to long term erosion or scour.

DEPLETION: The continued withdrawal of water from a stream, groundwater, or reservoir at a rate greater than the replacement rate.

DESIGN DISCHARGE: The maximum rate of flow for which a drainage facility is designed and expected to accommodate.

DETENTION DAM: A generally small dam constructed to temporarily retard or impound surface water.

DIKE: An impermeable linear structure for the containment of over-bank flow. Dikes are similar to levees, but generally much shorter.

DITCH: An artificial open channel or waterway constructed through earth or rock to convey water. A ditch is generally smaller than a canal.

DIVERSION: The taking of water from a stream or other body of surface water into a canal, pipeline, or other conduit.

DOMINANT OWNER OR PROPERTY: In terms of drainage, dominant refers to that land which is situated at a higher elevation than adjacent, contiguous property. Water would naturally flow from the higher or dominant land to lower or servient property.

DRAIN: A ditch and any watercourse or conduit, whether open, covered, or enclosed, natural or artificial, or partly natural and partly artificial, by which waters coming or falling upon a property are carried away.

DRAINAGE: Four definitions may be used: 1) The process of removing surplus groundwater or surface waters by gravity or pumping; 2) The manner in which the waters from an area are removed; 3) The area from which waters are drained; 4) The flow of all liquids under the force of gravity.

DRAINAGE AREA: Many definitions could be used. Common usage would be an area of land confined by drainage divides or boundaries, usually with only one outlet, expressed in acres, square miles, or other units of measure.

DRAINAGE DISTRICT: An organization created and operating under statutory authority for the purpose of financing, constructing, and operating a drainage system. Also can refer to the area of land within the boundaries of an established drainage district.

DRAINAGE STRUCTURES: Structures other than drains, levees, and pumping plants intended to promote or aid drainage. Such structures may be independent from other drainage work or may be a part of or incidental to it. The term includes, but is not restricted to, catch basins, bulkheads, spillways, flumes, drop boxes, pipe outlets, junction boxes, and structures whose primary purpose is to prevent the erosion of soil into a district drain.

DRAINAGE SYSTEM: A system of drains, drainage structures, levees, and pumping plants that drains land or protects it from overflow.

DRAWDOWN: The magnitude of change in surface elevation of a body of water as a result of withdrawal of water. Drawdown could refer to a well or groundwater.

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DREDGING: The removal of sediment or deposited material, generally in a body of water.

EASEMENT: An acquired right to cross or use another's property in some prescribed manner.

EFFLUENT: A liquid which flows from a process or confined space. Could be wastewater or other liquid, in the natural state, partially or completely treated, flowing from a reservoir, basin, or treatment plant. Also, an outflowing branch of a main stream or lake.

EMINENT DOMAIN: In law, the right of a government agency to take or authorize the taking of private property for public use, with just compensation provided to the owner.

ENJOIN: To direct a person or agency to desist in a certain activity or to perform a certain act, through the use of a court order or injunction.

EPHEMERAL STREAM: A stream that does not flow continuously for most of the year, generally flowing in response to precipitation, not springs or groundwater.

EQUALIZER: A culvert, pipe, or opening placed to balance water head and elevation on both sides of an embankment and reduce possible seepage flow.

EROSION: The wearing away or eroding of material on the land surface or along channel banks by wind, flowing water, or wave action.

EVAPORATION: The process by which water becomes vapor or the quantity of water that is evaporated.

FEEDLOT WASTES: Solid or liquid wastes from concentrated animal feeding operations.

FEDERAL REGISTER: A daily publication of the federal government making federal regulations, legal notices, presidential proclamations, executive orders, etc. known to the public as they are proposed and subsequently issued.

FIXED GROUNDWATER: Water in saturated rocks so fine grained that the water is assumed to be permanently attached to the rock particles.

FLAP GATE: A gate that opens and closes by rotation around hinges at the top of the gate. Flap gates are used to contain undesirable back flow during flood events.

FLOOD: A relatively high flow as measured by either gage height or discharge quantity.

FLOOD FREQUENCY: The average time interval, in years, in which a given storm or volume of flow in a stream will be exceeded, i.e., one hundred-year flood.

FLOODPLAIN: A nearly flat, alluvial lowland bordering a stream and commonly formed by stream process, that is subject to inundation by flooding.

GABION: A rectangular basket made of steel wire fabric or mesh that is filled with rock or similar material of suitable size and gradation. Gabions are used for bank protection, flow control structures, dikes, etc. Also called a pannier.

GROUNDWATER: Subsurface water that is in the zone of saturation, from which wells, springs, and groundwater run-off are supplied. Sometimes called phreatic water.

HEAD: The height of the free surface of fluid above any point of reference in a hydraulic system or a measure of force or pressure exerted by the fluid.

HYDRATION: The chemical process of combining of water with other substances.

HYDRIC SOIL: Soil that, in undrained condition, is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that support the growth and regeneration of hydrophytic vegetation.

HYDROLOGY: The applied science concerned with the waters of the earth in all possible states, occur-

- rence, distribution, and circulation through the unending cycle of precipitation, runoff, stream-flow, infiltration, storage, evaporation, and re-precipitation. Hydrology is concerned with the physical, chemical, and physiological reactions of water with the earth and life thereon.
- HYDROPHYTIC VEGETATION:** Plants growing in water or in a substrate that is at least periodically deficient in oxygen as a result of excessive water content.
- IMPERVIOUS:** Not allowing, or allowing only with great difficulty, the movement of water through a substance; impermeable.
- IMPOUNDMENT:** A pond, lake, tank, basin, or other space, natural or created which is used for the storage, regulation, and control of water.
- IMPROVEMENT:** As related to drainage, an improvement is a project that will enlarge, expand, or otherwise increase the capacity of an existing drainage facility. Adding drainage accommodations to an existing facility would also be considered an improvement.
- INDUSTRIAL WASTE:** Generally the liquid, solid, or gaseous wastes originating from the manufacture of specific products.
- INFILTRATION RATE:** The rate at which water enters the soil under given conditions, usually expressed in inches per hour, feet per day, or cubic feet per second.
- INJUNCTION:** A legal writ or command issued by a court and directed to a particular person or corporation, requiring that the person or corporation do or refrain from doing certain acts.
- INVERTED SIPHON:** (Sometimes called a depressed sewer or sag culvert, not a true siphon). A structure, generally a length of pipe, made to pass under an obstruction in such a manner that a concavity in the flow line results. The inlet and outlet of a sag culvert are at a higher elevation than a mid point flow line. Flow through an inverted siphon occurs under pressure, with a flow velocity in excess of 3 ft/sec needed to keep particles in suspension. May be problematic where drainage is subject to freezing.
- INVERSE CONDEMNATION:** A legal action brought by a land owner generally against a public agency alleging damages to property from an improvement that may not have been fully compensated through an earlier agreement or condemnation. These actions provided a means of obtaining compensation where governmental agencies maintained sovereign immunity.
- JETTY:** An obstruction consisting of piling, rock or other material extending into a stream or river in induce scour and bank building or to retard erosion.
- LAND USE:** A term that relates to both the physical characteristics of the land surface and the associated human activities thereon. Type of land use can affect the amount and character of runoff and erosion.
- LANDOWNER OR OWNER:** The owner of a real property. This term refers to an owner of an undivided interest, a life tenant, a remainderman, or a trustee under an active trust, but not to a mortgagee, a trustee under a trust deed in the nature of a mortgage, a lien holder, or a lessee.
- LEGAL LIABILITY:** Liability between litigants recognized and enforced by the courts.
- LEVEE:** An embankment generally constructed along the top bank of a stream to confine flow during high water periods.
- LIABLE:** Subject to civil action against or for redress from infringement of private rights.
- LITHOSPHERE:** That portion of the earth which is composed predominantly of rocks, together with everything in this rocky crust.

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MEANDER: The changes in direction and winding of flow, usually in an alluvial channel that is sinuous or winding in character.

MUNICIPAL WASTE: The untreated wastewater entering a municipal treatment plant. Also liquid or solid wastes originating from domestic, industrial, or commercial sources.

NATURAL DRAINAGE DOCTRINE OR RULE: A precept in civil law that deals with the management and use of naturally occurring waters, based on the preservation and continuation of natural drainage systems and run-off conditions.

NATURAL FLOW: The flow of a stream or river as it occurs under natural, not regulated conditions.

OPEN CHANNEL: Any natural or artificial waterway or conduit in which water flows with a free surface.

ORGANIC: Refers to volatile, combustible, and sometimes biodegradable chemical compounds containing carbon atoms bonded together and with other elements.

OUTFALL SEWER: A sewer that receives wastewater from a collection system or from a treatment plant and conveys it to a point of final discharge.

OUTLET: Downstream opening or discharge end of a pipe, culvert, ditch, or canal.

PERCHED GROUNDWATER: Groundwater separated from underlying layers by an unsaturated zone which exhibits such low permeability that downward percolation is severely hampered or nonexistent.

PERCOLATING WATER: Water passing through the ground beneath the surface of the earth without any definite channel and not part of a body or flow of any surface or underground water course.

PERENNIAL STREAM: A stream that flows continuously for all or most of the year, generally fed by groundwater.

PERMEABILITY: The property of a material that permits through movement of water when saturated and actuated by hydrostatic pressure.

pH: A measure of the hydrogen ion content of a solution, low pH (< 7.0) indicates an acidic condition, high pH (>7.0) indicates alkalinity.

PHREATIC: Pertaining to that layer of soil or rock through which water may enter wells or from which springs and seeps emerge.

PIEZOMETER: An instrument for measuring pressure head in a conduit, tank, or soil.

PILE: A long, slender stake or structural element of timber, steel, or concrete which is driven, jetted, or otherwise embedded to support a structure or compact the soil.

POLLUTION: A specific impairment of water quality by agricultural, domestic, or industrial wastes to a degree that has an adverse effect upon the beneficial use of the water.

PRECIPITATION: The total measurable supply of water received directly as rain, hail, snow, or sleet, usually measured as depth per period of time. Also the process whereby atmospheric moisture is discharged onto land or water surfaces.

PRESCRIPTION: Acquirement of a title or right through open and continuous use or actual possession over a legally recognized period of time.

PRESCRIPTIVE DRAINAGE EASEMENT: A prescriptive right that has been established through a long, uninterrupted, and undisputed use of a drainage facility or channel; the free or unencumbered use of a drainage facility for drainage or other purposes for a period of 10 years or more. Prescriptive rights only apply to private ownership, not public.

QUICKSAND: Sand that has lost grain-to-grain contact by the buoyancy effect of water flowing upward

- through the voids. This represents a condition, not a type of material.
- QUORUM:** A majority of those entitled to act. An official board cannot do business unless a quorum is present.
- RAINFALL:** Precipitation generally in the form of water. The amount of rain, usually expressed in inches over an area, that reaches the surface of the earth.
- REASONABLE USE DOCTRINE OR RULE:** A rule used in some jurisdictions where a riparian owner, acting in good faith for a legitimate purpose, may use and/or alter the natural flow of water from his/her land without liability to other owners. Reasonable care must be taken to avoid unnecessary injury or hindrance to the downstream land.
- REMONSTRANCE:** A representation by one or a group of citizens to a governmental body intended to demonstrate why a contemplated action should not be undertaken.
- REPAIR:** As relating to drainage, a repair is an action that will maintain or restore a drainage facility to original efficiency or capacity.
- RESERVIOR:** A pond, lake, tank basin, or other space, natural or created, which is used for the storage, regulation, and control of water for recreation, power, flood control, or consumption.
- RETENTION:** That part of precipitation falling on a drainage area which does not escape as surface stream-flow during a given period. It represents the difference between total precipitation and total runoff during that period, including evaporation, transpiration, leakage, and infiltration.
- RIGHT-OF-WAY:** A general term describing land, property, or interests acquired for roadway purposes.
- RILL:** A very small stream, also called a rivulet or streamlet.
- RIPARIAN:** Pertains to anything connected with or adjacent to the banks of a stream or other body of water.
- RIPARIAN DOCTRINE OR RULE:** A precept holding that the owner of adjacent property to a surface body of water has the first right to withdraw and use that water. This rule may be superceded by state statutes.
- RIPARIAN OWNER:** A property owner who owns those banks of a river, stream, or other body of water.
- RIPARIAN RIGHTS:** The rights of owners of lands along a watercourse, relating to such issues as water, use thereof, the soil below the stream, and accretions.
- RIPRAP:** Stones, masonry, or similar man-made materials such as broken concrete placed along the banks and bed of rivers, streams, or other bodies of water to protect against erosion.
- RULE OF LAW:** A legal principle of general application and sanctioned by the recognition of authorities and usually expressed as a maxim or logical proposition.
- RUNOFF:** That portion of precipitation that flows off the surface of a drainage area after accounting for all abstractions, such as interception, evaporation, infiltration, and surface storage.
- SANITARY WASTEWATER:** Domestic wastewater with storm and surface water excluded, discharged from sanitary conveniences in dwellings, office buildings, industry, and institutions. Also the water supply of a community after use and discharge into a sewer.
- SATURATED SOIL:** Soil that has all pores or void spaces filled with water to the point that run-off occurs.
- SCOUR:** The displacement and removal of channel bed material due to flowing water, usually localized as compared with general bed degradation.

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SEDIMENTATION: The deposit of soil particles that have been carried by flooding or other moving waters, not to be confused with silting. Usually occurs due to a decrease in velocity of flow below that which permits transport of suspended materials.

SEEP: A more or less poorly defined area where water oozes from the earth in small quantities.

SEMI-PERCHED WATER: Groundwater that has a greater pressure head than an underlying body of groundwater, from which it is not completely separated hydraulically.

SERVIENT OWNER OR PROPERTY: As related to drainage, servient refers to land that is situated at a lower elevation than adjacent, contiguous property. Water would naturally flow from higher or dominant land onto lower or servient property.

SEWAGE: Household and commercial wastewater that contains human waste.

SEWER: A pipe or conduit that carries wastewater or drainage water.

SILT: Material passing the No. 200 (0.074 mm) U.S. Standard Sieve that is non-plastic or only slightly plastic and exhibits little or no strength when air dried.

SIPHON: A closed conduit, a portion of which lies above the hydraulic grade line, resulting in a pressure less than atmospheric, and requiring a vacuum within the conduit to initiate flow.

SLOUGH: A small, sometimes muddy marshland often connected at both ends to the parent body of water.

SPILLWAY: A waterway in or about a dam or other hydraulic structure for the passage of excess water.

SPRING: A surface where, without human action, water issues from a rock or soil onto the land or into a

body of water, with the place of issuance being relatively restricted in size.

STANDPIPE: A pipe or tank connected to a closed conduit and extending to or above the hydraulic grade line of that conduit. Often installed to afford relief from surges of pressure in pipelines.

STATUTORY LAW: Law established by a legislative body and set forth in a formal document. In specific application, law implies prescription and enforcement by the ruling authority.

STORAGE: The long-term impounding of water, either in surface or in underground reservoirs, for future use.

STORMWATER: Surface water from rain, snow, or ice melting and flowing off the surface of a drainage area. It is normally collected in sewers, separate from sanitary sewers and discharged with little or no treatment.

STORMWATER RUNOFF: That portion of the rainfall over a given area which finds its way into natural or manmade drainage channels.

STREAM: A course of running water usually flowing in a particular direction in a definite channel and discharging into some other stream or body of water.

STATUTORY LAW: Law established by a legislative body and set forth in a formal document. In specific application, law implies prescription and enforcement by the ruling authority.

SUBDRAIN: A drain constructed beneath a lined conduit such as a sewer, storm drain, canal, or other structure such as a roadway. The purpose of a subdrain is to intercept and collect groundwater to avoid damage to the structure.

SURFACE DRAINAGE: The removal of surplus or excess surface water collecting on land, accomplished by natural or artificial means.

TERRACE: A flat, level, or nearly level area of land bounded on at least one side by a definite steep slope rising upward and on the other sides by downward slopes.

TILE DRAINAGE: The removal of surplus groundwater by means of buried pipes, with water entering through unsealed joints, perforations, or through surface inlets.

TORT: A private or civil wrong committed against a person or property independent of a contract. Elements of a tort action are legal duty of defendant to plaintiff, a breach of that duty, and damage as a result.

TREATED WATER: Water which has been subjected to a treatment process.

WASTEWATER: Spent or used water from communities, industries, or private residences which contain dissolved or suspended matter. From a legal aspect, water that is not needed or which has been used and is permitted to discharge, or which unavoidably escapes from ditches, canals, or other conduits, or reservoirs of the lawful owners of such structures.

WATER DISTRICT: An organization, created and operating under statute, for the purpose of financing, constructing, and operating a water supply. Also, the land or area within the boundaries of a water district, possibly embracing one or more political subdivisions.

WATER DRAINAGE RIGHTS: The right of a land owner to dispose of excess or surplus water that accumulates on his/her land, over the land of others.

WATER QUALITY: The chemical, physical, and biological characteristics of water with respect to its suitability for a particular purpose.

WATER RIGHT: An adjudication of waters, usually by a public agency, to a specified user for a beneficial purpose.

WATERSHED: The catchment area for rainfall that is delineated as the drainage area producing run-off. Generally considered as the area contained within a divide above a specified point on a stream.

WATER TABLE: The upper level of a zone of saturation in the earth, except where that surface is formed by an impermeable body (see perched ground water).

WEIR: A small dam across a channel for the purpose of diverting flow, measuring volume of flow, or reducing erosion.

WELL: An artificial excavation that derives water from the interstices of the rocks or soil penetrated.

WELL CONE OF INFLUENCE: The depression, roughly conical in shape, produced in a water table or other piezometric surface by the extraction of water from a well at a given rate. The volume of the cone will vary with the rate and duration of withdrawal of water.

WETLAND: Generally an area that has a predominance of hydric soils and is inundated or saturated by surface or ground water at a frequency or for a duration that supports hydrophytic vegetation, typically adapted to those conditions. Wetland includes swamps, bogs, marshes, and similar areas.