

# APPENDIX B

## GLOSSARY

### A

**Accelerated Erosion** See Erosion.

**Acidic** A material with a pH of less than 7.0. Soil nutrients are generally less soluble and less available to plants in moderately or strongly acid soils. Agricultural lime is commonly applied to acidic soils to increase the pH.

**Acre** An area of measurement equal to 43,560 square feet.

**Aeolian** Wind deposited material such as loess or dune sands.

**Aggregate** Sand, gravel, crushed stone or slag, usually having a known range of particle sizes. Used with a cementing medium to form concrete or alone as in a roadway bed or railroad ballast.

**Agronomy** The theory, study and practice of field crop production and soil management.

**Alkaline** A material with a pH greater than 7.0.

**Alluvial Soil** Soil formed from materials transported in suspension by flowing water and deposited by sedimentation.

**Anchor Trench** A long, narrow ditch in which the edges of a material (e.g. silt fence, erosion control blanket or geotextile) are buried to hold it in place.

**Angle of Repose** The maximum angle of slope (measured from a horizontal plane) at which loose, non-cohesive material will come to rest. The angle of repose for unconsolidated soil varies with the soil grain size, grain shape and moisture content. To maintain stability, cut or fill slopes should not exceed the angle of repose or slippage may occur.

**Anti-Seep Collar** A plate of metal, high-density plastic or butyl rubber attached perpendicularly to the outside of a pipe placed through an embankment. Used to prevent water from flowing unabated along the outside of the pipe causing soil piping and structure failure.

**Application Rate** The quantity (mass, volume or thickness) of material applied per unit area.

**Apron** Protective material laid on a streambed or ground surface to prevent scour at a culvert outlet, abutment, toe of a structure or slope or similar location.

**Aquifer** An underground, porous, water-bearing geological formation composed of a layer of permeable rock, sand or gravel that provides a groundwater reservoir.

**Armor** A protective coat or artificial surface on streambeds, banks, shores or embankments used to resist erosion or scour. Examples of hard armor include concrete and riprap. Soft armor includes flexible geosynthetic support systems used with vegetation.

**Articulated Block Systems** Concrete blocks linked by cables or interlocking pieces that are flexible, porous and can accommodate growth of herbaceous and woody vegetation while offering the strength and durability of a hard armor.

## **B**

**Best Management Practice, or BMP** The preferred methods and products that will correct or control erosion, sedimentation or water quality degradation on a specific site for particular site conditions.

**Backfill** Earth or other material used to replace material removed during construction, such as in culvert, sewer and pipeline installations.

**Base Course (Base)** A layer of material of specified thickness placed on the subgrade to distribute load, provide drainage and minimize frost action.

**Bedding** The soil or other material on which a pipe or conduit is supported.

**Bench** A step in a slope. Formed by a horizontal surface and a surface inclined at a steeper angle than the entire slope.

**Bentonite (Sodium Bentonite)** A highly plastic clay that swells extensively when wet. Used to seal soil to reduce seepage losses from ponds and lagoons.

**Berm** (1) A ridge of earth constructed to direct the flow of surface water. (2) A shelf that breaks the continuity of a slope. (3) The embankment of a pit or pond that may be wide and solid enough for vehicular traffic.

**Binder (Emulsion, Tackifier)** Natural or synthetic additive that causes an otherwise non-cohesive material to become bound into a cohesive matrix.

**Biodegradable** Ability of a material to breakdown or decompose under natural conditions and processes, within an acceptable time frame, without polluting the environment.

**Bioengineering** A method of construction using living plants or plant materials in combination with inorganic materials. The practice brings together biological, ecological and engineering concepts to produce living, functioning systems used to prevent erosion and control sedimentation. Also, it often provides wildlife habitat.

**Biological Stability** Ability to resist degradation from exposure to microorganisms.

**Blanket** Rolled materials consisting of coir (coconut fiber), jute, straw, wood fiber or various synthetic materials used to prevent erosion, trap sediment, protect seed and promote the growth of vegetation. They can be either degradable or permanent.

**Blinding (Clogging)** The condition whereby soil particles block the voids at the surface of a geotextile, thereby reducing the rate of water flow through the geotextile.

**Bridging (Soil)** The formation of large voids due to inadequate compaction of earth material or the inclusion of improper fill materials.

**Broadcast** The application of material scattered or sprayed on the soil surface. Broadcast seeding is a uniform distribution of seeds over the entire planted area.

## C

**CCIS**<sup>TM</sup> A Certified Compliance Inspector of Storm water as designated by Stormwater USA.

**CESSWI**<sup>TM</sup> A Certified Erosion, Sediment and Storm water Inspector as designated by EnviroCert International.

**CISEC**<sup>TM</sup> A Certified Inspector of Sediment and Erosion Control as designated by CISEC Inc.

**CPESC**<sup>TM</sup> A Certified Professional in Erosion and Sediment Control as designated by EnviroCert International.

**CPSWPPP**<sup>TM</sup> A Certified Preparer of Storm water Pollution Prevention Plans as designated by Stormwater USA.

**CPSWQ**<sup>R</sup> A Certified Professional in Storm water Quality as designated by EnviroCert International.

**Canopy (Plant)** The foliage of a tree, shrub or herbaceous plant. The area covered by the plant canopy is protected from splash erosion.

**Canopy (Inlet)** A principal spillway pipe with the inlet cut at an angle of 33, 45 or 56 degrees designed as an anti-vortex device that maximizes water flow through the pipe.

**Carbon Black** Material consisting primarily of elemental carbon used as an additive for plastic geosynthetic production. It imparts a black color to the compound, which retards aging by ultraviolet light from the sun.

**Catch Basin** A receptacle for diverting surface water to a sewer or subdrain, having at its base a sediment bowl to prevent the admission of coarse material into a sewer or stream.

**Cation Exchange Capacity, or CEC** The capacity of a soil for ion exchange for cations between the soil and soil solution. CEC is used as a measure of fertility and nutrient retention capacity.

**Cellular Confinement System** A synthetic grid with open spaces filled with soil, sand, gravel or concrete. The matrix mechanically stabilizes these materials and is used for erosion control and load support applications.

**Certified Seed** Seed that has been analyzed by a state association test laboratory for percent germination, weed seed content and purity.

**Channel** A natural stream or excavated ditch that conveys water.

**Channel Erosion** See Erosion.

**Channel Stabilization** Protection of the sides and bed of a channel from erosion by controlling flow velocities and directions or by lining the channel with vegetation, riprap, concrete or other material.

**Check Dam (Rock Check Structures)** Temporary barriers of 3 to 6 inch rock constructed across a swale or drainage ditch. Used to reduce the velocity of concentrated storm water flows, reduce degradation and to trap sediment.

**Chemical Stability** The ability to resist chemicals (e.g., acids, bases, solvents, oils and oxidation agents) and chemical reactions, including those catalyzed by light.

**Chute** A steeply inclined channel, usually lined with rock or concrete, for conveying water from a higher to a lower level.

**Clay** (1) Mineral particles less than .002 millimeters in equivalent diameter. (2) A soil containing more than 40 percent clay. Clay soils exhibit plasticity when moist, but are hard when dry.

**Clogging** See Blinding.

**Coefficient of Permeability (k)** The rate of discharge of a fluid per unit cross sectional area of a geotextile under a hydraulic gradient.

**Cohesive Soil** An unconfined soil that has considerable strength when air dried and significant resistance to disintegration when submerged in water.

**Coir** Organic fiber from the outer shell of the coconut, used as a mulch and in the manufacture of erosion control blankets, geotextiles and coir tubes for scour protection and planting in bioengineering applications.

**Compaction** The application of mechanical forces to the soil to make it denser and less porous.

**Concrete** A hard, strong building material composed of water, a cementing material such as portland cement and a mineral aggregate such as sand or gravel.

**Concrete Armor Blocks** Interlocking blocks of precast concrete used for channel linings and streambank stabilization.

**Conduit** Any channel or pipe for transporting water.

**Conservation District** A public organization created under state enabling law as a special-purpose district to develop and carry out a program of soil, water and related resource conservation, use and development within its boundaries. Often called a soil conservation district or soil and water conservation district, it is usually a subdivision of state government with a local governing body, but with limited authorities.

**Consistency** The relative ease with which a soil can be deformed. Soil moisture content directly influences how a soil behaves when subjected to compression.

**Contaminant** A secondary material added by human or natural activities which may, in sufficient concentrations, render the primary material or atmosphere unacceptable.

**Contour** An imaginary line on the surface of the earth connecting points of the same elevation.

**Coverage** The surface area to be covered by a specified material. For roll goods, allowance is made for a defined overlap of the edges of the material.

**Creep** (1) Slow mass movement of rock or soil material down slopes primarily driven by gravity which is not usually perceptible except to observations of long duration. (2) The slow change in length or thickness of a material under prolonged stress.

**Crest Elevation** (1) The maximum elevation of surface water under consideration. (2) The highest elevation of a structure or component.

**Critical Areas** Regions highly susceptible to erosion such as an area subjected to concentrated water flow.

**Critical Depth** Water depth in a conduit at which certain conditions of maximum flow will occur.

**Critical Slope** (1) The slope at which a maximum flow will occur at minimum velocity. (2) The maximum angle with the horizontal axis at which a sloped bank of soil or rock of a given height will stand unsupported. See Angle of Repose.

**Critical Velocity** The average velocity of flow when flow is at critical depth.

**Culvert** A conduit for conveying surface water through an embankment.

**Cut and Fill** A process of moving earth by excavating part of an area and using the excavated material for adjacent embankments or deposit areas.

## D

**d50** The sieve opening size that allows 50 percent of a given sample to pass through.

**Dam** An embankment constructed of compacted soil materials usually across a stream or area of concentrated water flow.

**Darcy's Law** A law describing the rate of flow of water through saturated porous media.

**Deformation** A change in the shape of a specimen, (e.g., an increase in length produced as a result of the application of a tensile force).

**Degradable** The ability of a material to break down or decompose into lesser components.

**Degradation** (1) The loss of desirable properties by a material as a result of some process or physical/chemical phenomenon. (2) The progressive general lowering of a stream channel by erosion.

**Density** The mass of a substance per unit volume.

**Department of Natural Resources, or DNR** The state agency in Missouri responsible for preserving and protecting the state's natural and cultural resources. Along with EPA, the Department of Natural Resources is authorized to regulate the NPDES program, which includes storm water runoff permitting. The department also provides grants and low-interest loans to public entities for sediment control, water pollution control and related information and

education projects.

**Design Flow** A quantity of flow expected at a certain point as a result of a design storm or flood frequency.

**Design Frequency** The recurrence interval for hydrologic events used for design purposes. As an example, a design frequency of 50 years means a storm of a magnitude that would be expected to occur on the average of once in every 50 years.

**Design Life** The length of time for which it is economically sound to require a structure to serve without major repairs or replacement.

**Design Standards** The defined conditions where a specific conservation practice or set of practices are to be used.

**Design Storm** A selected rainfall pattern of specified amount, duration, intensity and frequency that is used to calculate the volume of water runoff and peak discharge rate.

**Dewatering** The removal of surface or subsurface water such as removing water temporarily impounded in a holding basin or pond.

**Dew Point** The temperature at which water vapor starts to condense in cooling air at the existing atmospheric pressure and vapor content.

**Dike** An embankment or wall constructed to prevent flooding.

**Discharge** A volume of fluid passing a given point per unit time. The flow rate of storm water is commonly expressed as cubic feet per second.

**Diversion** A channel and ridge of earth constructed to divert surface runoff water from one area to another for disposal at a non-erosive velocity.

**Drainage** Interception and removal of groundwater or surface water, by artificial or natural means.

**Drainage Area** A geographical area that contributes runoff water to a common point.

**Drainage (Soil)** The frequency of saturation and duration of time needed for water to flow through soil.

**Dredging** The process of removing sediment from a watercourse such as a river or reservoir.

**Drop Inlet** A structure in which the water drops through a vertical riser connected to a discharge conduit or over the crest of a vertical wall to a lower elevation.

**Drop Structure** A structure in a channel or conduit that permits water to drop to a lower level.

**Dry Well** A steel catch basin with open bottom and perforated walls. Used to store surface runoff for infiltration, or recharge, into the ground.

## E

**Effective Calcium Carbonate, or ECC** A measure of the ability of a liming material to

neutralize soil acidity, expressed as a percentage. Agricultural lime is approximately 50 percent ECC.

**Ecosystem** A system formed by living organisms interacting with their nonliving environment.

**Effluent** A material that flows out from the point of concern. (e.g., sewage water or other waste liquids flowing out of a reservoir basin or treatment plant).

**Embankment** A mound of earth or stone built to hold back water or to support a roadway.

**Emergence** The process of a plant seedling rising above the soil surface.

**Emulsion** See Binder.

**Environmental Protection Agency, or EPA** The federal agency responsible for the enforcement of the Clean Water Act. See Resource Inventory List for more information.

**Energy Dissipater** A structure installed at the outlet of a channel, drop structure or conduit to absorb the force of high-velocity flow. It may consist of riprap, linings, baffles, staggered blocks, etc.

**Equivalent Opening Size, or EOS** Number of the U.S. Bureau of Standards sieve (in millimeters or inches) having openings closest in size to the diameter of uniform particles that will allow 5 percent by weight to pass through the material. Used to select filter fabric for filtration and separation usage.

**Equivalent Neutralizing Material, or ENM** See ECC.

**Erosion** The process by which soil particles are detached, transported and deposited by wind, water, ice or gravity. The following terms are used to describe different types of erosion:

**Accelerated erosion** Erosion much more rapid than natural or geologic erosion, primarily as a result of human activities.

**Channel erosion** The widening, deepening and headward cutting of small channels and waterways due to erosion caused by increased frequency of bank full (channel forming) flow.

**Gully erosion** The erosion process whereby runoff water accumulates in narrow channels removing the soil to considerable depths over relatively short time periods. When surface channels cannot be smoothed out by normal agricultural tillage operations, they are called gullies.

**Sheet erosion** The gradual removal of a fairly uniform layer of soil from the land surface by a thin evenly distributed sheet of runoff water.

**Shoreline erosion** The loss of soil materials due to the wave action of a permanent waterbody such as a pond, lake or ocean.

**Splash erosion** The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

**Rill erosion** The erosion process whereby numerous small channels only several inches deep are formed. Commonly occurs on recently disturbed and exposed soils. Rills are shallow enough to be removed by normal agricultural operations.

**Saltation** The movement of soil particles by rolling or a series of short bounces along the ground surface due to the wind.

**Suspension** The transport of soil particles by the wind for relatively long distances.

**Surface Creep** The transport of soil particles by the wind along the surface of the earth.

**Erosion Control** The prevention or reduction of soil particle movement. Erosion control reduces soil detachment, transport and deposition.

**Erosion Control Blanket** Temporary or permanent fabricated materials that protect the soil and enhance the establishment of vegetation.

**Erosion Control Technology Council, or ECTC** A division of the International Erosion Control Association, or IECA, which develops standards and guidelines for products and testing of materials.

**Evaporation** The conversion of water from liquid to vapor form.

## F

**Fabric** See Geotextile.

**Fabric Formed Concrete Systems** Geotextile tubes and mattresses filled with concrete to provide a hard armor protection system.

**Fabric Wrapped Drain** An inner core of a porous medium such as sand, gravel or a corrugated pipe with an outer geotextile wrap or sheath used to collect and remove excess water.

**Fascine (Wattle)** Bundles of tree or shrub branch cuttings tied together and anchored in trenches with wooden stakes. Used for a variety of slope stabilization projects.

**Fertilization** The process of adding soil nutrients to the soil to stimulate plant growth. The percentage of available nutrients in bulk fertilizer is labeled as percent nitrogen, percent phosphorus and percent potassium. A 100-pound bag of 12-12-12 is 12 percent nitrogen, 12 percent phosphorus and 12 percent phosphate. The bag contains 12 pounds of each nutrient along with 64 pounds of inert ingredients.

**Fill (Embankment)** A bank of soil, rock or other material constructed above the natural ground surface.

**Filter Cloth** See Geotextile.

**Filter Strip** A wide belt of vegetation designed to provide infiltration, intercept sediment and other pollutants, and reduce storm water flow and velocity. Designed to accept an even distribution of surface runoff; their effectiveness is reduced if a channel forms, or if high velocity flows occur.

**Filtration** The process of retaining soils or other materials while allowing the passage of water or fluids.

**Finished Grade** The final elevation of the ground surface conforming to the approved construction plan.

**Flood** An overwhelming quantity of water. Measured in terms of either water level or discharge rate.

**Floodplain** A relatively level surface of stratified alluvium that adjoins a water course and is

subject to periodic flooding, unless protected artificially by a dike or similar structure.

**Footing** The supporting base or ground work of a structure.

**Freeboard** The vertical distance between the elevation of the design high-water level and the top of a dam, diversion ridge or other water control device.

**Freeze-Thaw** Resistance the property of solids to resist cyclical freezing and thawing.

**Friction Angle** An angle, the tangent that is equal to the ratio of the friction force per unit area to the normal stress between two materials.

**Frost Heave** The raising of a surface or object due to the accumulation of ice in the underlying soil.

## G

**Gabion** A galvanized or polyvinylchloride-coated steel wire mesh basket filled with stones, broken concrete or other dense, erosion-resistant material. Individual baskets are usually linked together to form part of a larger unit. Used to protect channel banks, shorelines or steep slopes from erosion.

**Gauge** Standard measurement of the thickness of metal sheets or wire (and bearing a relation to the weight of the metal).

**Geocomposite** A manufactured material using geotextiles, geogrids or geomembranes in laminated or composite form.

**Geogrid** A net-like polymeric material used to reinforce, stabilize or contain soil, rock, earth or other material in a wide variety of applications including internally reinforced soil walls, segmental retaining walls, steep slopes, etc.

**Geomembrane** A synthetic impermeable membrane used to contain liquids or sediment.

**Geosynthetics** Any synthetic material, including geotextiles and geomembranes, or any combination thereof, used with foundation, soil, rock, earth or any other geotechnical engineering related material, as an integral part of a structure or system.

**Geotechnical Engineering** The application of the laws and principles of science and mathematics to solve problems related to the materials of the earth's crust. It includes the fields of soil mechanics, rock mechanics, and many of the engineering aspects of geology, geophysics, hydrology and related sciences.

**Geotextile (Fabric, Filter Cloth)** A woven, nonwoven or microfilament water permeable material, either natural or synthetic, used to filter liquids and to prevent the movement of sediment, to separate different materials or to reinforce and strengthen them.

**Germination** The beginning of plant growth. The sprouting of roots, stem and leaves from seed.

**Glacial Till** Material deposited by glaciation, usually composed of a wide range of particle sizes, that has not been subjected to the sorting action of water.

**Gradation** The distribution of particle sizes in a material.

**Grade** (1) To level off to a smooth horizontal or sloping surface. (2) A reference elevation. (3) Particle size distribution of an aggregate. (4) The slope of a plane.

**Grade Stabilization Structure** A structure, usually a combination of an earth embankment and mechanical spillway, installed to discharge water from a higher to a lower elevation in order to control erosion, head-cutting or to reduce channel grade.

**Gradient** See Slope.

**Great Rivers Alliance of Natural Resources Districts, or GRAND** Regional association of conservation districts serving the urban conservation needs of eight Missouri and Illinois counties in the St. Louis metropolitan area.

**Granular** A description of the uniformity of grain size of gravel, sand or crushed stone.

**Gravel** (1) Soil particles with diameters between 2 millimeters and 3 inches. (2) Loose, rounded fragments of rock commonly used to surface roads.

**Ground Cover** Any vegetation producing a protective mat on or just above the soil surface. Usually refers to low-growing herbaceous plants.

**Groundwater Level** See Water Table.

**Grout** A fluid mixture of cement, water and sand or other fillers that can be poured or pumped easily. Used to fill the voids between riprap, culverts or other structures in channels or slopes to prevent or reduce erosion or inadvertent water flow.

**Gully Erosion** See Erosion.

## H

**Head** Pressure measured as an equivalent height of water. Measured in feet or pounds per square inch.

**Headcut** The uphill end of a gully where water overfalls to a lower level and active erosion occurs.

**Herbaceous** A non-woody plant.

**High-Density Polyethylene, or HDPE** A synthetic polymer used for geomembranes and pond liners.

**Horizon** A layer of soil distinguishable from adjacent layers by characteristic physical and chemical composition. Soil horizons are commonly referred to as topsoil, subsoil and parent material. "A" horizon: the uppermost layer usually contains organic matter. "B" horizon: the layer which accumulates material leached from the "A" horizon. "C" horizon: undisturbed parent material from that the overlying layers have developed.

**Humus** See Organic Matter.

**Hydraulic Gradient** A line that represents the relative force available due to the potential energy available. This is a combination of energy due to the height of the water and internal pressure. In an open channel the line corresponds to the water surface. In a closed conduit,

if several openings are placed along the top of the pipe and open end tubes inserted, a line connecting the water levels in the tubes represents the hydraulic energy.

**Hydraulic Mulch** Processed materials such as wood and paper products, cotton or straw fibers that are applied by special equipment using a water-based slurry that is sprayed on the soil surface.

**Hydraulic Radius** The cross-sectional area of a stream of water divided by the length of that part of its periphery in contact with its containing conduit. The ratio of area to wetted perimeter.

**Hydraulics** The science and technology of the mechanics of fluids.

**Hydric Soil** Soils that are wet long enough to periodically produce anaerobic conditions, thereby influencing the growth of plants.

**Hydrograph** A chart showing for a given point on a stream the runoff rate, depth, velocity or other property with respect to time.

**Hydrologic Soil Groups** Categories of soil based upon their runoff producing characteristics. Group A soils have low runoff potential. Group D soils, the other extreme, have high runoff potential. Hydrologic soil groups are listed in NRCS soil surveys, a publication available at NRCS/Conservation District offices.

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

**Hydrophilic** Molecules and surfaces that have a strong affinity for water molecules.

**Hydrophobic** Molecules and surfaces that have little or no affinity for water molecules.

**Hydrophytic** A plant adapted to growth in water or saturated soil.

**Hydroseeding** Spreading of seed hydraulically in a water medium. Mulch, lime and fertilizer can also be incorporated into the sprayed mixture.

**Hydrostatic Pressure** A state of stress in which all the principal stresses are equal (and there is no shear stress), as in a liquid at rest; the pressure in a liquid under static conditions; the product of the unit weight of the liquid and the difference in elevation between the given point and the free water elevation. Measured in pounds per square inch.

**Hygroscopic** A material that attracts, absorbs and retains atmospheric moisture.

## I

**International Erosion Control Association, or IECA** P.O. BOX 774904, Steamboat Springs, Colorado 80477-4904 or phone 800-455-4322. Serves as a global resource for people who share a common responsibility for the prevention and control of erosion. The Great Rivers Chapter serves Iowa, Kansas, Missouri and Nebraska. Contact Great Rivers Chapter of IECA at 600 Broadway, Suite 200, Kansas City, MO 64105 or call 816-474-4240.

**Impermeable** Does not permit passage of a fluid or a gas.

**Impervious** Impenetrable. Soil that is resistant to the entrance of water, air or plant roots.

**Incorporate** To mix materials such as fertilizer or lime into the soil with tillage operations.

**Infiltration** The downward entry of water into the surface of soil.

**Inflow** The water discharged into a point of concern.

**Inoculation (of seeds)** The addition of nitrogen-fixing bacteria (inoculant) to legume seeds or to the soil in which the seeds are to be planted. The bacteria convert atmospheric nitrogen into a form available for plant growth.

**Inorganic** Composed of matter not of plant or animal origin.

**Inorganic Soil** See Mineral Soil.

**Intermittent Stream** A stream, or reach of a stream, that only flows during wet seasons; usually less than 50 percent of the year.

## K

**Kansas Department of Health and Environment, or KDHE** The state agency in Kansas that regulates the NPDES Program including storm water runoff permitting. See Resource Inventory List for more information.

## L

**Landscaping** The placement of sod, seed, trees and other vegetation after final grading is completed.

**Lapped Joint** A joint made by placing one surface partly over another surface and bonding or fastening them together.

**Leachate** Liquid that has percolated through a material and contains soluble components removed from that material.

**Leaching** The removal into solution of soluble materials by percolating water. Generally refers to the movement of soil nutrients to a deeper soil horizon, making them unavailable for plant growth. It can also refer to the movement of contaminants through the soil and into the groundwater.

**Legume** Any member of the pea or bean family which includes peas, beans, clovers, alfalfas, lespedezas and vetches. Most are nitrogen-fixing plants.

**Lift** An applied or compacted layer of soil, asphalt or waste. Also referred to as a course.

**Lime, Agricultural** A soil amendment containing calcium carbonate and other materials used to neutralize soil acidity and furnish calcium for plant growth.

**Liner** A layer of emplaced materials that serves to restrict the escape of liquids or solids placed within an impoundment. This includes reworked or compacted soil and clay, asphaltic and concrete materials, spray-on membranes, polymeric membranes or any substance that serves the above stated purpose. The portion of a reservoir responsible for the first line of defense against seepage; that is, the part immediately adjacent to the liquid being held.

**Liquefaction** Loss of strength of a saturated soil resulting from the combined effects of

vibrations and hydraulic forces, thereby causing the material to flow.

**Loam** A soil textural classification in which the proportions of sand, silt and clay are well balanced. Loams have the best properties for cultivation of plants.

**Loess** Material transported and deposited by wind and consisting of predominantly silt-sized particles. Loess has an open structure and relatively high cohesion due to cementation of clay or calcareous material at grain contacts. A characteristic of loess deposits is that they can stand with nearly vertical slopes.

**Losing Stream** A stream that loses water as it flows downstream. The water infiltrates into the ground recharging the groundwater.

## M

**Maximum Allowable Slope** means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

**Mid-America Association of Conservation Districts, or MAACD** A regional association of conservation districts serving the urban conservation needs of 10 Kansas and Missouri counties in the Kansas City metropolitan area.

**Manning's Equation** An equation for determining the flow rate of water in a uniform, steady state condition.

**Mass** The quantity of matter in a body.

**Mass Per Unit Area** The amount of material per unit area. Units can be ounces per square yard or grams per square meter.

**Mean** The average value of a group of numbers.

**Mil** Abbreviation for one-thousandth.

**Mineral Soil (Inorganic Soil)** A soil with less than 20 percent organic matter.

**Mitigation** The process of reducing the negative impacts of a project.

**Moisture Content** The percentage by weight of water contained in the pore space of a solid material with respect to the total weight of the solid material.

**Monomer** A relatively simple compound that can react to form a polymer.

**Mulch** A natural or artificial layer of plant residue or other materials covering the land surface that conserves moisture, reduces erosion and aids in the establishment of plant cover.

## N

**Natural Erosion** The natural influence of climatic forces on the surface of the earth.

**National Pollution Discharge Elimination System, or NPDES** Federal legislation that

requires cities with populations over 10,000 to establish a permit process to control sediment pollution. A permit is also required for development sites one acre or greater in size. Permits are authorized and enforced by the Environmental Protection Agency or a designated state agency as directed by the Clean Water Act.

**Natural Resources Conservation Service, or NRCS** A federal agency, formally known as the Soil Conservation Service, SCS, that provides technical assistance on natural resource management issues. See the Resource Inventory List for more information.

**Nonpoint Source Pollution, or NPS** Pollution that enters a waterbody from diffuse sources. A point source, by contrast, can be easily identified as having a distinct entry point, such as an industrial or sanitary sewer pipe.

**Normal Water Level** The average summer water level. The free surface associated with flow in natural streams.

## O

**Observation Well** A vertical pipe placed in the ground to observe groundwater levels.

**Open Channel** A drainage course that has no restrictive top. It is open to the atmosphere and may or may not permit surface flow to pass over its edge and into another channel in an unrestricted manner. In many cases where dikes are constructed to increase channel capacity, entrance of surface waters is necessarily controlled.

**Ordinance** A law set forth by a governmental authority.

**Organic Matter (Humus)** The portion of soil, usually dark in color, resulting from the decomposition of plant and animal materials.

**Outfall** The location where storm water discharges from a drainageway or conduit to a receiving stream or body of water.

**Outlet** The point of water discharge from a stream, river, lake or artificial drain.

**Outlet Channel** A waterway constructed or altered primarily to carry water from structures such as smaller channels, tile lines, dams and diversions.

**Overburden** (1) The loose soil, sand, silt or clay that overlies bedrock. (2) All material overlying an underground excavation.

**Overfall** A sudden drop in grade, usually associated with a gully.

**Overlap** The section of adjacent geosynthetic materials that are in contact, one under the other, forming a seamed or unseamed joint.

## P

**Pure Live Seed, or PLS** A measure of seed quality expressed as a percentage. The product of the percentage of seed purity and the percentage of germination (including the germination of

hard seed) divided by 100.

**Particle Size** The effective diameter of a particle measured by sedimentation, sieving or micrometric methods.

**Peak Discharge** The maximum instantaneous flow from a given storm condition at a specific location.

**Percent Open Area** The net area of a fabric not occupied by fabric filaments, normally determinable only for geotextiles having distinct visible and measurable openings that continue directly through the fabric.

**Percolation** The downward sub-surface movement of water through the soil horizons. The percolation rate of soil is usually expressed as inches per hour.

**Permanent Seeding** The establishment of perennial vegetation on disturbed areas for periods longer than 12 months.

**Permeability (Soil)** The property of the soil that expresses the ease with which water moves downward through the profile. The rate (inches per hour) at which a saturated soil transmits water.

**Permittivity** The rate of flow of water through a geotextile.

**Pervious** A property of a material through which water passes relatively freely (e.g., sands and gravels).

**pH** A measure of the acidity or alkalinity of a substance. A pH value of 7.0 is neutral, less than 7.0 is acidic, greater than 7.0 is alkaline.

**Photo degradable** The ability of a material to breakdown due to exposure to sunlight.

**Pipe** A culvert having a non-rectangular cross-section, often assumed to be circular unless specified otherwise, which carries a liquid or gas.

**Piping (Tunneling)** The movement of soil particles by seepage leading to the development of subsurface voids, tunnels or pipe like cavities.

**Plastic** A material that contains as an essential ingredient one or more organic polymeric substances of large molecular weight, is solid in its finished state and, at some stage in its manufacture or processing into finished particles, can be shaped by flow.

**Plasticity** The capacity of a soil or rock to be deformed continuously and permanently by relatively moderate pressure without cracking or appreciable volume change.

**Polymer** A macromolecular material formed by the chemical combination of monomers. Plastics, rubbers and textile fibers are all high molecular weight polymers. Only synthetic polymers are used to make synthetics.

**Polyvinylchloride, or PVC** A synthetic thermoplastic polymer prepared from vinyl chloride. PVC can be compounded into rigid forms used in pipes or into flexible forms used in the manufacture of geotextiles.

**Ponding** Water backed up in a channel, depression or ditch as the result of a constriction,

obstruction or lack of outlet.

**Porosity** The percentage by volume of voids of a given material with respect to the total volume of the material.

**Porous Pavement** A permeable surface material provides support for traffic without deformation and allows for storm water and surface runoff to gradually infiltrate into the subsoil.

**Potable Water** Water suitable for human consumption.

**Precipitation** Process by which water in liquid or solid state (rain, sleet, snow) is discharged out of the atmosphere upon a land or water surface.

## Q

**Qualified Design Professional** Someone trained and highly qualified in their field such as horticulturists, landscapers, various design specialists and technicians.

**Qualified Personnel** A person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.

## R

**Revised Universal Soil Loss Equation, or RUSLE** An updated, computerized method of estimating soil movement due to water erosion. RUSLE incorporates the updated climate, soil erodibility and vegetative cover factors of the Universal Soil Loss Equation.

**Registered Design Professional** A qualified design professional who is normally certified or degreed as an engineer, landscape architect, arborist, forester, biologist, erosion and sediment control specialist, etc.

**Reinforcement** To strengthen by the addition of materials or support. (e.g., the strengthening of a slope by inclusion of geosynthetic structural materials).

**Residual Soil** Soil derived by in place weathering of parent material.

**Retaining Wall** A constructed wall used to eliminate steep slopes while providing stability.

**Revetment** A lining of stone, concrete, geosynthetics or organic materials used to stabilize a streambank, riverbank or channel.

**Rill Erosion** See Erosion.

**Riparian Area** Land adjacent to a body of water at least periodically influenced by concentrated water flows or by flooding.

**Riprap** Dense stone of various sizes, resistant to weathering, placed on earth surfaces such as the face of a dam or the bank of a stream to prevent scour erosion.

**Riser** A vertical pipe connected to an underground pipe used to control the discharge rate from a pond or basin.

**Rock** Natural, solid, mineral matter occurring in large masses or fragments.

**Rock Check Structures** See Check Dam.

**Roll Goods** A general term applied to manufactured materials such as erosion control blankets, turf reinforcement mats, netting, geotextiles and other geosynthetics that are furnished in rolls.

**Roughness Coefficient** A factor in flow formulas representing the effect of channel or conduit roughness on the velocity of flowing water.

**Runoff** That portion of precipitation not absorbed or retained on the land surface, but which collects and flows from a drainage area. Water that is lost without entering the soil is called surface runoff. Water that enters the soil before reaching a stream channel is called groundwater run off. The rate of surface water runoff in open channels or in storm water conveyance systems is measured in cubic feet per second.

## S

**Sand** (1) Mineral particles that range in size from 2 millimeters to .05 millimeters in equivalent diameter. (2) A loose, granular material that results from the disintegration of rocks, consisting of particles smaller than gravel but coarser than silt. (3) A soil containing 85 percent or more of sand and 10 percent or less of clay.

**Sand Diaphragm** A vertical wall of sand around a pipe placed through an embankment. Used instead of anti-seep collars. Drainage from the wall is released from the pipe at the downstream toe of the embankment.

**Saltation** See Erosion.

**Saturation (Soil)** The point at which all the voids between soil particles are filled with water.

**Scarify** (1) Roughening the land surface. (2) To abrade the seed coat to improve seed germination.

**Scour** The clearing and digging action of flowing water, especially the erosion caused by stream water in sweeping away sediment from the streambed and outside bank of a curved channel.

**Sediment** Mineral or organic material transported from its original location by wind, water, gravity or ice. The word silt is sometimes used interchangeably with the word sediment. This is incorrect. See Silt.

**Sedimentation** The deposition of soil particles that were transported from its original location by water, wind, ice or gravity.

**Seed Bed** Soil prepared to promote the germination of seed and the growth of seedlings.

**Seed Purity** The percentage of the desired species, in relation to the total quantity of bulk material that may include other species, weed seeds or inert matter such as leaves, stems, soil, etc.

**Seepage** The slow, gravitationally driven, movement of water out of soil, rock, embankments or

structures onto the land surface.

**Separation** The function of a geotextile or other product as a partition between two adjacent dissimilar materials to prevent mixing of the two materials.

**Shear Stress (Tangential Stress)** The stress component tangential to a given plane. Basic formula to determine the shear stress of a channel (unit wt. of water [62.4 lbs/ft<sup>3</sup>] X Slope [ft./ft.] X Depth [ft.] = Shear Stress [lbs/ ft<sup>2</sup>]).

**Sheet Erosion** See Erosion.

**Sheet Flow** Water flowing across a wide, uniform area such as a highway, parking lot or field.

**Shoreline Erosion** See Erosion.

**Shotcrete** Mortar or concrete conveyed through a hose and pneumatically projected at high velocity onto a surface. Used to stabilize the surface. Can be applied by a wet or dry mix method.

**Shrink-Swell** The volume change of soil based on moisture capacity. Soils that shrink when dry and swell when wet can damage plant roots, roads, dams and building foundations.

**Silt** (1) Mineral particles that range in size from .005 millimeters to .002 millimeters in equivalent diameter. (2) A soil containing 80 percent or more of silt and less than 12 percent clay. (3) Imprecise colloquial term for a deposition of sediment.

**Silt Fence** A temporary barrier consisting of a geotextile that is attached to supporting posts and trenched into the ground at the base. As the runoff water slowly filters through the geotextile, the sediment settles out on the uphill side of the silt fence.

**Sink Hole** A depression in the substrate, usually deep in comparison to its diameter, caused by settlement or substrate particle removal by migrating water.

**Site** Synonymous with job site.

**Slag** Rough, cindery material from volcanic lava or smelting operations.

**Slide** Rapid movement of a part of the earth under force of gravity, usually due to saturated conditions, or an earthquake.

**Slope** Degree of deviation from horizontal expressed as a percentage, as a numerical ratio or in degrees. As a percentage, slope is the number of feet of rise or fall in 100 feet of horizontal distance. As a ratio, it is the number of feet of horizontal to the number of feet vertical. For example, a 25 percent slope is equal to a 4:1 slope and is equal to a slope of approximately 14 degrees.

**Sloughing** The separation and downhill movement of a small portion of the slope from surrounding material.

**Slump** A slope failure in which a mass of rock or unconsolidated material drops along a concave slip surface. Slump material moves downslope as an intact block and frequently rotates backwards.

**Slurry** A watery mixture of suspended matter.

**Small Storm** The volume and rate of runoff for rainfall events less than two inches. These small storms [often referred to as the water quality storm] are believed to cause the majority of

urban stormwater pollution.

**Soil (Earth)** Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks or organic materials.

**Soil Mechanics** The application of the laws and principles of mechanics and hydraulics to engineering problems dealing with soil as an engineering material.

**Soil Profile** Vertical section of the soil from the surface through all horizons.

**Soil Stabilization** Chemical or mechanical treatment designed to increase or maintain the stability of a mass of soil or otherwise to improve its engineering properties.

**Soil Test** The process to determine the soil pH and the nutrient-supplying capability of a specific soil for a specific crop or plant species. Used to determine recommended liming and fertilization rates. Available through University Extension offices and private laboratories.

**Soil and Water Conservation Society, or SWCS** A multidisciplinary membership organization advocating the protection, enhancement and wise use of soil, water and related natural resources located at 945 SW Ankeny Rd., Ankeny, Iowa 50023 or phone 515-289-2331.

**Species** The basic biological classification of organisms. For example, species of grass include tall fescue, smooth bromegrass and timothy.

**Specific Gravity** The ratio of the density of a material to the density of water when both densities are obtained by weighing in air. A specific gravity less than one implies that the material will float.

**Spillway (Principal)** An open or closed channel or conduit used to convey excess water from a pond, reservoir or basin.

**Spillway (Emergency)** A designed depression at one side of the embankment of a pond or basin that will pass peak discharges greater than the maximum design storm controlled by the principal spillway and detention storage.

**Splash Erosion** See Erosion.

**Splash Pad** A nonporous material placed at the outfall of a conduit, channel or grade stabilization structure to decrease energy of water flow to a non-erosive velocity.

**Spoil** Excess rock or soil material not needed after a practice is constructed.

**Sprig** A portion of the stem/or roots of a plant used for propagation (e.g., Bermuda grass is commonly established with sprigs rather than seed).

**Stable** (1) A non-erosive condition in which storm water runoff from a design storm will not cause erosion of soil; usually achieved by protecting erodible areas with structures or vegetation. (2) A soil condition that will not slide or slump; usually established by removing saturated conditions or by flattening slopes.

**Stable Outlet** A natural or constructed outlet that will dispose of water at non-erosive velocities and without flooding.

**Stage** The height of the surface of a river above an arbitrary zero point that defines a critical condition. Examples include low flow stage, bank full stage, monitoring stage and flood stage.

**Staple** A fastening device typically manufactured of 8- to 11-gauge wire, "U" shaped with 4 to 10 inch legs and a 1 to 2 inch crown, used to secure erosion control blankets, geotextiles and related materials to the ground.

**Steady Flow** A flow in which the volume passing a given point per unit of time remains constant.

**Storage Basin** Space for detention or retention of storm water runoff water for controlled release during or following the design storm. Storage may be upstream, downstream, offstream, onstream or underground.

**Stone** Crushed or naturally angular particles of rock between the size of 4.75 and 75 millimeters.

**Storm Sewer** A conduit that carries storm water, surface drainage, street wash and other washwaters but usually excludes sewage and industrial wastes. Also called a storm drain.

**Storm water** Water that originates during precipitation events. It may also be used to apply to water that originates from snowmelt.

**Storm water Management** A master plan or systems approach to the planning of facilities, programs and management organizations for comprehensive control and use of storm water within a defined geographical area.

**Stream Hydraulics** The science and technology of water behavior in streams.

**Structure** (1) The relation of particles or groups of particles which impart to the whole soil a characteristic manner of breaking: some types are crumb, block, platy and columnar. (2) A constructed practice designed to control erosion, sedimentation, storm water runoff or an overfall.

**Subgrade** The soil prepared and compacted to support a structure or a pavement system.

**Subsoil** (1) Soil below a sub grade or fill. (2) That part of the soil profile occurring below the "A" horizon.

**Subsurface Drain (Underdrain)** A perforated pipe used for subsurface drainage, usually surrounded by aggregate or wrapped in a geotextile filter fabric to prevent the migration of soil particles.

**Suspension** The state of a substance when its particles are kept from falling or sinking. See Erosion.

**Swale** A low-lying, often wet, area of land.

**Synthetic** Any material created by artificial means.

## T

**Tackifier** See Binder.

**Tangential Stress** See Shear Stress.

**Temporary Seeding** The establishment of fast-growing annual vegetation to provide economical erosion control for up to 12 months and to reduce the amount of sediment moving

off the site.

**Tensile Strength** The maximum force a material can bear without tearing apart. Units are reported as maximum stress (e.g., pounds per square inch) or force per unit thickness (e.g., pounds per inch width).

**Tenting** Separation of installed manufactured blankets from contact with the ground surface. This is usually due to clods of soil not fine graded and prepared properly for blanket installation.

**Texture** The percent of sand, silt and clay in a soil.

**Tillage** The mechanical manipulation of soil with equipment such as plows, discs, cultivators or harrows. Also, tilled land.

**Toe Drain** A subdrain installed near the downstream toe of a dam or levee to intercept seepage and to outlet it away from the structure.

**Toe of Slope** The junction of a slope and the bottom of the slope.

**Top of Slope** The junction of a slope and the top of the berm, channel or embankment.

**Topographic Map** A map of isolines linking common elevations that effectively illustrates the contours of the land surface.

**Topsoil** Surface soil usually containing organic matter. The fertile soil most capable of growing vegetation and crops.

**Toxic** The characteristic of being poisonous or harmful to plant or animal life.

**Trash Rack** A structural device used to prevent debris from entering a pipe, spill way or other water structure.

**Turbidity** The degree of cloudiness in water caused by suspended particles. Turbidity can be precisely measured in nephelometric turbidity units (ntu) and is often used as an indicator of pollution.

**Turf Reinforcement Mat, or TRM** Permanent synthetic erosion control blankets that can reduce the loss of underlying soil and reinforce the root zone of vegetation. TRM can be used to improve the ability of vegetation to resist heavier, more erosive, flows that would otherwise compromise the integrity of the plant materials.

## U

**Underdrain** See Subsurface Drain.

**Undermining** A process of scour by hydraulic action that progressively removes earth support from a structure. Undermining commonly occurs at the outlet of a culvert or sewer.

**Ultraviolet Degradation** Breakdown of polymeric structures when exposed to the ultraviolet bandwidth of light.

**Ultraviolet Radiation Stability, or UV** The ability of a material to resist deterioration from exposure to the ultraviolet component of sunlight.

**Uniform Flow** Flow in which the velocities are the same in both magnitude and direction from point to point along the stream or conduit.

**Unsheltered Distance** The distance from the downwind edge of an area and a stable point in the direction of the prevailing wind. Used as a factor in estimating wind erosion.

**Unsteady Flow** A flow in which the velocity changes with respect to both space and time.

**Upland** The region of higher elevations above a floodplain.

**Uplift** The hydrostatic force of water exerted on or underneath a structure, causing a displacement of the structure.

**Universal Soil Loss Equation, or USLE** An estimate of the amount of soil that moves due to water erosion based upon five factors: climate, soil erodibility, length and steepness of slope, vegetative cover and structural or management practices.

## V

**Vegetation** Plant life or total plant cover of an area.

**Void** (1) Space in a soil or rock mass not occupied by solid mineral matter. This space is generally occupied by air or water. (2) The open spaces in a geosynthetic material through which flow can occur.

## W

**Washout** The failure of a culvert, bridge, embankment or other structure resulting from the action of flowing water.

**Water Course** A natural or artificial channel in which a flow of water occurs, either continuously or intermittently. Water courses may be either on the surface or underground.

**Water Quality** The chemical, physical and biological characteristics of water, usually with respect to its suitability for a particular purpose.

**Water Quality Storm** The volume and rate of runoff for rainfall events less than 2 inches. These small storms are believed to cause the majority of urban storm water pollution.

**Water Table (Ground Water Level)** The upper surface of the zone of saturation in permeable rock or soil.

**Watershed** The region drained by or contributing water to a stream, lake or other body of water.

**Wattle** See Fascine.

**Weathering** The process of disintegration and decomposition as a consequence of exposure to the atmosphere, to chemical action and to the action of frost, water and heat.

**Weir** A structure that extends across the width of a channel and is intended to delay or alter the flow of water through the channel.

**Well Graded** An equal distribution of particle sizes. Usually refers to gravel.

**Wetland** Land area that is wet or flooded by surface or groundwater often enough and long enough to develop characteristic hydric soil properties and to support vegetation that will grow in saturated soil conditions.

**Wetted Perimeter** The length of wetted contact between a stream of water and its containing channel measured at right angles to the direction of flow.

**Wind Erosion Equation** An estimate of the amount of soil that moves due to wind erosion based upon five factors: soil erodibility, ridge roughness, climate, unsheltered distance and vegetative cover.