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Common Terms

100-Year (or Base) Flood:

A flood event that statistically has a 1 out of 100 (or one percent) chance of being equaled or exceeded on a specific watercourse in any given year. A flood event of this magnitude is often used to determine if flood insurance is either advisable or required on a property.

Aggradation:

A progressive buildup or raising of the channel bed due to sediment deposition. Permanent or continuous aggradation is an indicator that a change in the stream's discharge and sediment characteristics is taking place.

Alluvial Fan:

A geomorphologic feature characterized by a cone or fan-shaped deposit of boulders, gravel and fine sediments that have been eroded from mountain slopes, transported by flood flows and then deposited in the valley floors and which is subject to flash flooding, high velocity flows, debris flows, erosion, sediment movement and deposition and channel migration.

Area Drainage Master Plan (ADMP):

A plan, which identifies the preferred alternatives of those identified in an ADMS. An ADMP provides minimum criteria and standards for flood control and drainage relating to land use and development.

Area Drainage Master Study (ADMS):

A study to develop hydrology for a watershed, to define watercourses, identify potential flood problem areas, drainage problems and recommend solutions and standards for sound floodplain and stormwater management. The ADMS will identify alternative solutions to a given flooding or drainage problem.

Armor:

Surfacing of channel bed, banks, or embankment slope to resist erosion

As Built Plans:

A community may require submission of "as-built" plans to certify that a project was built in accordance with the permit. A registered professional architect or engineer certifies the actual construction.

Backfill:

The placement of fill material within a specified depression, hole or excavation pit below the surrounding adjacent ground level, as a means of improving flood water conveyance, or to restore the land to the natural contours existing prior to excavation.

Base Flood Elevation:

A base flood elevation (BFE) is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum of 1929, the North American Vertical Datum of 1988, or other datum referenced in the Flood Insurance Study report, or the depth of the base flood, usually in feet, above the ground surface.

Braided Stream:

A stream whose flow is divided at normal stage by small islands.

Catch Basin:

A chamber or well, usually built at the curb line of a street, for the admission of surface water to a storm sewer or sub-drain

CFS:

The measuring unit of cubic feet per second (cfs), which is used to quantify the amount of flow in a wash. A cubic foot is equivalent to 7.5 gallons of water. Thus, 1 cfs is 7.5 gallons of water passing by you every second.

Channel:

An open conveyance of surface stormwater having a bottom and sides in a linear configuration. Channels can be natural or man-made. Channels have levees or dikes along their sides to build up their depth. Constructed channels can be plain earth, landscaped, or lined with concrete, stone, or any other hard surface to resist erosion and scour.

Channel Failure:

Sudden collapse of a channel due to an unstable condition.

Community Rating System:

A program administered by the Federal Emergency Management Agency (FEMA) that recognizes and rewards communities working to reduce flood damages through a variety of approved floodplain management and flood awareness activities. Through the program, a community can reduce the flood insurance premiums that flood prone property owners pay.

Culvert:

A hydraulically short conduit, which conveys surface water runoff through a roadway embankment or through some other type of flow obstruction.

Delineation:

Defining the physical boundaries of a stream, floodplain, jurisdictional wash, etc.

Deposit:

Something dropped or left behind by moving water, as sand or mud.

Design Discharge:

The nth-year storm for which it is expected that the structure or facility be designed to accommodate.

Detention Basin:

A basin or reservoir where water is stored for regulating a flood. It has outlets for releasing the flows during the floods

Development:

A man-made change to property, such as buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations.

Discharge:

The amount of water that passes a specific point on a watercourse over a given period of time. Rates of discharge are usually measured in cubic feet per second (cfs).

Drainage Basin:

A geographical area, which contributes surface water runoff to a particular point. The terms “drainage basin,” “tributary area,” and “watershed” can be used interchangeably.

Drainage Clearance:

The approval by the Maricopa County Drainage Administrator of a grading and drainage plan to develop a site. This plan may be a site plan or an engineered grading and drainage plan.

Dry Well:

A deep hole covered and designed to hold drainage water until it seeps into the ground.

Elevation Certificate:

The Elevation Certificate is an important administrative tool of the National Flood Insurance Program (NFIP). It is to be used to provide elevation information necessary to ensure compliance with community floodplain management ordinances, to determine the proper insurance premium rate, and to support a request for a Letter of Map Amendment or Revision (LOMA or LOMR-F). [Click here to download the Elevation Certificate Instructions or Form from FEMA](#)

Embankment:

A man-made earth structure constructed for the purpose of impounding water.

Emergency Spillway:

An outflow from a detention/retention facility that provides for the safe overflow of floodwaters for large storms that exceed the design capacity of the outlet or in the event of a malfunction. The emergency spillway prevents the water from overtopping the facility.

Encroachment:

The result of placing a building, fence, berm or other structure in a floodplain in a manner that obstructs or increases the depth (or velocity) of flow on a watercourse.

Erosion:

The wearing away of land by the flow of water.

Erosion Hazard Zone:

Land adjacent to a watercourse regulated by Maricopa County that is subject to flood-related erosion losses.

Federally-Mapped Floodplain:

A flood prone area that has been mapped and accepted by FEMA as the result of a flood insurance study (FIS) for a watercourse and surrounding areas. Mapped floodplains are used for flood insurance needs and for other regulatory purposes.

FEMA (Federal Emergency Management Agency):

An independent federal agency established to respond to major emergencies that state and local agencies don't have the resources to handle. FEMA seeks to reduce the loss of life and protect property against all types of hazards through a comprehensive, risk-based emergency management program. [Click here to visit the FEMA web site.](#)

Fill Material:

Any material used for the primary purpose of replacing an aquatic area with dry land or for changing the bottom elevation of a water body. This includes both natural materials (silt, sand, gravel, rock, and wood) and manufactured materials (concrete, plastic, steel, treated wood).

Flood Control:

Various activities and regulations that help reduce or prevent damages caused by flooding. Typical flood control activities include: structural flood control works (such as bank stabilization, levees, and drainage channels), acquisition of flood prone land, flood insurance programs and studies, river and basin management plans, public education programs, and flood warning and emergency preparedness activities.

Flood Insurance Rate Map (FIRM):

Issued by FEMA, these maps show special hazard areas, including the 100-year floodplain. They also show flood insurance risk zones and other flood-related information applicable to a community.

Flood Insurance Study (FIS):

Hydrologic and Hydraulic studies that identify a flood hazard area, flood insurance risk zones and other flood data such as flood depths and velocities.

Flood Proofing:

Any combination of changes to a structure or property using berms, flood walls, closures or sealants, which reduces or eliminates flood damage to buildings or property.

Flood/Flooding:

A temporary condition caused by the accumulation of runoff from any source, which exceeds the capacity of a natural or man-made drainage system and results in inundation of normally dry land areas.

Floodplain:

The area adjoining a watercourse that may be covered by floodwater during a flood. Storm runoff and flood events may cause alterations in the floodplain in certain areas.

Floodplain Management:

A program that uses corrective and preventative measures to reduce flood and erosion damage and preserve natural habitat and wildlife resources in flood prone areas. Some of these measures include: adopting and administering Floodplain Regulations, resolving drainage complaint, protecting riparian habitat communities, and assuring effective maintenance and operation of flood control works.

Floodplain Regulations:

Adopted policies, codes, ordinances, and regulations pertaining to the use and development of lands that lie within a regulatory floodplain.

[Click here to view the Floodplain Regulations](#)

Floodplain Use Permit:

An official document, which authorizes specific activities within a regulatory floodplain or erosion hazard area.

[Click here to learn more about the Flood Plain Use Permit](#)

Floodway:

The channel of a watercourse and portion of the adjacent floodplain that is needed to convey the base or 100-year flood event without increasing flood levels by more than one foot and without increasing velocities of flood water.

Floodway Fringe:

The areas of a delineated floodplain adjacent to the Floodway where encroachment may be permitted.

Flowage Easement:

Legal right to allow water to flow across someone's property

Grade Control Structure:

A structure used across a stream channel placed bank to bank to control bed elevation, velocity, pressure, etc.

Grading:

Disturbance of existing land contours

Groundwater:

Water within the earth that supplies wells and springs; water in the zone of saturation where all openings in rocks and soil are filled, the upper surface of which forms the water table.

Habitat Mitigation:

The compensation for the removal of natural vegetation during the construction of a flood control project by establishing new vegetation elsewhere.

Hydraulic Structures:

The facilities used to impound, accommodate, convey, or control the flow of water, such as dams, intakes, culverts, channels, and bridges.

Hydraulics:

A field of study dealing with the flow pattern and rate of water movement based on the principles of fluid mechanics.

Hydrology:

A field of study concerned with the distribution and circulation of surface water, as well as water dynamics below the ground and in the atmosphere.

Lateral Stream Migration:

Change in position of a channel by lateral erosion of one bank and simultaneous deposition on the opposite bank.

Levee:

A man-made structure, usually an earthen embankment often reinforced with soil cement that is designed to contain or divert the flow of water.

LOMA (Letter of Map Amendment):

An official amendment of a current Flood Insurance Rate Map (FIRM) accepted by FEMA for a property or a structure. The LOMA verifies that the structure or portions of the property have been removed from a designated-floodplain area.

LOMR (Letter of Map Revision):

An official revision of a current Flood Insurance Rate Map (FIRM) accepted by FEMA, which reflects changes in mapped areas for flood zones, floodplain areas, and floodways and flood elevations.

Low Flow Channel:

A channel within a larger channel, which typically carries low and/or normal flows

Map Repository:

An agency or entity designated to maintain official FEMA flood insurance rate maps for the community as well as LOMAs and LOMRs to those maps.

Multi-Use Facility:

A detention or retention basin that provides additional benefits to its primary function of flood control. Such benefits include recreation, parking, visual buffers, or water harvesting.

National Flood Insurance Act of 1968:

An Act passed by Congress that established the National Flood Insurance Program as a means of mitigating flood damages. The Act makes flood insurance available to communities that adopt and enforce measures to reduce flood losses. Prior to the Act, property owners in flood prone areas typically were not able to obtain this coverage through private insurance companies.

National Flood Insurance Program (NFIP):

A federal program that allows property owners to purchase insurance protection against losses due to flooding. In order to participate in this program, local communities must agree to implement and enforce measures that reduce future flood risks in special flood hazard areas.

www.fema.gov/nfip

Outlet Structure:

A hydraulic structure placed at the outlet of a channel, spillway, pipe, etc., for the purpose of dissipating energy and providing a transition to the channel or pipe downstream.

Peak Flow:

The maximum rate of flow through a watercourse for a given storm

Percolation:

The movement of water through the subsurface soil layers, usually continuing downward to the groundwater or water table reservoirs.

Physical Weathering:

Breaking down of rock into bits and pieces by exposure to temperature and changes and the physical action of moving ice and water, growing roots, and human activities such as farming and construction.

Probable Maximum Flood:

The flood runoff that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

Reach:

A term used to describe a specific length of a stream or watercourse. For example, the term can be used to describe a section of a stream or watercourse between two bridges.

Regulatory:

Subject to the control of or required to follow rules set forth by a governmental agency. With respect to washes or streams it refers to those areas where the federal government restricts the use or development of areas it has deemed to be “Waters of the U.S.” These regulations are part of the Clean Water Act.

Regulatory Flood Elevation:

The elevation, which is one foot above the base flood elevation for a watercourse. Where a floodway has been delineated, the base flood elevation is the higher of either the natural or encroached water surface elevation of the 100-year flow.

Regulatory Floodplain:

A portion of the geologic floodplain that may be inundated by the base flood where the peak discharge is 100 cubic feet per second (cfs) or greater. Regulatory floodplains also include areas, which are subject to sheet flooding, or areas on existing recorded subdivision plats mapped as being flood prone.

Retention Basin:

A basin or reservoir where water is stored for regulating a flood. Unlike a detention basin, it does not have outlets for releasing the flows, the water must be disposed by draining into the soil, evaporation, or pumping systems.

Riparian Habitat:

Plant communities that occur in association with any spring, cienega, lake, watercourse, river, stream, creek, wash, arroyo, or other body of water. Riparian habitats can be supported by either surface or subsurface water sources.

Riparian Zone:

A stream and all the vegetation on its banks.

Runoff:

The portion of precipitation on land that ultimately reaches streams, especially water from rain or melted snow that flows over ground surface.

Sediment:

Soil particles, sand, and minerals washed from the land into aquatic systems as a result of natural and human activities.

Sedimentation:

A large-scale water treatment process where heavy solids settle out to the bottom of the treatment tank after flocculation.

Setback:

The minimum distance required between a man-made structure and a watercourse. This distance is measured from the top edge of the highest channel bank or the edge of the 100-year floodwater surface elevation.

Sheet Flooding:

A condition where stormwater runoff forms a sheet of water to a depth of six inches or more. Sheet flooding is often found in areas where there are no clearly defined channels.

Sheet Flow:

Very shallow overland discharge.

Soil Erosion:

The processes by which soil is removed from one place by forces such as wind, water, waves, glaciers, and construction activity and eventually deposited at some new place.

Spillway:

An outlet pipe or channel serving to discharge water from a dam, ditch, gutter, or basin.

Storm Drainage System:

A drainage system for collecting runoff of stormwater on highways and removing it to appropriate outlets. The system includes inlets, catch basins, storm sewers, drains, reservoirs, pump stations, and detention basins.

Stormwater:

Precipitation from rain or snow that accumulates in a natural or man-made watercourse or conveyance system.

Surface Water:

Water that flows in streams and rivers and in natural lakes, in wetlands, and in reservoirs constructed by humans.

Tailwater:

The water surface elevation in the channel downstream of a hydraulic structure

Thalweg:

The line of maximum depth in a stream. The thalweg is the part that has the maximum velocity and causes cutbanks and channel migration.

Trashrack:

A metal bar or grate located at the outlet structure of a detention or retention basin, which is designed to prevent blockage of the structure by debris.

Tributary:

A stream that contributes its water to another stream or body of water.

Variance:

Legal permission to build a structure in a manner that would otherwise be prohibited by an ordinance.

Virgin flow:

The streamflow, which exists or would exist if man had not modified the conditions on or along the stream or in the drainage basin.

Water quality standards:

Laws or regulations, promulgated under Section 303 of the Clean Water Act, that consist of the designated use or uses of a water body or a segment of a water body and the water quality criteria that are necessary to protect the use or uses of that particular water body. Water quality standards also contain an antidegradation statement. Every State is required to develop water quality criteria standards applicable to the various waterbodies within the State and revise them every 3 years.

Water table:

Level below the earth's surface at which the ground becomes saturated with water. The surface of an unconfined aquifer, which fluctuates due to seasonal precipitation.

Watercourse:

Any minor or major lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

Watercourse Master Plan (WCMP):

A hydraulic plan for a watercourse that examines the cumulative impacts of existing development and future encroachment in the floodplain and future development in the watershed on potential flood damages, and establishes technical criteria for subsequent development so as to minimize potential flood damages for all flood events up to and including the one hundred-year flood.

Waters of the U.S.:

All waters, which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce.

Watershed:

An area from which water drains into a lake, stream or other body of water. A watershed is also often referred to as a basin, with the basin boundary defined by a high ridge or divide, and with a lake or river located at a lower point.

Wetlands:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances

do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Zone A (unnumbered):

Zone A is a Special Flood Hazard Area identified by FEMA that is subject to inundation from a 100-year flood event. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are shown. Mandatory flood insurance requirements apply.

Zone AE and A1-30:

Special Flood Hazard Areas subject to inundation by the 100-year flood determined by a Flood Insurance Study (FIS). Base flood elevations are shown within these zones and mandatory flood insurance requirements apply. (Zone AE is used on newer maps in place of Zones A1-30.)

Zone AH:

Special Flood Hazard Areas subject to inundation by 100-year shallow flooding (usually areas of ponding) with average depths between one and three feet. Base flood elevations derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance requirements apply.

Zone AO:

Special Flood Hazard Areas subject to inundation by 100-year shallow flooding, usually resulting from sheet flow on sloping terrain, with average depths between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone. Mandatory flood insurance requirements apply.

Zone B, C and X:

Areas that have been identified in a community flood insurance study as having moderate or minimal hazard from flooding. Buildings or other improvements in these zones could be flooded by severe, concentrated rainfall, in the absence of adequate drainage systems. Flood insurance is available in participating communities, but it is not required in these zones. (Zone X is used on newer maps in place of Zones B and C.)

Zone D:

Unstudied areas where flood hazards are undetermined but where flooding is possible. No mandatory flood insurance requirements apply, but coverage is available in participating communities.

Source:

<http://www.ksda.gov/Default.aspx?tabid=248>

Riverine Flooding:

Overbanks flooding of rivers and streams is the most common type of flood event. Riverine floodplains range from narrow, confined channels in the steep valleys of hilly and mountainous areas, and wide, flat areas in the Plain States and low-lying coastal regions. The volume of water in the floodplain is a function of the size of the contributing watershed and topographic characteristics such as watershed shape and slope, and climatic and land-use characteristics.

In steep, narrow valleys, flooding usually occurs quickly, is short duration, and floodwaters are likely to be rapid and deep. In relatively flat floodplains, areas may remain inundated for days or even weeks, but floodwaters are typically slow moving and relatively shallow, and may accumulate over long periods of time.

Flooding in large rivers usually results from large-scale weather system that generates prolonged rainfall over wide areas. These same weather systems may cause flooding in hundreds of small basins that drain to major rivers. Small rivers and streams are susceptible to flooding from more localized weather systems that cause intense rainfall over small areas. In some parts of the Northern and Western States, annual spring floods result from snowmelt, and the extent of flooding depends on the depth of the winter snowpack and spring weather patterns.

There is often no sharp distinction between riverine floods, flash floods, alluvial fan floods, ice-jam floods, and dam-break floods that occur due to structural failures or overtopping of embankments during flood events. Nevertheless, these types of floods are widely recognized and helpful in considering not only the range of flood risk, but also appropriate responses.

Flash Floods:

Flash flood is the term widely used by flood experts and the general population. However, there is not single definition, and a clear means to separate flash floods from the rest of the spectrum of riverine floods does not exist.

Flash floods are characterized by a rapid rise in water level, high velocity, and large amounts of debris. They are capable of tearing out trees, undermining buildings and bridges, and scouring new channels. Major factors in flash flooding are the intensity and duration of rainfall and the steepness of watershed and stream gradients. The amount of watershed vegetation, the natural and artificial flood storage areas, and the configuration of the streambed and floodplain are also important.

Flash floods may result from failure of a dam or the sudden breakup of an ice jam. Both can cause the release of a large volume of water in a short period of time. Flash flooding in urban areas is an increasingly serious problem due to removal of vegetation, paving and replacement of ground cover by impermeable surfaces that increase runoff, and construction of drainage system that increase the speed of runoff.

Alluvial Fan Floods:

Alluvial fans are deposits of rock and soil that have eroded from mountainsides and accumulated on valley floors in a fan-shaped pattern. The deposits are narrow and steep at the head of the fan, broadening as they spread out onto the valley floor. As rain runs off steep valley walls, it gains velocity, carrying large boulders and other debris. When the debris fills channels on the fan, floodwaters spill out and cut new channels. The process is repeated, resulting in shifting channels and combined erosion and flooding problems over a large area (FEMA 165,1989). Alluvial fan flooding is most prevalent in the arid Western States.

Alluvial fan floods can cause greater damage than typical riverine flooding because of the high velocity of flow, the amount of debris carried, and the broad area affected. Floodwaters typically move at velocities of 15 to 30 ft/s (5 to 10 m/s) due to the steep slopes and lack of vegetation (L.R. Johnson Associates, FIA-18, 1992).

Human activities often exacerbate flooding and erosion problems on alluvial fans. Roads act as drainage channels, carrying high-velocity flows to lower portions of the fan, while fill, leveling, grading, and structures can alter flows patterns.

Ice Jam Floods:

Flooding caused by ice jams is similar to flash flooding. Ice jam formation causes a rapid rise of water at the jam and extending upstream. Failure or release of the jam causes sudden flooding downstream.

The formation of ice jams depends on the weather and physical conditions in river channels. Ice jams are most likely to occur where the channel slope naturally decreases, where culverts freeze solid, at headwaters of reservoirs, at natural channel constrictions such as bends and bridges, and along shallows where channels may freeze solid.

Ice jam floods can occur during fall freeze-up from the formation of frazil ice, during midwinter periods when stream channels freeze solid forming anchor ice, and during spring breakup when rising water levels from snowmelt or rainfall break exiting ice cover into large floating masses that lodge at bridges and other constructions. Damage from ice jam flooding usually exceeds that caused by open water flooding. Flood elevations are usually higher than predicted from free-flow conditions and water may change rapidly. Additional physical damage is caused by the force of ice impacting buildings and other structures.

Dam Break Floods:

Dam failures can occur as a result of structural failures, such as progressive erosion of an embankment or overtopping and breaching by a severe flood. Earthquake may weaken dams. Disastrous floods caused by dam failures, although not in the category of natural

hazards, have caused great loss of life and property damage, primarily due to their unexpected nature and high velocity floodwater.

Local Drainage or High Groundwater Levels:

Locally heavy precipitation may produce flooding in areas other than delineated floodplains or along recognizable drainage channels. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems. During winter and spring, frozen ground and accumulations of snow may contribute to inadequate drainage and localized ponding. Flooding problems of this nature generally occur in areas with flat gradients, and generally increase with urbanization, which speeds the accumulation of floodwaters because of impervious areas. Shallow sheet flooding may result unless channels have been improved to account for increased flows.

High groundwater levels may be concern and can cause problems even where there is no surface flooding. Basements are susceptible to high groundwater levels. Seasonally high groundwater is common in many areas while in other high groundwater occurs only after long periods of above-average precipitation.