

Runoff Control and Conveyance Measures

Storm water runoff is rainfall or snowmelt that runs off the ground or impervious surfaces (buildings, roads, parking lots, etc.) and drains into natural or manmade drainage ways. In some cases, it drains directly into streams, rivers, lakes, sounds or the ocean. In other cases, particularly urbanized areas, it drains into streets and manmade drainage systems consisting of inlets and underground pipes commonly referred to as “storm sewers.” Storm water entering storm sewers does not usually receive any treatment before it enters streams, lakes and other surface waters.

Storm water runoff problems and impacts are most evident in areas where urbanization has occurred. Changes in land use have a major effect on both the quantity and quality of Storm water runoff. Urbanization, if not properly planned and managed, can dramatically alter the natural hydrology of an area. Increased impervious cover decreases the amount of rainwater that can naturally infiltrate into the soil and increases the volume and rate of storm water runoff. These changes lead to more frequent and severe flooding and potential damage to public and private property. Under natural conditions, typically 10% of rainwater falling on a piece of property runs off the land surface into streams, rivers or lakes. The remainder either evaporates into the air or infiltrates into the soil replenishing groundwater supplies. Development of the site increases the percentage of impervious surfaces. As the percentage of impervious surfaces increases, the percentage of runoff increases since there is less vegetated area to soak up the rainwater.

The rate of runoff and streamflow after a storm event also shows dramatic increases under post versus predevelopment conditions. The higher and more rapid peak discharge of runoff and streamflow can overload the capacity of the stream or river, causing downstream flooding and streambank erosion. Local governments spend millions of dollars each year rectifying damage to public and private property caused by uncontrolled storm water runoff. In heavily developed areas, damage to public and private property occurs during heavy rains. This damage includes road, culvert, and water and sewer line washouts, flooded homes and yards, the deposition of sediment and debris on properties and roads, and damage to bridges. When streambanks erode they clog stream channels, culverts, and pipes with sediment contributing to flooding problems. Sediment is washed into ponds, lakes, and other impoundments reducing their capacity to store water and requiring costly removal efforts. The increased volume and velocity of runoff and streamflow can also cause accelerated channel erosion and changes in streambed composition. This can destroy fish habitat and disrupt the natural ecology of the stream or river.

The following runoff control BMPs are discussed in this handbook:

- Pipe Slope Drains
- Runoff Diversion Measures
- Level Spreader
- Temporary Stream Crossing
- Subsurface Drains
- Construction De-watering