Description

An Infiltration Basin (INB) consists of an earthen basin constructed in naturally pervious soils (Type A or B soils) with a flat bottom and provided with inlet structure to dissipate energy of incoming flow and an emergency spillway to control excess flows. An optional relief underdrain may be provided to drain the basin if standing water conditions occur. A forebay settling basin as described for EDBs should be provided if high sediment loads are anticipated. An INB functions by retaining the SQDV in the basin and allowing the retained runoff to percolate into the underlying native soils over a specified period of time (40 hours). The bottoms of basins are typically vegetated with dry-land grasses or irrigated turf grass. . A typical layout of an INB system is shown in Figure 5-14.

General Application

Infiltration basins can serve drainage areas up to 50 acres. Infiltration basins can be sized to pass storm volumes greater than the storm quality capture volume (SQDV). However, treatment efficiencies are reduced and the threat of system failure increases as the volume of runoff directed to the infiltration basin increases above the SQDV. It is recommended that the basin be sized to treat the storm quality capture volume only and divert all other flows around the treatment control measure.

Advantages/Disadvantages

General

In addition to removing pollutants effectively, infiltration basins also control runoff volume, which may serve to reduce downstream bank erosion in watercourses. INBs, are empty when not in use and can be dual-purpose facilities. A grass-covered area in a park, for example, could function as an infiltration basin during the wet season, and as a park during the dry season .

The primary disadvantage of an infiltration basin is the potential for clogging if excessive sediment is allowed to flow into the facility. Basins cannot be put into operation until the upstream tributary area is stabilized. The cost of restorative maintenance can be high if soil infiltration rates are significantly reduced due sediment deposition.

Also, there is a risk of groundwater contamination in very coarse soils since coarse soils do not effectively remove dissolved pollutants. This may require groundwater monitoring

Site Suitability

An infiltration basin requires significant space and is suitable for large drainage areas (10 to 50 acres. INBs infiltration basins cannot be placed on fill or unstable sites. Also, INBs should not be placed in high-risk areas such as service/gas stations, truck stops, and heavy industrial sites due to the groundwater contamination risk.

Before exploring the use of infiltration BMPs, preliminary soil investigations, including a percolation test, shall be performed to assess whether the soils on site have an extended infiltration rate of at least 0.5 inches per hour. Separate on-site infiltration systems from the groundwater table (or bedrock) by a minimum of 10 feet vertically to provide sufficient infiltration volume within the soil. Tributary area should have a low potential for erosion. Other suitability considerations include the soil makeup (Appendix E), site topography, and the location of other facilities. Prior to the use of infiltration basins consultation with local agencies is recommended to identify the location of unconfined groundwater basins and vulnerable unconfined aquifers to determine the appropriateness of this BMP. In an area identified as an unconfined groundwater basin or a vulnerable unconfined aquifer the application of infiltration BMPs should be limited to those that provide pre-treatment to ensure groundwater is protected for pollutants of concern.

The site must further provide a relatively flat area in which to construct the facility. Infiltration facilities shall be sited at least 50 feet away from slopes steeper than 15 percent. Adequate spacing (100 feet or more) shall be provided between infiltration facilities and non-potable wells, tanks, drain fields and springs. For separation between infiltration BMPs and potable water supply wells, follow Department of Health Services requirements in the Guidelines for Location of Water Wells. INBs shall also be sited at least 20 feet down slope or 100 feet up slope from building foundations. A geotechnical expert shall be consulted when necessary to verify appropriate placement on site.

An important consideration for all infiltration facility configurations is that, during construction, great care must be taken not to reduce the infiltration capacity of the soil in the facility through compaction or by using the infiltration area as a sediment trap. Infiltration facilities shall be constructed late in the site development after soils (that might erode and clog the units) have been stabilized, or shall be protected until the site is stabilized.

Pollutant Removal

The amount of pollutant removed by INBs should be significant and should equal or exceed the removal rates provided by sand filters. In addition to settling, infiltration basins provide filtering, adsorption, and biological uptake of constituents in stormwater. Relative pollutant removal effectiveness is indicated in Table 5-1.