Auckland Regional Council
TE RAUHĪTANGA TAIAO

Infiltration Trenches

2007

Fact sheet

What is an Infiltration Trench?

An infiltration trench is a stormwater management device designed to treat runoff and divert it into groundwater. The infiltration process reduces the total volume of stormwater runoff providing minor storage for smaller storms and reduces the level of contaminants entering receiving environments. Infiltration trenches therefore recharge ground water supplies and provide stream protection by reducing the volume and peak flow rates of stormwater that discharges into the receiving environment.

Infiltration occurs through an excavated trench, which is backfilled with stone or filter media. The excavated trench provides storage until the runoff can infiltrate into the underlying soil. The ability of an infiltration trench to capture and treat runoff depends on the overall design and soil characteristics.

Key Design Components of an Infiltration Trench

Infiltration trenches have a large length to width ratio and are often selected, as a stormwater management device in areas where space availability is limited. Infiltration trenches are designed to serve an area no greater than 4 hectares. Performance is greatest on slopes no greater than 15%.

Soil permeability is the most critical consideration for determining the suitability of infiltration practices. The infiltration trench is usually built in local soils where soil is of a medium texture to allow the percolation of water. Where this texture is not available media can be created with sand, peat or a combination of both. When this is the case an under drain maybe required to improve the drainage capacity of the infiltration trench. Clay is not a suitable soil type as this restricts percolation and causes clogging and can be geotechnically unstable. A soil with a high gravel composition creates the risk of contaminating ground water. Infiltration practices are not appropriate for a number of areas within the Auckland Region due to the high clay component within the soil. A percolation test can be performed during the initial planning process to ensure an infiltration trench will be an appropriate stormwater management device for the site.

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Construction Issues Associated with Infiltration Trenches

Before constructing an infiltration trench it is important to ensure the contributing site areas draining to the device are stabilised. Sediment reaching the infiltration trench should be minimised to prevent surface clogging. An infiltration trench often requires a pretreatment device such as a forebay or a swale to remove larger solids and prevent clogging. Placing filter fabric at 300mm below the surface can prevent the migration of soil particles from the sidewalls and prevent sealing of the soil surface. An observation well must be installed within the infiltration trench to allow inspections to be undertaken which will determine if the device is functioning as designed.

Compaction of soil during construction should be avoided. It is particularly important to stake out the infiltration area to ensure vehicles do not cross the device both during and after construction. The compaction of soil will reduce the infiltration rate, performance and efficiency of the device.

Operation and Maintenance of an Infiltration Trench

Regular inspections and maintenance should be carried out to address any issues of clogging or standing water, which could reduce the efficiency of the infiltration trench. Clogging occurs when sediments that enter the infiltration trench seal off the soil surface preventing infiltration of stormwater runoff. The presence of standing water over the surface of the infiltration trench during a period of time when rain has not occurred can indicate problems with the infiltration rate. It should be recognised that standing water can however be an indication of seasonal high water tables or ground water mounding. If the infiltration trench becomes clogged the practice should be allowed to dry out before removal of sediment or rock fill is attempted. Once the media is removed it may be necessary to replace underlying filter fabric.

Education is an important component to reducing the maintenance requirements of an infiltration trench. It is important for owners to be aware of the nature of site to ensure certain activities are avoided included animal grazing, sediment tracking and the parking of vehicles over the device.

For more information

Call the Auckland Regional Council on (09) 366 2000 or refer to ARC TP10 Stormwater Management Devices: Design Guide Manual Chapter: 8