

Infiltration trench

An infiltration trench is a 3-foot to 12-foot deep trench that does not contain an outlet structure and is lined with filter fabric and rocks or stones. Storm water is able to infiltrate through the rock and into the soil.

Because most infiltration trenches are designed for the 1-year storm, they are very effective at capturing the first flush, as well as reducing flow volumes. Pretreatment is recommended however to remove sediment and prevent clogging. This pretreatment may be in the form of a swale with check dam, a filter strip or a sediment basin/trap.

Advantages

- Can be very effective for removing fine sediment, metals, nutrients, bacteria and oxygen-demanding substances
- Appropriate for small sites
- Reduces the volume of runoff from a site
- Provides groundwater recharge and baseflow for nearby streams
- Reduces downstream flooding and scouring of streambanks
- Appropriate for areas where space is limited, due to their narrow shape.

AT-A-GLANCE SUMMARY

Benefit	
Major	●
Secondary	◐
Minor/None	○

Flow attenuation ◐

Runoff Volume reduction ●

Pollutant Removals

Total Suspended Solids ●

Floatables ◐

Heavy metals ●

Oil and grease ◐

Fecal coliform ◐

BOD ◐

Total Phosphorous ●

Nitrogen ●

Costs ◐

Maintenance ●

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Limitations

- Groundwater contamination may occur if an infiltration trench is installed too close to the water table.
- If infiltration rates of the native soils are not high, then these practices may not function well.
- Susceptible to clogging by sediment
- Frequent maintenance required
- Not applicable in areas where high amounts or concentrations of pollutants are released

Costs

Construction costs for infiltration trenches normally center around \$5 per cubic foot of storm water treated.

Maintenance

- Utilizing pretreatment will significantly reduce maintenance requirements
- Trench should be inspected after every major storm for the first few months following installation
- After the first few months of operation, the trench should be inspected at least twice a year to ensure that sediment build-up is not hindering performance
- Water that ponds in the infiltration trench for several days may indicate that the trench is clogged and it may need to be tilled. The filter fabric and stone should also be replaced at this time.
- Typical maintenance costs for infiltration trenches are approximately 5-10% of the capital costs.

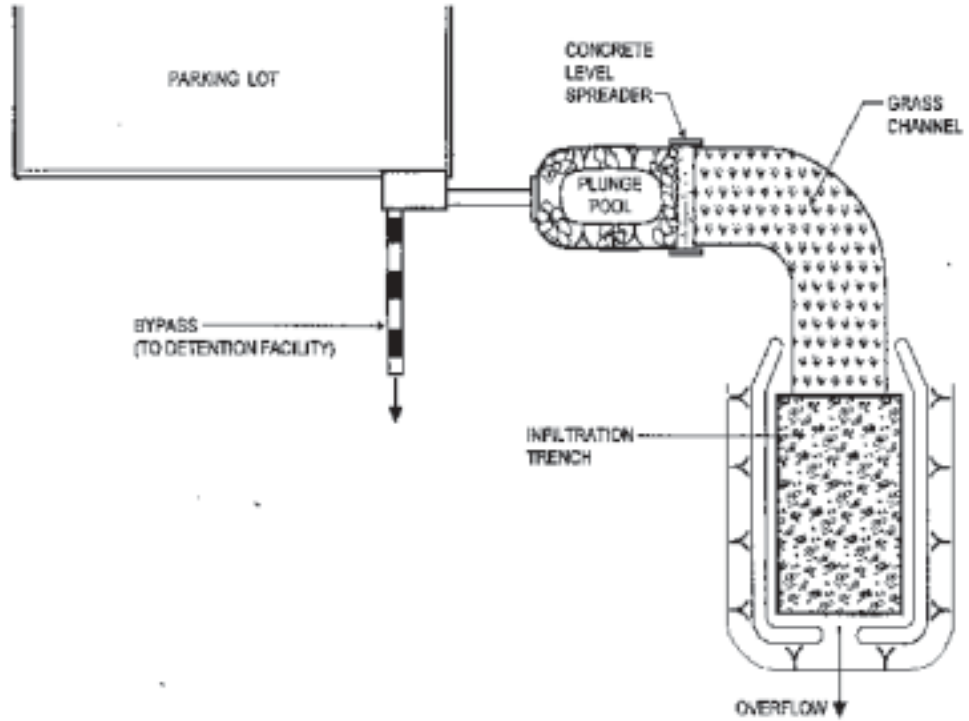
Design Specifications

- It is recommended that infiltration trenches be located in an open or lawn area
- Trenches should be designed to detain water for 24 to 48 hours
- Underlying soils should have an infiltration rate of 0.5 inches per hour or greater in order to maximize infiltration

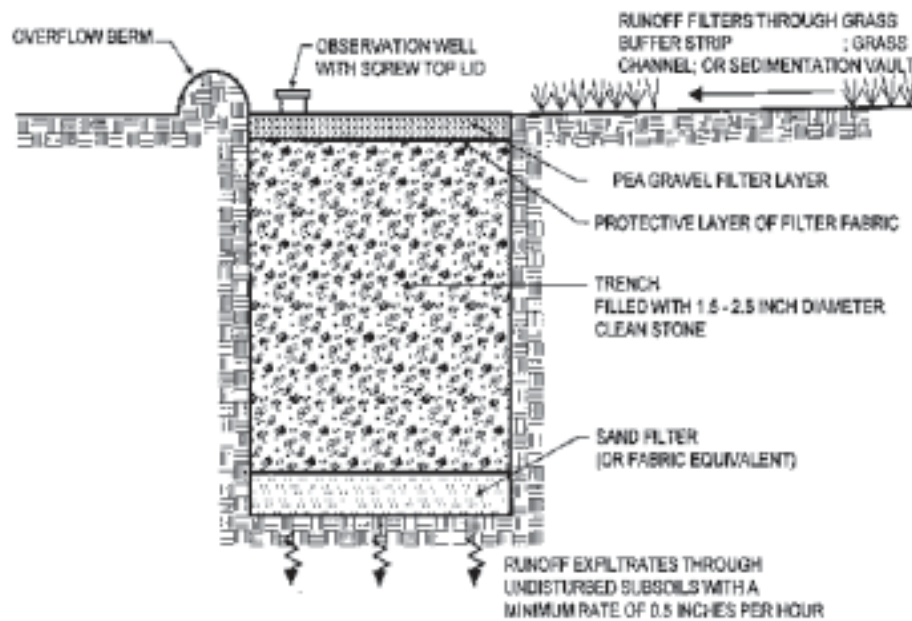
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- Trenches should be designed to treat runoff from no more than 5 to 10 acres
- Trenches should be 3 to 8 feet in depth and less than 25 feet in width
- Pretreatment is essential to the effectiveness of any infiltration practice. Infiltration trenches should include one of the following pretreatment devices:
 - If the trench receives sheet flow from an adjacent drainage area, a minimum of a 25-foot filter strip should be installed
 - If the trench is receiving runoff from both directions, a vegetated buffer strip should be installed around the entire trench
- The sides and top of the trench should be lined with a geotextile fabric. The top layer of fabric should be placed 2 to 6 inches from the top of the trench to serve as a sediment barrier
- The cut width of the filter fabric should have a minimum 12-inch overlap
- The trench should be filled with clean, washed stone with a diameter of 1.5 to 2.5 inches, which creates a void space of 40%
- A 6-inch layer of clean, washed sand should be placed on the bottom of the trench to encourage drainage
- The bottom of the trench should be at least 4 feet from the top of the water table and any bedrock
- The top of the trench above the filter fabric should be covered with pea gravel
- An observation well should be installed in all infiltration trenches, extending to the bottom of the trench and usually consists of perforated PVC pipe, 4 to 6 inches in diameter
- A bypass should be installed on the trench to accommodate larger storms
- Three main rules of infiltration trench construction:
 - Trenches should be constructed at the end of development construction
 - Smearing of the soil at the interface with the trench bottom and sides must be avoided. Smearing of the trench bottom can be corrected by raking or rototilling
 - Compaction of the trench storage media and surrounding soils during construction must be minimized

Infiltration Trench



PLAN VIEW



SECTION

Infiltration Trench Design Example

Source: Center for Watershed Protection