## 6.2.2 Infiltration Trench

An infiltration trench is a stone-filled excavation used to temporarily store runoff so that it can infiltrate into the ground. There are two types of infiltration trenches: surface trenches and underground trenches. A surface trench is open at the ground surface, exposing the trench's top layer of stone. An example of a surface trench is shown in Figure 6-2. Runoff enters this trench as overland flow after pretreatment through a filter strip or vegetated buffer. Turf or pavement covers an underground trench. An example of an underground trench is shown in Figure 6-3. Runoff enters the trench in a solid pipe; it is distributed within the trench by perforated pipe. Pipes or manhole structures may be incorporated into infiltration trenches to increase the storage capacity while minimizing the footprint of the infiltration system. When a trench is properly sited and designed, most runoff pollutants will become bound to the soil under the trench while the runoff water percolates to the groundwater table.

An infiltration trench is suitable for treating runoff from small drainage areas (less than 10 acres). Installations around the perimeter of parking lots, between residential lots, and along roads are most common. Infiltration trenches can also be incorporated beneath a vegetated swale to increase its infiltration ability.

### Design and Construction Criteria

In addition to the general design and construction criteria discussed in the beginning of this chapter, the following criteria must also be applied in the design and construction of Infiltration Trenches.

1. **Site Slopes:** The surface grade at the trench site should be 20% or less for an underground trench and 5% or less for a surface trench.

2. **Setback from Foundations:** Locate the trench at least 20 feet from any foundation located upslope from the trench and at least 100 feet from any foundation located downslope from the trench. Designers should always evaluate the possible effects of mounding to determine if greater setbacks are required.

3. **Setback from Natural Water Bodies:** Site the trench at least 75 feet away from any wetland, stream, river, lake, or coastal estuary.

4. **Erosion Control:** Construct the infiltration trench after the trench's drainage area is stabilized with vegetation and erosion controls are installed to prevent sediment from reaching the trench. An infiltration trench receiving flow from an unstabilized site will have its working life greatly reduced and may even clog prior to the completion of the development. The contractor should use sod to vegetate the filter strip surrounding a surface trench. If hydroseeding or hand broadcasting must be used, then the contractor should install a sediment barrier between the filter strip and trench until the filter strip is fully vegetated. The contractor should install a pretreatment drop-inlet sediment filter around the pretreatment inlet to an underground trench. Keep the inlet filter in place until the trench's drainage area is fully stabilized with pavement and vegetation.

5. **Trench Grade:** The grade of the trench bottom and trench base should be as close to 0% as possible. Always install the trench parallel to elevation contours.

6. **Filter Fabric Installation:** Line the trench with geotextile fabric so that the cloth will completely surround the stone-filled reservoir; it should extend from the bottom of the trench to within six to twelve inches of the surface. The cut width of the fabric should include sufficient material to have a twelve inch overlap at the top of the enclosed stone. If overlaps are required between rolls of fabric, then the upstream roll should lap a minimum of two feet over the downstream roll to provide a shingled effect.

## Maintenance

In addition to the general maintenance criteria discussed in the beginning of this chapter, the following criteria must also be applied to maintain infiltration trenches. There is no reliable estimate about the length of time an infiltration trench will function before clogging. It is probable that the effective lifetime of a trench is 10 to 15 years, depending on the maintenance of the pretreatment BMPs, the choice of filter fabric to line the trench, and the amount of fines in the sediment load to the trench. One study (Galli, 1993) found that slightly over half were not functioning as designed within 5 years. Proper design and long term maintenance is crucial to extend the life of an infiltration trench.

### 1. Maintaining a Surface Trench

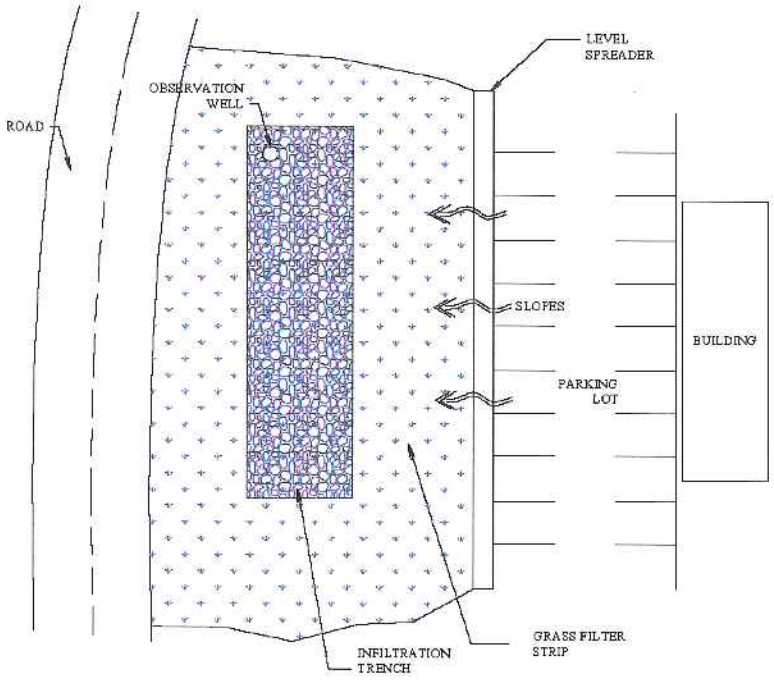
a. *Inlet Maintenance:* Remove any fallen leaves and other debris from the trench's surface inlet at least every fall after leaf drop and every spring after snow melt. If left in place, the trash and leaves will clog the trench inlet.

b. *Rehabilitation:* Clogging in a surface trench is most likely to occur near the top of the trench between the top layer of stone and the protective layer of filter fabric. Relieve this surface clogging by carefully removing the top layer of stone, removing the clogged filter fabric, installing new fabric, and replacing the top layer of stone. If the old stone is reused, it should be washed to remove any fine sediment prior to being placed back in the trench.

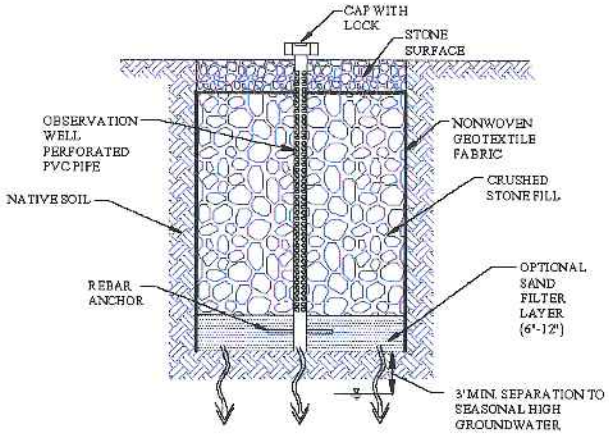
### 2. Maintaining a Subsurface Trench

a. *Inlet Maintenance:* Check the pretreatment inlets to an underground trench at least annually and clean-out any sediment, trash, oil, and grease when these materials deplete more than 10% of the inlet structure's capacity.

b. *Rehabilitation:* Clogging of an underground infiltration trench is likely to occur at the bottom of the trench. Relieve this clogging by excavating away any pavement, turf, and soil over the trench; removing the existing stone and perforated pipe,; and rebuilding the trench. Scarify the soil at the bottom of the trench with a tiller or dig-out this soil and replace it with a six-inch layer of sand. The old stone in the trench can be reused if it is washed prior to reinstalling it in the trench.




PLAN VIEW

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CROSS- SECTION

FIGURE 6-2. TYPICAL SURFACE INFILTRATION TRENCH