6. Infiltration Trench or Basin

Definition. Practices that capture and temporarily store the design storm volume before allowing it to infiltrate into the soil over a two day period. Design variants include:

- I-1 Infiltration Trench
- I-2 Infiltration Basin

Infiltration practices use temporary surface or underground storage to allow incoming stormwater runoff to exfiltrate into underlying soils. Runoff first passes through multiple pretreatment mechanisms to trap sediment and organic matter before it reaches the practice. As the stormwater penetrates the underlying soil, chemical and physical adsorption processes remove pollutants. Infiltration practices are suitable for use in residential and other urban areas where field *measured* soil infiltration rates are sufficient. To prevent possible groundwater contamination, infiltration should not be utilized at sites designated as stormwater hotspots.

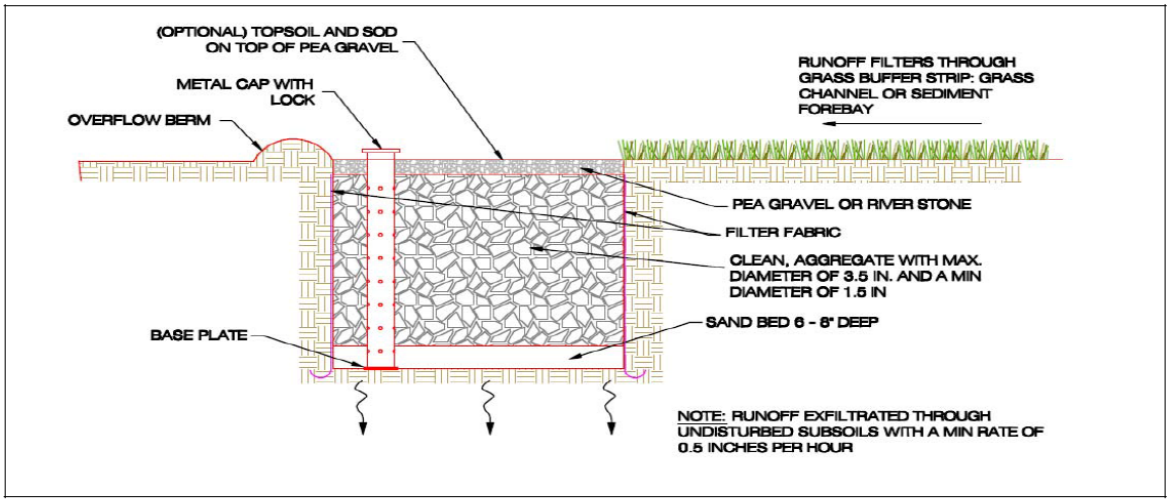

Figure 3.7.1. Example of an Infiltration Trench.

Equation 3.7.1. Maximum Surface Basin Depth (for Infiltration Basins).

$$d_{\max} = \tfrac{1}{2} i \times t_d$$

Equation 3.7.2. Maximum Underground Reservoir Depth (for Infiltration Trenches).

$$d_{\max} = \left(\tfrac{1}{2} i \times t_d\right) / \eta_r$$

Where:

d_{max}	=	Maximum depth of the infiltration practice (feet)
i	=	Field-verified infiltration rate for the native soils(ft./day)
t_d	=	Maximum drawn down time (normally 1.5 to 2 days) (day)
η_r	=	Available porosity of the stone reservoir (assume 0.35)

6. Infiltration Trench or Basin (continued)

Equation 3.7.3. Surface Basin Surface Area (for Infiltration Basins).

$$SA = DesignStorm / (d + \tfrac{1}{2}\, i \times t_f)$$

Equation 3.7.4. Underground Reservoir Surface Area (for Infiltration Trenches).

$$SA = DesignStorm / (\eta_r \times d + \tfrac{1}{2}\, i \times t_f)$$

Where:

SA	=	Surface area (sq. ft.)
$DesignStorm$	=	SWRv or other design storm volume (cu. ft.) (e.g., portion of the SWRv)
η_r	=	available porosity of the stone reservoir (assume 0.35)
d	=	Infiltration depth (ft.) (maximum depends on the scale of infiltration and the results of **Equation 3.7.1 or 3.7.2**)
i	=	field-verified infiltration rate for the native soils (ft./day)
t_f	=	Time to fill the infiltration facility (days – typically 2 hours, or 0.083 days)

Table 3.7.1. Infiltration material specifications.

Material	Specification	Notes
Surface Layer (optional)	Topsoil and grass layer	
Surface Stone	Install a 3-inch layer of river stone or pea gravel.	This provides an attractive surface cover that can suppress weed growth.
Stone Layer	Clean, aggregate with a maximum diameter of 3.5 inches and a minimum diameter of 1.5 inches.	
Observation Well	Install a vertical 6-inch Schedule 40 PVC perforated pipe, with a lockable cap and anchor plate.	Install one per 50 feet of length of infiltration practice.
Overflow collection pipe (optional)	Use 4-inch or 6-inch rigid schedule 40 PVC pipe, with 3/8" perforations at 6 inches on center, with each perforated underdrain installed at a slope of 1% for the length of the infiltration practice.	
Trench Bottom	Install a 6 to 8 inch sand layer (e.g. ASTM C 33, 0.02-0.04 inch)	
Filter Fabric (sides only)	Use woven monofilament polyprene geotextile with a flow rate of > 100 gal./min./sq. ft.	