

Permeable Paver Exercise - Solution

Task 1 Solution

Step 1: Determine the volume of runoff to be stored:

$$V = 3630(5 \text{ ac})(1.53 \text{ in/hr})(1 \text{ hr}) = 27770 \text{ ft}^3$$

Step 2: Calculate the depth of the storage reservoir required (using equation 3):

$$H = \frac{27770 \text{ ft}^3}{(0.4)\left(\frac{5 \text{ ac}}{4}\right)(43560 \text{ ft}^2/\text{ac})} = 1.28 \text{ ft}$$

Step 3: Check the storage time provided against the required infiltration time (using equation 1):

$$t = \frac{12(1.28 \text{ ft})(0.4)}{0.29 \text{ in/hr}} = 21.2 \text{ hr}$$

This infiltration time is slightly less than the desired 24-hr time which would require a storage depth of:

$$H = \frac{(0.29)(24)}{(12)(0.4)} = 1.45 \text{ ft}$$

Step 4: Re-calculate the required surface area of permeable pavers required to determine whether it can be designed within the available 1.25 acres:

$$A_s = \frac{27770 \text{ ft}^3}{(0.4)(1.45 \text{ ft})} = 47,880 \text{ ft}^2 = 1.1 \text{ ac}$$

Conclusion: 1.1 acres of permeable pavers is less than the anticipated 25% of the lot space. Therefore, a feasible permeable paver system can be designed.