

## Process Scenario #2: Collection System

You must show your work to receive full credit even if the answer is correct.

Bayou Estates' sewers are expected to last 50 years. They were put in service 5 years ago. Estimated total costs are: \$600 per foot of 12 inch sewer, \$500 per foot of 10 inch sewer and \$300 per foot of 8 inch sewer when the service lines need to be replaced. Starting now, how much money will have to be set aside each month by Cypressburg on a per household basis to replace all the mainline sewers from manhole "A" up into the Bayou Estates subdivision when the sewer line life has expired? Assume 2.5 residents per household, no funds have been collected thus far and that any interest earned from funds collected is equal to the increase of the estimated cost of replacing the sewers.

A	\$6.81 per month
<input checked="" type="radio"/> B	\$1.70 per month
C	\$1.53 per month
D	\$0.68 per month

$$\begin{array}{r} 12'' \quad 10'' \quad 8'' \\ 1000' \quad 800' \quad 2800' \\ \times 600 \quad \times 500 \quad \times 300 \\ \hline \$600,000 \quad \$400,000 \quad \$840,000 \end{array}$$

$$\begin{array}{r} \text{total} \\ 400,000 \\ 600,000 \\ \hline 840,000 \end{array}$$

$$\text{Population } \frac{5000}{2.5} = 2000 \text{ households}$$

$$\text{Time } (50-5) \times 12 = 540 \text{ months}$$

$$\frac{\$1,840,000}{2000 \times 540} = \$1.70$$

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For grader's use only	
Points (60/120)	Proper answer

\_\_\_\_\_ B \_\_\_\_\_

# Process Scenario #2: Collection System

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What kind of detention time would you expect in the Village's forcemain? Assume the pump station operates continuously at the design average flow rate

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$3 \times 5280 \times \left(\frac{12}{2}\right)^2 \times \pi \times 7.48 =$   
 $\frac{93056 \text{ gal}}{50000 \text{ gpd}}$   
 $= 0.186 \text{ d}$   
 $\frac{0.186 \text{ d} \times 24}{1} = 4.47 \text{ hrs}$

<input checked="" type="radio"/> A	4.5 hours
<input type="radio"/> B	8.9 hours
<input type="radio"/> C	0.6 hours
<input type="radio"/> D	17.9 hours

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Points (60/120)	Proper answer

\_\_\_\_\_   A