

Equivalent Dwelling Unit (EDU) Calculation Information

How does the EDU calculation work?

On average, the City's wastewater system costs consist of about 60% flow-related costs, 20% BOD-related costs, and 20% TSS-related costs. For individual commercial customers, their flow (as estimated by their average monthly winter water use) and strength factors for BOD and TSS are compared to the typical (average) flow, BOD and TSS of residential customers (i.e., an EDU). The number of EDUs for an individual commercial customer is calculated as follows:

$$\text{Commercial EDUs} = \left[\frac{CF}{RF} \times 60\% \right] + \left[\frac{CBOD}{RBOD} \times 20\% \right] + \left[\frac{CTSS}{RTSS} \times 20\% \right]$$

Where:

CF = Commercial Flow measured in hundred cubic feet (hcf) per month.

RF = Avg. Residential Flow measured in hcf/month.

CBOD and *CTSS* = Commercial BOD and TSS in pounds/month.

RBOD and *RTSS* = Avg. Residential BOD and TSS in pounds/month.

Avg. Residential Flow = 9.4 hcf/mo.

Avg. Residential BOD = 3.6 lbs./mo.

Avg. Residential TSS = 4.3 lbs./mo.

How do I calculate my pounds of BOD and TSS?

The pounds of BOD and TSS for individual commercial customers is based on three factors:

- Your average monthly winter water use (in hcf),
- Your BOD/TSS strength factors (see Table 1)
- A conversion factor that reflects several unit conversions and the difference in actual treatment plant effluent received vs. total customer water usages.
 - For BOD this constant is 0.002173.
 - For TSS this constant is 0.002630.

Table 1 – Effluent Strength Factors

| Customer Class ¹ | BOD | TSS |
|-----------------------------|---|---|
| | Average Strength Factor ³ (mg/l) | Average Strength Factor ³ (mg/l) |
| Bars without Dining | 200 | 200 |
| Brewery | 1,000 | 600 |
| Car Wash | 20 | 150 |
| Dorms | 175 | 175 |
| Hospital & Convalescent | 250 | 100 |
| Hotels w/o Dining | 310 | 120 |
| Hotels with Dining | 500 | 600 |
| Industrial Laundry | 670 | 680 |
| Laundromat | 150 | 110 |
| Markets/Bakeries | 800 | 800 |
| Mortuary | 800 | 800 |
| Restaurants | 1,000 | 600 |
| School | 130 | 100 |
| All Other | 175 | 175 |

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How does the BOD and TSS calculation work?

Here's an example for calculating the pounds of BOD and TSS for a Laundromat (using a hypothetical hcf/mo. of 100 hcf):

$$\begin{aligned} \text{BOD} &= 100 \text{ hcf/mo.} \times 150 \text{ mg/L BOD} \times 0.002173 \\ &= 32.6 \text{ lbs. BOD/mo.} \end{aligned}$$

$$\begin{aligned} \text{TSS} &= 100 \text{ hcf/mo.} \times 110 \text{ mg/L BOD} \times 0.002630 \\ &= 28.9 \text{ lbs. TSS/mo.} \end{aligned}$$

Can you show me how the entire EDU calculation works?

Here's an example for calculating the EDUs for a Laundromat (using 100 hcf/mo., BOD of 32.6 lbs./mo., and TSS of 28.9 lbs./mo.):

$$\begin{aligned} &\left[\frac{100 \text{ hcf/mo.}}{9.4 \text{ hcf/mo.}} \times 60\% \right] + \left[\frac{32.6 \text{ lbs. BOD/mo.}}{3.6 \text{ lbs. BOD/mo.}} \times 20\% \right] + \left[\frac{28.9 \text{ lbs. TSS/mo.}}{4.3 \text{ lbs. TSS/mo.}} \times 20\% \right] \\ &= \quad \mathbf{6.38 \text{ EDU}} \quad + \quad \mathbf{1.81 \text{ EDU}} \quad + \quad \mathbf{1.34 \text{ EDU}} \\ &= \quad \mathbf{9.53 \text{ EDU}} \end{aligned}$$

What is the sewer bill for this example?

The monthly sewer bill in this case is EDUs times the Fixed Charge of \$26.84 plus 100 hcf/mo. times the Volumetric Rate of \$0.65/hcf:

$$\begin{aligned} &(9.53 \text{ EDU} \times \$26.84/\text{EDU/mo.}) \\ &+ (100 \text{ hcf/mo.} \times \$0.65/\text{hcf/mo.}) \\ &= \$320.78/\text{mo.} \end{aligned}$$