

EVE 420 Solid Waste System Design

Waste Generation Example Problem

Problem Statement:

From the following data, estimate the unit waste disposal rate per week for a residential area consisting of 1200 homes. The average occupancy is 3.5 persons per home. The observation location is a local transfer station that receives all of the wastes collected for disposal. The observation period was one week.

Data:

- Number of compactor truck loads = 9
- Average size of compactor truck = 20 yd³
- Number of flatbed loads = 7
- Average flatbed volume = 2 yd³
- Number of loads from individual residents' private cars and trucks = 20
- Estimated average volume per domestic vehicle = 8 ft³

Solution:

Step 1: Setup a computation table to estimate the total weight of waste disposed during this week.

Waste Source	Number of Loads	Average Volume, yd ³	Specific Weight, lb/yd ³ †	Total Weight, lb
Compactor Truck	9	20	500	90,000
Flatbed Truck	7	2	225	3,150
Private Vehicle	20	0.3	150	900
Total, lb/week =				94,050

† based on estimates of average vehicle volume and weight

Step 2: Determine the unit waste disposal rate.

$$\text{Unit or PerCapita Disposal Rate} = \frac{94,050 \text{ lb/wk}}{(200 \text{ homes}) (3.5 \text{ persons/home}) (7 \text{ days/wk})}$$

$\text{Unit or PerCapita Disposal Rate} = 3.2 \frac{\text{lb}}{\text{capita} \cdot \text{day}}$
