

**CE326**  
**Principles of Environmental Engineering**  
Solid Waste Homework

1. The estimated amount of municipal solid waste generated in the U.S. in 2003 was 236 million tons. If the municipal solid wastes were placed (with compaction) on football fields of average dimensions (60 x 120 yards including the end zones) to a depth of 10 yards, how many football fields would be needed to accommodate all of the municipal solid waste produced in the U.S.? Use a compacted density of 410 Kg/m<sup>3</sup>.
2. The typical composition of municipal solid wastes in the US excluding yard waste, ashes and masonry is shown in the following table including percent of wet weight, wet density, and moisture as discarded for each component:

<u>Component</u>	<u>% of Wet weight</u>	<u>Wet Density, Kg/m<sup>3</sup></u>	<u>% Moisture</u>
Food Wastes	8.6	290	75
Paper & Cardboard	47.4	85	16
Plastics	10.5	65	2
Wood	7.5	240	20
Rubber & Leather	3.0	145	5
Textiles	3.6	65	10
Glass	8.5	195	2
Ferrous Metal	8.4	320	3
Nonferrous Metal	2.5	160	3

Based on above analysis, calculate:

- a. The weight percent of each component on a dry weight basis.
- b. The overall average moisture content.
- c. The volume occupied by 1 ton solid wastes as discarded.
- d. The volume occupied by 1 ton on a wet weight basis after normal compaction based on the normal compaction ratios given in Table 8-9 (p. 670) in Davis and Cornwell.
- e. The volume occupied by 1 ton solid wastes (as discarded) after incineration of the combustible components. Assume that the normal compaction ratios apply for the glass, ferrous metal and nonferrous metal and assume that the ash remaining after incineration will have a mass equal to 10 percent of the dry weight of the combustible materials and a density of 1,500 Kg/ m<sup>3</sup>.