

PROBLEM FORMULATION II (LAND USE)

(Land Use and Development). The Birdeyes Real Estate Co. owns 800 acres of prime, but undeveloped, land on a scenic lake in the heart of the Ozark Mountain. In the past, little or no regulation was applied to new developments around the lake. The lake shores are now lined with clustered vacation homes. Because of the lack of sewage service, septic tanks, the septic tanks have resulted in a severe water pollution problem.

To curb further degradation in the quality of water, country officials introduced and approved some stringent ordinances applicable to all future developments.

1. Only single-, double-, and triple-family homes can be constructed, with the single-family homes accounting for at least 50% of the total.
2. To limit the number of septic tanks, minimum lot sizes of 2, 3, and 4 acres are required for single-, double-, and triple-family homes.
3. Recreation areas of 1 acre each must be established at the rate of one area per 200 families.
4. To preserve the ecology of the lake, underground water may not be pumped for house or garden use.

The president of Birdeyes Real Estate is studying the possibility of developing the company's 800 acres on the lake. The new development will include single-, double-, and triple-family homes. He estimates that 15% of the acreage will be consumed in the opening of streets and easement for utilities. He also estimates his returns from the different housing units:

Housing Units	Single	Double	Triple
Net return per unit (\$)	10,000	15,000	20,000

The cost of connecting water service to the area is appropriate to the number of units constructed. However, the country stipulates that minimum of \$100,000 must be collected for the project to be economically feasible. Additionally, the expansion of the water system beyond its present capacity is limited to 200,000 gallons per day during peak periods. The following data summarize the cost of connecting water service as well as the water consumption assuming an average size family:

Housing Unit	Single	Double	Triple	Recreation
Water service cost				
Per unit (\$)	1000	1200	1400	800
Water consumption				
Per unit (gal/day)	400	600	840	450