

**THE UNIVERSITY OF ZAMBIA**  
**SCHOOL OF ENGINEERING**  
**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**  
**CEE 4412: ENVIRONMENTAL ENGINEERING I**

**ASSIGNMENT NO. 04.**

**DUE DATE: 05/11/2021 17:00HRS**

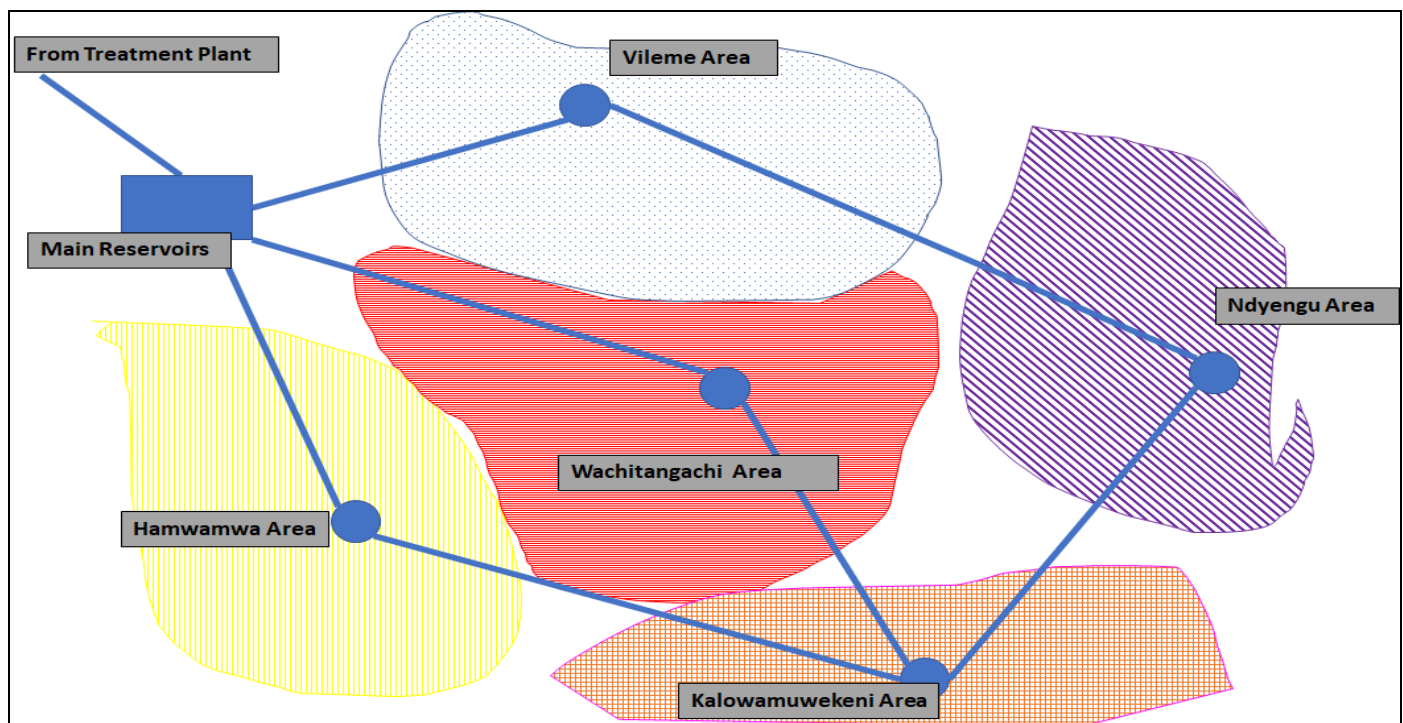
A wastewater treatment plant is being designed for Chaona District which is a new district in Luopili Province. The layout of the district is presented in Figure 1. The demographic data for the various areas within the district is presented in Table 1. The raw sewage quality from the estate is expected to have an average BOD concentration of 400mg/l and Faecal Coliforms counts will be in the vicinity of 1,000,000 CFU/100ml.

The design and construction works will take a period of three years. The life span of the project is anticipated to be 20 years and the population growth is linear. Two design options will be investigated as follows:

1. A conventional wastewater treatment plant; and
2. A full wastewater stabilization pond system.

Your task is to come up with the above two designs. In 1), you are required to provide a full layout of the system but you are only designing the primary, biological and secondary treatment units. In 2) you are required to present a full layout of the system but you are only designing the ponds.

**Note: Where information is not given, make and clearly state your assumptions.**



*Figure 1: Layout of Chaona District*

*Table 1: Demographical data for the various areas in Chaona District to be serviced by the proposed water treatment plant*

Area	Type of Area	Population (No.)
Vileme	Medium Cost	170,000
Wachitangachi	High Cost	80,000
Ndyengu	Low cost	120,000
Kalowamuwekeni	Peri-Urban	60,000
Hamwamwa	Low Cost	40,000

*Happy Independence Day*