1. A conventional wastewater treatment plant was designed for an average flow of 35000 m3/d. The process train includes preliminary treatment (bar rack and aerated grit chamber), primary sedimentation, conventional activated sludge and a final clarifier. Develop the construction cost of the plant and annual operation and maintenance costs. Add in the construction costs: 28 % for piping, electrical, and site preparation and 30% for engineering and construction supervision and contingencies. The sludge treatment costs are not included in this project. Hint: Use equations given in Appendix C in your textbook.
2. A service area has a total population of 30000 residents. The total length of the sewerage system is 20 m per resident. The typical length distribution of average sewer sizes are 20 cm, 70 %; 30 cm, 20 %; 40 cm, 5 %; and 50 cm, 5 %. Calculate the equivalent pipe diameter. If infiltration/inflow is 1450 L per d per cm per km, express the infiltration/inflow in Lpcd.
3. Draw a flowchart for a typical activated sludge wastewater treatment system including all units for sludge treatment (**use AUTO-CAD**).
4. A wastewater treatment was designed for a flow of 11400 m3/d. The construction of cost of the facility is $8 million. The annual operation and maintenance cost is $300 000. Calculate the unit treatment cost in $/m3.