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"Design And Analysis Of Sewage Treatment Plant For Sanskrithi School Of Engineering, Puttaparthi"

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ABSTRACT: Our instructive organization don't have appropriate treatment unit for treating the sewage made by it. So it is needed to develop a Sewage Treatment Plant with adequate ability to treat the sewage. This paper manages the legitimate plan of a total treatment of sewage and its significant segments, for example, Screen chamber, Skimming Tank, Primary Sedimentation Tank, ASP (Activated Sludge Process) Tank, Secondary Sedimentation Tank and Disinfection of sewage. By the execution of this plan the whole sewage treatment of our instructive establishment should be possible viably and effectively.

KEYWORDS: Sewage treatment plant, Primary Sedimentation Tank, ASP(Activated Sludge Process) Tank, Secondary Sedimentation Tank, Disinfection

I. INTRODUCTION

Sewage treatment is the process of removing contaminants from wastewater and household sewage, both runoff (effluents) and domestic. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce a treated effluent and a solid waste or sludge suitable for discharge or reuse back into the environment. This material is often inadvertently contaminated with many toxic organic and inorganic compounds.

II. OBJECTIVES OF THE STUDY

There are three major objectives of our study-

- Physical, chemical and biological characterization of wastewater.
- Comparison with the prescribed standards.
- Design of a sewage treatment plant by designing all its units.

III. STUDY AREA

SSE college is located near Beedupalli village, Puttaparthi , Andhra Pradesh 515134. The coordinates of SSE college are 14.1337°N 77.7787° E.

Google map of Sanskrithi school of Engineering

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IV. CHEMICAL TEST TABLE

Table -1: Chemical Quality of Raw and Standard sewage

Sl.no	Parameters	Raw Sewage	Standard
1.	pH	6.4	5.5 – 9.0
2.	BOD	200mg/l	≤20mg/l
3.	COD	600mg/l	≤250mg/l
4.	Oil and grease	50 mg/l	≤5 mg/l
5.	Total suspended solids	600 mg/l	≤30 mg/l
6.	Nitrogen	61 mg/l	≤5 mg/l
7.	Ammonia nitrogen	50 mg/l	≤50 mg/l
8.	Total phosphorous	5 mg/l	≤5 mg/l
9.	Total coli form	100000 MPN/ml	≤1000 no/ 100ml

V. DESIGN CALCULATIONS OF SEWAGE GENERATION

The current population of SSE has been calculated for the estimation of the total sewage generation.

Ultimate design period= 30 years.
Approximately, present population in SSE =2548.
water consumption = 135lpcd

TOTAL DISCHARGE CALCULATION:

FOR HOSTEL:

Population = 801 persons
Per capita demand = 135 per head
Water demand = 801 x 135
= 108135 l/day
= 0.0012 m^3/day
Sewage demand, Q_{S1} = 0.8 x 0.012
= 0.001 m^3/sec

FOR COLLEGE:

Population = 2548-801 =1747 persons
Per capita demand = 45 per head
Water demand = 1747 x 45
= 82109 l/day
= 0.0009 m3/day
Sewage demand, Q_{S2} = 0.8 x 0.0009
= 0.00076 m^3/sec
Total Sewage Demand
Q_S= 0.001+0.00076=0.0017 m^3/sec.
Q=3.5 x 0.0017
= 0.0059 m^3/sec.

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Table -2: Design detais of screening

S.no	Design parameter	Value
1	Pick flow through core screen	0.0059m^3/sec
2	Velocity through the screen	0.9 m/s
3	Clear opening area	0.012 m^2.
4	Clear opening between bars	0.03m
5	No. of clear opening in Coarse Screen	21
6	Width of channel for coarse screen	0.83m
7	Depth of channel for coarse screen	0.9m

Table -3: Design details of skimming tank

S.no	Design parameter	Value
1	Peak flow of sewage in skimming tank	509.76 m^3/day
2	Area of skimming tank	0.01m^2
3	Width of skimming tank	0.08m
4	Length of skimming tank	0.12m
5	Depth of skimming tank	1.5m

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Table -4: Design details of sedimentation tank

S.no	Design parameter	Value
1	Quantity of sewage	0.0059m^3/sec
2	Volume of primary sedimentation tank	42.49m^3
3	Detention period	2 hours
4	Surface area of primary sedimentation tank	10m^2
5	Depth of primary sedimentation tank	4.3m
6	Diameter of primary sedimentation tank	4m

Table -5: Design details of aeration tank

S.no	Design parameter	Value
1	Depth of aeration tank	3.5 m
2	Length of aeration tank	1.2 m
3	Width of aeration tank	4 m

Table -6: Design details of secondary sedimentation tank

S.no	Design parameter	Value
1	Quantity of sewage	509 m^3/day
2	Volume of secondary sedimentation tank	65m^3
3	Detention period	2 hours
4	Surface area of secondary sedimentation tank	20.36 m^2
5	Depth of secondary sedimentation tank	3.5m
6	Diameter of secondary sedimentation tank	5m

VI. CONCLUSIONS

A fruitful specialized task includes incorporation of different fields. This is an endeavor to consolidate a few parts of ecological, organic and synthetic and structural engineering.The plant is planned consummately to meet the future extension for the following 30 years as per Indian Codal arrangements. This undertaking comprises the plan

of the total segments of a Sewage Treatment Plant from getting chamber, screening chamber, coarseness chamber, skimming tank, sedimentation tank, auxiliary clarifier for sewage.

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