A Survey on Sewage Treatment Plant For Malkapur City

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Abstract- *The town is located at the intersection of latitude 20°88Nandlongitude76°20'30"Ein Maharashtra state. It is also known as the "Vidharbh acha Praveshdwar" area under town boundary is 11.89 sq.km, with 14,098 households and 68,431 population as per Census 2011.*

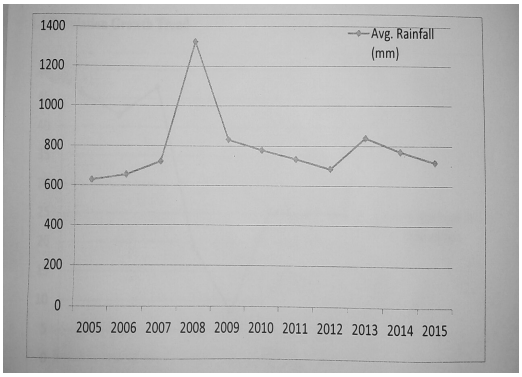
Malkapur is a Municipal town and district head quarter situated at the western border of Vidarbha region, 500 km from the state capital, Mumbai. Being the administrative headquarter the district level, inhabitants have expectations from Buldhana for all levels of support and infrastructure requirement for their development. For the same reasons malkapur town development becomes even more important to fulfill everyone's hopes and future prospects.

Keywords- DO, BOD, COD sewage, cloudiness, etc.

I. INTRODUCTION

The town is located in western half of the district and is connected to all important towns by roads. Malkapur, Sholapur (Chikhli) State Highway divides the town into two parts. Malkapur is connected railway station and Nandura 33 km. Khamgaon, an industrial town and an emerging corporate tehsil is 51 km away from Malkapur.SH176and SH 24 connects other major cities Solapur Nashik of Maharashtra and Baitul, in Madhya Pradesh. Aurangabad is the nearest airport which is 140 km away.

The climate of the town is very pleasant. Malkapur is generally dry and hot. It is the coldest place in Vidarbha region considered to be healthy. Maximum temperature during summers recorded is 41.4°C and during winters 10°C. The average annual rainfall in the town is 655 mm. Rainfall graphs shows a decline in rain fall every year after 2005. Hailstorms are common during February to April and also during the post monsoon period from November to January. Pre-monsoon ground water depth in is about 10.16 m and post-monsoon is 1.26 m below the ground level.



Graph 1.1:- percent increase in population of the town

Humidity

The air is generally dry, except the South west monsoon season when the relative humidity is high, in the district. The relative humidity is between 25 and 30 per cent in the afternoons in the summer season.

Cloudiness

The skies are heavily clouded during the south-west monsoon season. It remains clear or lightly clouded rest of the year.

Winds

Winds are generally light with some increase in speed in the latter part of the summer and in monsoon season. In the post-monsoon months the wind blows mostly form east or north-east. With the progress of the season wind form northwest directions become predominant. During the south-west monsoon season winds are mainly from directions between south-west and north-west. The speed of wind observed 5.8 m/sec lowest in the month of November and highest 14.9 m/sec in the month of May.

II. LITERATURE SURVEY

The wastewater generated by a community is called "sewage," which is a mixture of domestic wastewater, industrial wastewater (where the industry is discharging its wastewater in the same sewage system) and rain water, (where

a single sewer system exists for the wastewater and storm water (Garg S.K., 1976:Environmental Engineering}.

In the developing/underdeveloped countries of the world, more than 90% of the sewage is discharged untreated in the environment due to lack of proper wastewater collection and treatment facilities (Kerri, K.D. 2002}. The quantity and strength of wastewater is governed by the size and socioeconomic status of the population of the community. The composition of sewage varies greatly and its characterization is important for determining the size and designing of treatment plant (Amar M. Dliere, Chandrasekhar B. Pawar,Pratapsingh B. Pardeshi and Dhanraj A. Patil, "Municipal waste water disposal in Pune city - An analysis of air and groundwater pollution", current science, vol. 95, no. 6, 25 September 2008}.

2.1 History

The first water disposal system was developed very early in history. The first known sewer was a Babylonian seal cylinder which dates back to the Seventh Century BC (Metcalf & Eddy, Wastewater Engineering, 1972}. Remains of wastewater disposals and sanitary sewers have been found in the cities of ancient Crete and Assyria, as well as in the city of Jerusalem. The Ancient Athens reused their sewage for irrigation purposes. Storm water sewers built by the Romans are still in use even today. Yet, it is thought that very few personal homes were connected to the sewers, and instead, most of the facilities were public.

A few centuries later, storm sewers in the form of gutters and open channels were developed. Following multiple Cholera outbreaks in large cities such as London, the 19thcentury saw the development of modem sewer systems. By 1910, the United States had built 25,000 miles of sewer lines, though most had proportions that were unnecessarily Large. Through the 19th century, people were much more concerned about how the polluted water was obstructing their agricultural and manufacturing ventures than their health. In 1880, Eberth discovered bacillus in typhoid fever and began, for the first time, to provide a link between bacteria found in pollution and disease (Metcalf & Eddy, Sewerage and Sewage Disposal: A Textbook, 1930). Yet, it was not until the 20 century that people truly became more aware of the importance of treating wastewater for health reasons, and, hence, built more sewers and wastewater treatment facilities.

On January 1st of 1970, the National Environmental Policy Act (NEPA) was signed to protect the environment. In 1972, the Water Pollution Control Act Amendments extended the role of the federal government in water pollution control, which greatly increased the federal funds for the construction of waste water treatment plants.

In today's cities, water is pumped from wells, rivers, streams, and reservoirs to water treatment plants, where it is treated and distributed to customers. After it is used, the water, which has now become wastewater, travels through customers' sewer pipes to wastewater treatment plants, where it is either treated and returned to streams, rivers, and oceans or reused for irrigation and landscaping. At the plant, equipment and processes remove or destroy harmful materials, chemical compounds, and microorganisms from the water. Pumps, valves, and other equipment move the water or wastewater through the various treatment processes, after which they dispose of the removed waste materials, first glance, the treatment of wastewater is actually a requires great care.

Table no 01: Parameter based value

Sr. No.	Parameter	Value (mg/l except PH)approximate average	
		19-01-2019	18-03-2019
1	DO	5	Nil
2	BOD (5 days at 20°C)	-	42.2
3	COD	9.68	22.01
4	Total Suspended Solids (TSS)	635.33	93.17
5	pH	7.9	7.6
6	Nitrate	9.11	0.295
7	Phosphate	0.2	0.102

III. OVERVIEW OF SEWAGE METHODOLOGY AND FINDINGS

Lakes are important part of urban ecosystem. Though relatively small in size, lakesperform significant environmental, social and economic functions, ranging from being a source of drinking water, recharging ground water, acting as sponges to control flooding, supporting drinking water, recharging ground water, acting as sponges to control flooding, supporting biodiversity and providing livelihoods. Water in lakes is an easily available source of water for the needs of many sectors of economy such as agriculture, domestic and industrial. These water bodies, whether man-made or natural, fresh or brackish play a very vital role in maintaining environmental balance in urban environments.

At present in India, lakes and wetlands are extremely in bad shape and are in varying degrees of environmental degradation. Theses Water bodies are neglected and destroyed without knowing their environmental, social and economic

significance. Today these water bodies are either encroached or full of sewage and garbage. Because of unplanned development, much of the landscape around the lakes has been covered by impervious surfaces. As a result, instead of rainwater, the sewage dandy effluents are filling up in urban water bodies. Due to deposition of sewage, waste and get chocked even which low rainfall it overflow into the channels and during high rainfall causing floods in the city. It is disappearance of these. Sponges of the city that have exacerbated floods and sharpened the pain of droughts.Considering the present bleak water scenario of the Indian cities, today we need our urban lakes and wetlands more than ever.

Methods of Population Forecasting

There are many methods for population forecasting suitable for the town these methods are given below:

a) Arithmetical Increase Method: In this method the average increase of population per decade is calculated form the past records and added to the present population to find out population in the next decades. This method gives low value and is suitable for well settle and established communities.
b) Incremental Increase Method: In this method the increment in arithmetical increase is determined form the past decades and the average of that increment is added to the average increase. This method increases the figures obtained by the arithmetical increase method.
c) Geometric Progression Method: In this method the percentage increase is assumed to be the rate of growth and the average of the percentage increase is used to find out future increment in population. This extension has to be done carefully and it requires vast experience and good judgment. This method gives much higher value and mostly applicable for growing towns and cities having vast scope for expansion.

Existing Situation of Water Bodies

Malkapur is located in the south east direction of the town. All the lakes in town are under threat. The greenish lake water is polluted by washing of clothes on the bank and the land surrounding to the lake is polluted by open defecations as well as open disposalof solid waste. Due to the topography of the town, the lakes receive waste water generated from the surrounding areas throughout the year. Lake water was used as drinking water source before 30 years and also for agricultural purpose.

- **Untreated Waste Water Disposal**

The waste water from surrounding area enters into the lakes without filtration. Along the waste water, hazardous content also enters into the lakes without any treatment which influence the quality of the lake water and ultimately causes water pollution in the lakes. Also the water from surrounding agricultural land enters into the lakes (Lake) which contains little amount of the pesticides and fertilizers. Hazardous content in the lake water increases the Biological Oxygen Demand (BOD).

- **Solid Waste Disposal**

Slum encroachment exists on the lake periphery. Open solid waste disposal and open defecation is done on the lake periphery due to day to day activities of the slum dwellers. The solid waste contains both bio-degradable and non-bio degradable waste (plastic bags, glass, dry and wet waste form households, etc.). This causes land pollution on the periphery of the lake. Some of the waste enters into the lake which pollutes the lake water.

- **Slum Encroachment**

Rapid urbanization attracts the people in the town and many of these have encroached on the lake periphery. The major part of the west bank of Lake is encroached by the slum. Due to slum encroachment, the periphery is polluted day to day to day activities of the slum dwellers. At present, the slum on the periphery of the lake having 97 huts and 281 populations is developed.

- **Bathing and Cloth Washing**

Due to unavailability of services like water supply and sanitation to the slum dwellers, bathing, cloth washing and open defecation is done on the lake bank. These activities contaminate the lake water as well as pollute the peripheral land around lake.

- **Eutrophication and Vegetation**

Eutrophication is the ecosystem's response to the addition of artificial or natural substances, mainly phosphates, through detergents, fertilizers, or sewage, to an aquatic system. The waste water from sewage, cloth washing, idol immersion and surface runoff from agricultural land, creates eutrophication in lakes. Due to eutrophication water quality decline and leads vegetation in the lake.

- **Sample Test report of Sewage**

To check the quality of sewage, tests were conducted on the various sewage samples in the laboratory of STP at Shegaon, Dist. Buldana.

As per the sample testing 19th Jan 2018

- Water is greenish turbid with fine suspended solids
- Increased COD & nitrate.
- Dissolved Oxygen (DO) is within permissible limit i.e. 5 mg/1 or more

As per the sample testing in 11th March 2018

- Water is greenish turbid with fine suspended solids & offensive smell
- Increased COD
- Deficit of oxygen with high BOD

IV. CONCLUSION

Understanding the nature of wastewater is fundamental to design appropriate waste water treatment process,to adopt an appropriate procedure, determination of acceptable criteria for the residues, determination of a degree of evaluation required to validate the procedure and decision on the residues to be tested based on toxicity therefore, it is necessary to ensure the safety,efficacy and quality of the treated wastewater. Based on the nature of wastewater,it is suggested whether primary, secondary and tertiary treatment will be carried out before final disposal. Contamination of water bodies is thus prevented.

The problem of scarcity of water in the town will be encountered as the treated water can be reused for agricultural purpose, for car washing in garages, washing roads, etc. The ultimate goal of wastewater management is the protection of the environment in a manner commensurate with public health and socio-economic concerns. Sludge may be utilized in fields as nutrients for plants.

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