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Designing of Water Supply and Sewerage System in a Newly Added Village in Pune Municipal Corporation [PMC]: Lohagaon

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Abstract

The requirement of water is continuously increases with respect to the continuous increase in population. In Pune Megacity the drinking water demand is continuously increasing due to the speedy town planning, urbanization, rapid growth in population, institution, factories, township planning, IT and BT sectors, commercial divisions. All around and balanced drinking water is low even if the drinking water is provide as per the growing population. High water losses while circulation, distribution and sharing out. With the water supply there is a huge problem regarding with drainage systems. For urban infrastructure development we have great need of sewerage system. Sewerage systems have same and equal important with Water supply system. Monitoring the water supply and distribution of water has provided valuable information to evaluate vital sources of water to extract suitable action to find out per capita water consumption and water losses as we selected a Lohagaon to Design water supply and sewerage system.

Keywords *- PMC, Lohagaon, Pune Municipal Corporation, Water supply, Sewerage system.*

I. INTRODUCTION

The overall population of world as well as India is increases since the last two decades which results increasing the water demand. At the same time water consumption and waste water is also increasing especially in metro cities due to different kind of movements and developments such as urbanization, Industrialization, town planning, IT and BT sectors and commercialization. The lack of water is the weighty problem in all over the world and around 1 billon population is without safe drinking water. As everybody knows newly addition of 34 villages in Pune municipal corporation [PMC]. Pune Municipal Corporation [PMC] is responsible for providing infrastructure services within the area of legal power. The jurisdiction or legal power area of PMC [as authority] is hugely spread over an area about 332.5 square kilometers and having a population about 50 lacks as per 2010.Within the frame of reference, the authority proposed to develop and achieved water supply to all its consumers. Newly added 11 villages have population about 8 lacks and proposed 23 villages covering a population of 4 lacks. As we see in news and all the other social media platforms in daily life that people are losing their health because of unsafe water. Also due to the open sewer and improper management of daily

waste water. This helps to creation of slum areas. That's why water supply and sewerage system management has become huge problem now days.

II. LITERATURE REVIEW

In this paper they give the system for improving water supply system. How to reduce water losses in transportation and how to eliminate them are given in very different way. This paper affords an administration idea to enhance the environment friendly use of water sources in water grant systems. This is primarily based on administration tools, venture administration and is prepared into three stages of planning (strategic, tactical and operational), following definitions of theories of strategic planning. This paper small print these stages of planning, with a center of attention on strategic management, i.e., motion plans at the strategic level, describing a methodology and detailing the fundamental duties that need to be executed, as properly as the major equipment that can be used in every task, such as SWOT evaluation and Balanced Scorecard. [1]

This paper affords a planning strategy for collecting, analyzing, and mapping consuming water carrier facts at the village, block, and district ranges in Pune district, Maharashtra, India. The planning strategy created cell software for facts series with the aid of *gram sevaks* at the village level. It employed ranking strategies developed with district officers to prioritize villages with the best needs, cluster evaluation to distinguish one-of-a-kind sorts of needs, and geographic data machine (GIS) mapping to visualize the spatial distribution of these needs. This evaluation indicates that there are excessive tiers of spatial heterogeneity in water offerings within, as properly as between, blocks however additionally that there are vast patterns of priorities for planning and coverage purposes. These priorities consist of water provider wants in the Western Ghats, an aggregate of water supply and provider wants in dissected plateau lands, supply strengthening in the Japanese plains, and neighborhood warm spots in peri-urban areas. Based on this Pune district case study, the Government of Maharashtra is trying out the strategy in 5 extra districts. [2]

This paper shows the demand of consuming water is consistently growing in the Pune Metropolitan Region. Growth of speedy urbanization, population, business units, institutions, IT and BT and township planning are the predominant factors. Supply of consuming water is deliberate in accordance to the increase of populace however the insurance and equitable distribution of water is low. Water loss at some point of transmission and distribution is additionally higher. Private area participation is most pressing want to limit water leakages, enhance the insurance and equitable distribution of water in Pune Metropolitan Region. Restructuring tariff will enhance the water use and limit wastage. [3]

The study of these paper shows In order to fulfill the water demand of the continually developing population, it is imperative to furnish the adequate and uniform volume of water via the designed community of pipes. This paper shows the various types of population forecasting and methods of water distribution systems. Also steps in designing water distribution methods in details. For this reason the small print furnished by using the IPH (IRRIGATION AND PUBLIC HEALTHE DEPARTMENT) department, Indora Himachal Pradesh have been followed. The normal aspects of the vicinity like records about the foremost water source, populace of the area, demand of water, requirement of the pumps, distribution community and water tanks are integral for efficient sketch of water distribution system. According to the authorities of Himachal Pradesh the per capita consumption of water with the aid of an Individual man or woman is 70litres per day and format has been made

accordingly. This work highlights the manner carried out on sketch of water furnish gadget for a vicinity named KATHGARH with the assist of all this records the layout of the water furnish scheme for the vicinity with the assist of software program "EPANET". This design of the water furnish scheme for ideal provide of water is environment friendly to meet the each day requirement of water in this area. [4]

In this paper study of the find out about of water useful resource repute in Mumbai and it outlines the want for reforms in city water useful resource administration in line with the effectively goals. The common emphasis is made right here on volume aspects, however the satisfactory factors are additionally linked with quantity. These paper shows detail study about water distribution method in Mumbai covering each and every point. Understanding the present day system of water useful resource management in Mumbai, in phrases of water provide vis-à-vis demand, water tariffs and water establishments. [5]

This paper shows the detail designing of water supply of InNelatur village, which shows methodology of designing of water supply system. Survey and maps, tentative layout, calculation of pipe lines diameter required, design procedure in details manner of village as a case study. InNelatur Village, which is the case study, the current gadget of water grant is intermittent grant and a tree gadget or useless give up machine community is adopted for water distribution. This device may also now not be ample in the coming years to cater to the growing water demand of the village. Therefore this learn about is about the evaluation and layout of the water distribution community of this place the use of EPANET software, which helps to plan the water distribution community for any required area, for any home residence maintain usages or any business purposes. EPANET, which consists of a laptop program, does the simulation of hydraulic conduct and water high-quality conduct with in the strain pipe networks.. The evaluation of the distribution community is performed primarily based on a number of public demands, portions of inflows and out flows of the over-head reservoirs. This evaluation gives the statistics about quite a number demands, losses, and makes use of the public. The diagram of a new community of provide will make the municipality be conscious of the new demands, price of amplify in the demands. The sketch is made preserving in view of the populace boom rate, and the improvement in the village. The graph brings out an enhancement in the present community. [6]

This paper shows the designing of sewage system for residential building consisting a basic building water supply design. The nine-story building in a certain district is taken as the lookup object, and the graph evaluation is carried out in accordance to the applicable statistics of the constructing and the residing wants of the residents to affirm the feasibility. According to the 4 components of water supply, drainage, furnace safety and rainwater drainage, the water grant and drainage challenge of the constructing is analyzed, and the building factors are quickly given. It can efficaciously improve the graph stage and best of the water grant and drainage machine of the building, and facilitate the use of home water for residents. [7]

The paper provides a superior modeling and diagram software program software for sewer network-sewerGEMSV8i; it permits initiatives to be entire in an extraordinarily brief time, with excessive effectively and much less prices. In the existing find out about the sewer community has to be designed for Zone 10, of Belagavi city. In the format of a sewerage device the sewer community is the primary unit taking location persistently in the graph activity. Any financial savings throughout the plan of this unit will have an effect on the average fee of the sewerage system. Bentley sewerGEMSV8i is the first and solely entirely dynamic, multi-

platform (GIS, CAD and stand-alone) sanitary and collective sewer modeling solution. With Bentley sewerGEMSV8i, we will consider all sanitary sewer machines in one bundle and the alternative of imparting the analyses with the SWMM algorithm or our very own implicit answer of the full saint empty equations. The hydraulic format consists in the totaling of transit and complete waft and hydraulic modeling for community pipes diameters or slopes. The community consists of pipes of various diameter, manholes and outfalls. The software gives reports, layouts, and longitudinal or transversal pass sections of pipe network, displayed in a superior photo machine primarily based on AutoCAD technology. With specified equipment and plotting the drawings of sewage networks. In this work, the sewerage networks have been designed through thinking about the guidelines put forth by way of main our bodies and the use of commercially reachable substances and effects got are properly inside range. [8]

This paper shows study about the design and analysis of the water distribution in Adypu campus. Water provides gadget is a gadget of engineered hydrologic and hydraulic aspects which grant water supply. Water is one of the simple requirements of each residing being in the world. Water demand is growing day by using day. Water distribution community plays quintessential function in maintaining and imparting suited existence high-quality to the public, of which reliability of provide is the fundamental component. To remedy this problem, layout of new or up-gradation of present water distribution community is necessary. Such kind of trouble can be solved manually as nicely as by using the usage of specific computation applied sciences like LOOP 4.0, MIKENET, STANET and EPANET two software. Find out about is primarily based on evaluation of present water distribution community the use of EPANET two software. The pipe community and junction community device is simulated to apprehend its conduct for one-of-a-kind inputs the usage of EPANET 2.0. Simulations have been carried out for hydraulic parameters such as head, stress and go with the flow rate. The consequences got confirm that the pressures at all junctions and the flows with their velocities at all pipes are viable adequate to supply enough water by using the community of learn about area. [9]

Sewerage System is an essential infrastructure for city needs. This paper gives different types of sewerage systems in detailing manner. This paper aimed to evaluation the choice sewer or the science preferences for the sewerage community system, a number of Designing applied sciences and fabric of construction. There are distinctive technological know-how choice in the sewerage community machine like, Gravity sewer system, Vacuum sewer machine and Pressure sewer system. Also, there are one of a kind methods for Designing of the above system, like Open reduce excavation, Trenchless Technology etc., and there a variety of sorts of development cloth are accessible like, metallic, concrete and plastic pipes and pre-fabricated RCC & FRP manholes etc. The one of a kind applied sciences and choice cloth facilitate with ease of Designing and time saving. However, there is price implication concerned in adopting the today's technology, however nonetheless the today's technological know-how is being viewed the place it is warranted. Ranges of elements assist decide which wastewater applied sciences is quality acceptable for a unique domestic or area. Often, communities will use a mixture of exceptional strategies in exceptional occasions to keep money, manage development, and defend public fitness and the environment. Alternative sewerage gadget ought to be regarded as a feasible alternative for corporations of residences and organizations in areas like these, or somewhere they can cost-effectively fulfill the fitness and environmental desires of the community. [10]

In these paper Water shortage is one of the principal troubles in the world and hundreds of thousands of humans have no get entry to freshwater. Untreated wastewater is extensively used for agriculture in many countries. This is one of the world-leading serious environmental and public fitness concerns. Instead of the use of untreated wastewater, dealt with wastewater has been observed extra relevant and ecofriendly option. Moreover, environmental toxicity due to solid waste exposures is additionally one of the main fitness concerns. Therefore, intending to fight the issues related with the use of untreated wastewater, we recommend in this assessment a multidisciplinary strategy to cope with wastewater as a practicable useful resource for use in agriculture. We suggest a mannequin displaying the environment friendly strategies for wastewater cure and the utilization of strong wastes in fertilizers. Learn about additionally factors out the related fitness situation for farmers, who are working in wastewater-irrigated fields alongside with the detrimental outcomes of untreated wastewater. The consumption of crop irrigated by means of wastewater has main fitness implications additionally mentioned in this assessment paper. This overview similarly displays that our modern-day perception of the wastewater therapy and use in agriculture with addressing developments in therapy strategies has remarkable future possibilities. [11]

III. OBJECTIVES OF STUDY

- **To** design the water supply system in Lohagaon via vision of Pune to provide water supply of 24 x 7.
- To design the proper sewerage system in Lohagaon.
- Safe and equitable water supply to all citizens for next 30 years.
- To distribute the water to all citizens for 24 hours of the day.
- To reduce the amount of water losses.
- Ensuring technological, economic and environmental sustainability of water supply services.
- To suggest innovative technologies for water supply and sewerage system.

IV. PROPOSED METHODOLOGY

1. First of all we have to find out design period of water supply and sewerage system. We have to fix the design period for the project.
2. To find out current population of city.
3. Then we have to do population forecasting for design period of project for selected area.
4. After that to find out water demand up to the design period of project.
5. Finding out the source of water to fulfill the need.
6. To find out the proper method of water supply from source up to destination. If not then design lifting method or using of pumping station.
7. Design of water storage tank
8. Design of water purification plant.
9. To study current distribution system.[if not]
10. Design of overhead tank to distribute water and lifting system for same, if required [check feasibility]
11. Find out total volume of sewage sludge.

12. Design of sewage treatment plant
13. Design of sewage line so goes away from city to decompose and cost comparison.

V. FLOW CHART OF METHODOLOGY

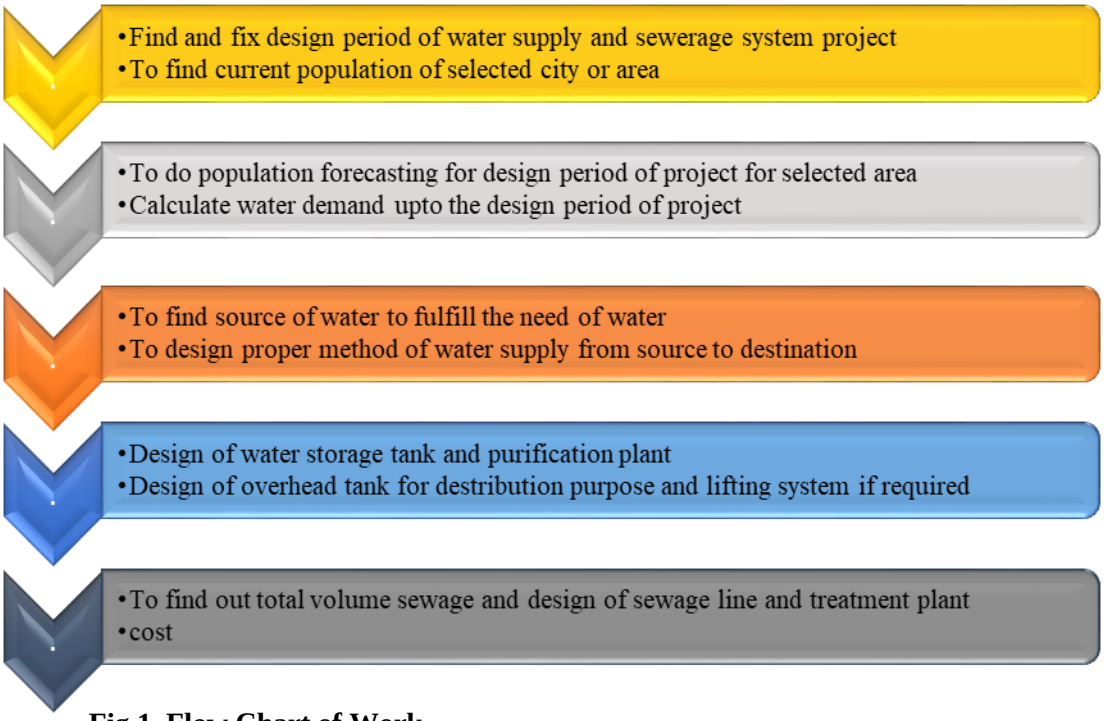

Fig.1. Flow Chart of Work

VI. CONCLUSION

Our study will achieve optimal water supply system for use and sewerage water to Lohagaon village by using effective and Economical Water supply scheme with following Points.

a) Safe and potable water supply for all citizens.
b) We assure to citizen that, the water supply will on regular frequency.
c) We will aim to water losses should be less.

REFERENCES

[1]. E. V. de Souza, M. A. Costa da Silva (2013), "*Management system for improving the efficiency of use water systems water supply*" in Procedia Engineering 70 (2014) (458-466).

[2]. Rahu Singh, Rahul Brahmankar, J. V. R. Murty, Piyush Verma and James L. Wescoat, Jr (2020), "Analyzing rural drinking water services for district planning in Maharashtra, India" in water policy 22 (2020) 37-51.

[3]. Sanjay Rode (January 2009), "*Sustainable Drinking water Supply in Pune Metropolitan Region: Alternative Policies*" in Theoretical and Empirial researches in Urban Management.

[4]. Arjun Kumar, Vivek Thakur, Neeraj Malhotra (September 2015), "*Design of Water Distribution Systems using EPANET*" in International Journal of Advanced Research.

[5] Ramakrishna Nallathiga (February 2005), "*Water Resources Management in Mumbai: The Need for Reforms in Institutions and Governance*" in Conference Paper.

[6]. Qamar Sultana (February 2021), *"Design of Water Supply Distribution System: A Case Study*" in Conference Paper.

[7]. Suxian Ye, Jingwen Li1, Jiao Yuan, Yao Hu, Xiaoqiang Han, Web of Conferences 53, 03044 (2018), "*Design And Analysis Of Water Supply And Drainage Engineering For A Residential Building*" in ICAEER 2018.

[8]. Ms.Harsha S. Bhavimani, Dr. Anand V. Shivapur (2017), *"Design of Sanitary Sewer Network for Zone 10, Belagavi city using SewerGEMSV8i Software"* in IJRTI,Volume 2,Issue 8, ISSN:2456-3315.

[9]. Rushikesh Jagtap, Rakesh Gawali, Vinayak Kanade, Sanket Thite, Prof P R Gayake, (May 2020) *"A Review Paper On Design And Analysis Of Water Distribution System Of Adypu Campus"* in International Research Journal of Engineering and Technology (IRJET), Volume: 07 Issue: 05 | May 2020.

[10]. B. Balaji, Dr. P. Mariappan, Dr. S. Senthamilkumar, (2014), *"Technology Options For Sewerage System"* Volume-3,Issue-11,Nov Special Issue -2014 ISSN NO. 2277-8160.in Research Paper.

[11]. Kavindra Kumar Kesari & Ramendra Soni & Qazi Mohammad Sajid Jamal & Pooja Tripathi & Jonathan A. Lal & Niraj Kumar Jha & Mohammed Haris Siddiqui & Pradeep Kumar & Vijay Tripathi & Janne Ruokolainen (10 May 2021), *"Wastewater Treatment and Reuse: a Review of its Applications and Health Implications"* in Water Air Soil Pollut (2021) 232-208