

# Smart Water Supply System

ISSN 2395-1621

<sup>#1</sup>Shubham A. Borse, <sup>#2</sup>Sanket S. Daramwar, <sup>#3</sup>Aniket B. Kharde, <sup>#4</sup>Pramod S. Mahadik,  
<sup>#5</sup>Pandurang S. Lokhande, <sup>#6</sup>Prof. Ms. Shital Shinde

<sup>1</sup>shubham.anil53@gmail.com  
<sup>2</sup>sanketsdaramwar@gmail.com

<sup>#12345</sup>Student, Department of Civil Engineering  
<sup>#6</sup>Prof. Department of Civil Engineering

G. H. Raisoni Institute of Engineering & Technology,  
Wagholi, Pune -412207



## ABSTRACT

In order to fulfill the water demand of the continuously growing population in Wagholi, it is essential to provide the sufficient and uniform quantity of water through the designed network of pipes. For this purpose, The general features of the wagholi area like information about the main water source, population of the area, demand of water, requirement of the pumps, distribution network and water tanks are essential for efficient design of water distribution system. According to the government of Maharashtra the per capita consumption of water by an Individual person is 135 litres per day and design has been made accordingly. This work highlights the process carried out on design of water supply system for an area named wagholi, pune with the help of all this information the design of the water supply scheme for the area with the help of software "EPANET" and "Q-GIS". This design of the water supply scheme for proper supply of water is efficient to meet the daily requirement of water in this area.

**Keywords:** EPANET, Q-GIS, Water supply.

## ARTICLE INFO

### Article History

Received: 6<sup>th</sup> May 2016

Received in revised form :  
6<sup>th</sup> May 2016

Accepted: 10<sup>th</sup> May 2016

### Published online :

11<sup>th</sup> May 2016

## I. INTRODUCTION

In the present developing stage of country like India where the growth rate of Population and its effect on the resources like Food, Water, Land, etc. are been areas for the researchers. Due to the limitations of the resources, the alternative arrangement also is being studied. The Water resources as being one of the compulsory parts of our daily life have the priority to study under it. The surface and subsurface water resources have its uniqueness in the different aspects, locations and durations. India being a tropical country, for the low to moderate rainfall regions the stress of water resource is mainly on the subsurface resource i.e. Groundwater. As the Groundwater availability largely depends upon the regional factors like Rainfall, Surface and subsurface Geology, Aquifer characteristics so it's the nature and the characteristics of the demand for the water resources on these regional factors. The factors constitute the objective of the present study which emphasis on the Groundwater resources, purpose, need, effective utilization, recharge and replenishment.

GIS and remote sensing and EPANET tools are widely used for the management of various natural resources Delineating the potential groundwater zones using GIS is an effective

tool. In recent years, extensive use of satellite data along with conventional maps and rectified ground truth data, has made it easier to establish the base line information for groundwater potential zones GIS for the exploration of groundwater potential zones are carried out by a number of researchers around the world, and it was found that the involved factors in determining the groundwater potential zones were Different, and hence the results vary accordingly.

## II. NEED OF WATER SUPPLY

Human life, as with all animal and plant life on the planet, is dependent upon water. Not only do we need water to grow our food, generate our power and run our industries, but we need it as a basic part of our daily lives - our bodies need to ingest water every day to continue functioning. "Basic needs of about 135 litres per person per day". It includes the need for water to maintain a basic standard of personal and domestic hygiene sufficient to maintain health. The effects of inadequate water supply causes disease, time and energy expended in daily collection, high unit costs, etc. provision of basic daily water needs is yet to be regarded by many countries as a human right. When existing water supplies

available to a specific water user group are less than projected demands, there is a need for water. In other words, once there is an identified water demand projection for a given water user group, this estimate is then deducted from identified existing supplies for that water user group, resulting in either a water supply surplus or a need.

### III. STUDY AREA

The study area Wagholi (Tal. - Haveli, Dist.-Pune Maharashtra) is a semi-developed village where it is emerging as prime residential hub to East of Pune. Wagholi lies in the North-east (73059'E and 18035'N) of Pune city. It has a geographic area of 3367 hectares. The Wagholi population is about 33,479 (Census 2011). The study area is classified as BM 46 elementary watershed. The mean minimum temperature is about 12oC and means maximum temperature is about 40oC. The average annual rainfall is about 866 mm (Haveli, Pune).



Fig 1. Wagholi area map

### IV. OBJECTIVE

1. To find out the water quality in Wagholi area.
2. To make preventative measure for sanitation.
3. For water distribution.
4. To find out quantity
5. To improve the quality of the water.
6. Design water supply line.
7. Design drainage distribution line.

### V. WATER PROBLEM

As the Wagholi comes under the low rainfall region; hence there is always a problem of water. The water sources near Wagholi region is also less. Hence the main source of water is either bore water or tanker water a water supply scheme was built in 2006 to service all of the communities due to a successful appeal won by SANTULAN. Unfortunately, there are several issues with the water supply scheme as investigated in 2010/11. The water is supplied by the Municipal Corporation. The water is supplied by the Municipal Corporation (local government body) in Pune City to the Gram Panchayat (local self-government) in Wagholi, who is responsible for distributing the water. The pumping station at Wagholi is the furthest town from Pune City being supplied and there are many illegal connections and transmission losses (Rode, 2003) in between. Therefore, the Gram Panchayat is not receiving their full entitlement to manage the distribution of the water and only possesses a significantly diminished water volume to supply the stone quarry communities. Another issue with the existing scheme is the quality of the piping in the water distribution scheme. The piping is damaged in several locations potentially due to poor quality materials, poor construction Techniques combined with the excessive loads from the stone carrying dumper trucks. Additionally, there are rumors that the pipes have been intentionally blocked due to caste differences and power politics. The Gram Panchayat has taken on the responsibility for operation and maintenance costs of the water supply scheme and does not charge the mining communities a user fee. Despite this, the issues of the defunct infrastructure have not been resolved. Not requesting a user fee charge may also be compounding the issue, as it is easy to discriminate against non-paying users.

The main source of drinking water for most communities is generally from wells located on neighboring agricultural properties with access agreed upon with the local farmers. These are unprotected water sources and have varying degrees of water quality issues and require treatment to be suitable for drinking. Some people use disinfectant or boil the water but the majority of people filters the water using cloth or do not treat the water at all. Sources of pollution may include: human faces, animal faces, household waste, dust, sediment from erosion, fuel/oil from heavy vehicles/machines, chemicals from explosives, mineralization, fertilizers, nitrates, phosphates from agricultural practices and pathogenic waterborne microbiological organisms.



Fig 2. A woman and a school girl collecting water from a nearby well

## EPANET

EPANET is a computer program that performs extended period simulation of hydraulic and water quality behavior within pressurized pipe networks. A network consists of pipes, nodes (pipe junctions), pumps, valves and storage tanks or reservoirs. EPANET tracks the flow of water in each pipe, the pressure at each node, the height of water in each tank, and the concentration of a chemical species throughout the network during a simulation period comprised of multiple time steps. In addition to chemical species, water age and source tracing can also be simulated. EPANET is designed to be a research tool for improving our understanding of the movement and fate of drinking water constituents within distribution systems. EPANET can help assess alternative management strategies for improving water quality throughout a system. These can include:

- (i) Altering source utilization within multiple source systems,
- (ii) Altering pumping and tank filling/emptying schedules,
- (iii) Use of satellite treatment, such as re-chlorination at storage tanks,
- (iv) Targeted pipe cleaning and replacement.

Different Issues Form Due To Water Supply and Sanitation Problem:

- Health Issues:

Anecdotal evidence reveals that intestinal worms and diarrhea are common health issues in the community. This can be directly attributed to poor hygienic practices, poor quality drinking water or a combination of both. Additionally, skin and eye infections are also common due to inadequate quantities of clean water for personal hygiene. There have also been cases of malaria reported within the communities indicating that the pools of stagnant water on-site encourage breeding of mosquitoes that transmit disease.

- Financial Issues:

Diseases from poor water and sanitation practices mean there is a high rate of sick days from work impacting pay and also a high rate of sick days from schools impacting the children's Education. Additionally, the community members spend their Already scarce amount of money on medicine. Some families also spend money on water carting.

- Environmental Issues:

Lack of sanitation is polluting the environment including ground water, surface water and air quality. Drinking water sources are under increasing threat of contamination, with far reaching consequences for the health of children and for the economic and social development of the communities.

## VI. CONCLUSION

In this paper we have conclude this work highlights the process carried out on design of water supply system for an area named Wagholi, Pune with the help of all this information the design of the water supply scheme for the

area with the help of software "EPANET" and "Q-GIS". This design of the water supply scheme for proper supply of water is efficient to meet the daily requirement of water in this area.

## REFERENCE

- [1]Application of methodologies for analysing health outcomes related to unsafe water, sanitation, and hygiene in national studies, Practical manual for national researchers, WHO, 2006
- [2]Assessment of contamination of bacteria of soil in Ulaanbaatar city, IAC, PHI, MOH, Ulaanbaatar, 2003
- [3]Book of Science and research work - V, Public Health Institute, 2006, Ulaanbaatar, page 45-78
- [4]Book of Science and research work -I V, Public Health Institute, 2005, Ulaanbaatar, page 97-134
- [5]Inventory data on wells provided by the Ministry of Food and Agriculture, 2003
- [6]Mongolia Common Country Assessment, United Nations Country Team, Ulaanbaatar, Mongolia, November, 2005
- [7]Programme for sanitation facilities, Government of Mongolia, 2006
- [8]Rural water supply, sanitation and hygiene, WHO, AGFUND, UNDP, UNICEF, Government of Mongolia, Ulaanbaatar, 2007