Design Of Water Distribution System For Village Padali-Ale, Tal: Parner, Dist: Ahmednagar .

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 Abstract:. The present system of water supply is intermittent supply and a tree system or dead end system network is adopted for water distribution. This system may not be sufficient in the coming years to cater to the increasing water demand of the village, which helps to design the water distribution network for any required area, for any domestic house hold usages or any commercial purposes. In which consists of a computer program, does the simulation of hydraulic behavior and water quality behavior with in the pressure pipe networks.. The analysis of the distribution network is done based on various public demands, quantities of inflows and out flows of the over-head reservoirs. This analysis provides the information about various demands, losses, and uses of the public. The design of a new network of supply will make the municipality be aware of the new demands, rate of increase in the demands. The design is made keeping in view of the population growth rate and the development in the village. The design brings out an improvement in the existing network.
Keywords –water distribution network, grid iron system, water requirement.

I. INTRODUCTION

Water supply distribution network is a part of town and municipality planning. Hence it's planning and design has to be done by the city planners and Civil Engineers with utmost care, considering the effecting factors like the location of the town or city, its current water demand, the future demand growth, leakages in the conduits, required pressure in pipes, losses in the pipes etc.

We designed a distribution system for the Padali ale village ,tal-parner,dist –Ahmadnagar ,the population of the village is around 2400 peoples in this village so we designed the system for the next 30 years which is to be 30 lakhs liter we designed the storage tanks for the storage of the water .

Study area :

According to Census 2011 information the location code or village code of Padali Ale village is 558342. Padali Ale village is located in Parner Tehsil of Ahmadnagar district in Maharashtra, India. It is situated 32km away from sub-district headquarter Parner (tehsildar office) and 70km away from district headquarter Ahmadnagar. As per 2009 stats, Padali Ale is the gram panchayat of Padali Ale village.

The total geographical area of village is 1299.03 hectares. Padali Ale has a total population of 2,252 peoples. There are about 428 houses in Padali Ale village. When it comes to administration, Padali Ale village is administrated by a sarpanch who is elected representative of the village by the local elections. As per 2019 stats, Padali Ale villages comes under Parner assembly & Ahmednagar parliamentary constituency. Ahmadnagar is nearest town to Padali Ale for all major economic activities, which is approximately 70km away.
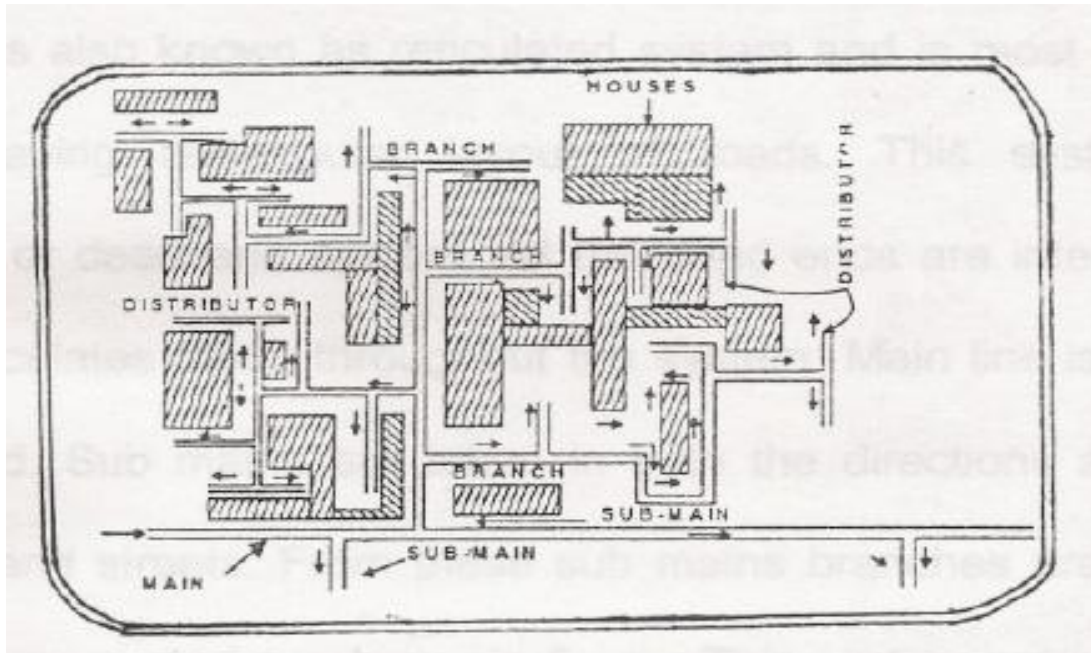
II. METHODOLOGY

Fig. 4.1 Layout of Dead end system

The above figure shows the layout of this system. It is suitable for irregular developed towns or cities. In this system one main starts from require reservoir along the main road. Sub mains are connected to the main in both the directions along other roads which meet the main road. Sub mains, branches and minor distributors are connected to sub mains. They are cheap in initial cost. When the pipe breaks down or is closed for repair the whole locality beyond the pint goes without water. It cannot meet the five demands.

Design Of Distribution System:
1   MANUAL DESIGN:
The layout of the city of town, topography etc. will greatly affect the layout and design of the distribution system. The existing population expected future population commercial and industrial present and future water requirements all have to be considered in the layout and design of the distribution system.
The main work in the distribution system design is to determine the sizes of the distribution pipes which will be capable to carry the repaired quantity of water at the desired pressure.

2   Design of pipe lines:

Till date no direct method are available for the design of distribution pipes. While doing the design first of all Dia. of the pipes are assumed the terminal pressure heads which could be made available at the end of each pipe section after allowing for the loss of pressure head in the pipe section when full peak flow discharge is flowing are then determined. The determination of the friction losses in each pipe section is done. The total discharge flowing through main pipes is to be determined in advance.

Hazen William formula is widely used for determine the velocity through pipes. It states

$$v = 085C_H R^{o. 63}S^{C-54}$$

Hardy cross method is most widely used

1.Hardy Cross Method:

In this method the corrections are applied to the assumed flow in each successive trail. The head loss in each pipe is determined by pipe flow formula. The successive corrections are made in the flow in each pipe will be the heads are balanced and the principle of continuity is satisfied at each junction.

Now it be the assumed flow in a pipe and Q be the actual flow in that pipe, then correction will be given by the relation.

If the head loss in the pipe under reference is HL it can be determined by formula

$$H_L = K.Q^a$$

When k is a constant depending upon the size of the pipe and its interval condition. The head loss can also be determined by Hazen William formula in this term. As a common practice + ve sign is given to the head losses in clockwise direction and -ve signs to those in the anti-clockwise direction. The minor losses are usually neglected. In case of network of pipes having many loops, the system must be divided in to two or more loops such that each pipe in the network is included in the circuit of one loop. We have adopted Hardy cross method for analysis of pipe network.

Table no.3.0: Analysis of water pressure in pipes

Calculation :

No of people in the village : 2400 persons male / female

Per person water demand for per day use is 135-200 liter per day according to the new research 2020.

We conduct 160 liter water for per person

Factor of safety : 0.35

Water required for per person is calculated by =(0.35x 160+160) = **216 liter per day**

Growth of population is =0.20% per year according from 2011

Hence, W design it for next **30 years**

So, Future population =   2400+(2400x0.20x30)=16800 persons

Add factor of safety =5000

Final population =16800+5000=**21800**

Water storage capacity = 21800x216=**40,08,800 liters**

Now we constructed 2 elevated storage tank with about 10 lakhs liter storage capacity each
And 2 ground water storage tank which can store 5 lakhs liter water in each tank. The village 10 lakhs liter water storage is existed in it so we design have to remains it:30 lakhs liter.

ESR =20,00,000/2 = **10 lakhs liter capacity per tank**
GSR =10,00,000/2 = **5 lakhs liter capacity each**

SOURCES OF WATER SUPPLY : canal passes from mid section of the village,it have k.t.weir in the mid section
The village has it own wells and borewells,we also use rain water which has to be reined in rainy season.

III. CONCLUSION

Result of distribution system from manual so we designed water distribution system for next 30 years is to be 30 lakhs liter which fulfill the water demand for the peoples which is to be 160 liter per day. We designed 2 elevated storage tank and 2 ground storage tank thus we can achieve requirement of the village population accordingly.

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