DETAIL INVESTIGATION ON WATER TREATMENT PROCESS AND IT'S DISTRIBUTION NETWORK OF MISSION BHAGIRATHA IN PALERU – A CASE STUDY

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ABSTRACT: Drinking Water Supply Corporation Limited (TDWSCL) is the nodal agency for implementation of
Telangana Drinking Water Supply Project (TDWSP) in the state. TDWSP is a flagship program of the newly constituted state of Telangana.This paper reviews the process of water treatment simply and detailed study about distribution network. TheObjective of the project is to ensure safe and sustainable PIPED drinking water supply from surface watersources at 100 LPCD (liters per capita per day) for rural areas, 135 LPCD for Municipalities, 150 LPCD forMunicipal Corporations and 10% to meet Industrial requirements. All intake structures, transmissions, WTP
Structures. In this for our case study, we have selected paleru segment Warangal.The project comprises of 26 segments in 9 districts and supply water to 62, 01, 552 habitations whichCovers the pipeline of entire state is of about 1.697, lakh km and it includes 19 nos. of intake structure,549nos. of over head balancing reservoirs, 550nos. of ground level balancing reservoir & sumps, 35,573 nos. ofvillage over head service reservoirs and 153 nos. of water. Treatment plant.This project is located at madhiripuram in maripeda mandal of Mahabubabad district.The capacity of WTP is 170 MLD.

1.0 INTRODUCTION

General

The Government of Telangana has decided to take up the Water Grid programme as a flag ship item to provide safe drinking water to all rural and urban people at 100 LPCD to rural households and 135LPCD in municipalities and 150 LPCD in corporation areas. The provision of safe drinking water deserves top priority to improve the health and economic development of the people in the project area. Majority of people in the Project area are tribal, illiterate and economically very poor. Scarcity of water is one of the major problems in this area. Mahabubabad is one of the 31 Districts in Telangana state. In this District there are 17mandals. The total population of the district is 1146655 which comprises of rural population of 1044705 and urban population of 101950. The people in district purely depend only on ground water for drinking, domestic and agriculture purposes. Mahabubabad District comprises geographically the underlain granites with coarse to medium texture.Due to shallow basin of the area having very poor potential of ground water and over exploited by the farmers for Irrigation purposes by digging many of open wells in their fields, the individual sources of open wells for the PWS Schemes and MPWS Schemes have become seasonal and failed to supply sufficient drinking water to the people in project area, in summer months. To avoid the drinking water scarcity and to provide safe drinking water in quality affected habitations and to provide sufficient drinking water to all the rural and urban people in the state, the Water Grid Programme is planned with 26 segments by taking various perennial sources.Palair segment is one of the segment in it. The Palair Segment Warangal is taken up with the source of Palair Reservoir at Palair village of Kusumanchimandal in Khammam District. The source is balancing reservoir fed from Nagarjunasagar through its right canal. The Intake well is constructed in Paleru reservoir by Paleru segment Khammam district of Mission Bhageeratha. From the Intake well the raw water will be pumped to the 170MLD WTP at Abbaipalem (Madhiripuram) in MaripedaMandal of Mahabubabad District. The treated water from WTP will be supplied to 22mandals (14 Mandals in MahabubabadDistrict,7mandals in Warangal Rural district and 1 mandal in Khammam district).

2.0 LITERATURE REVIEW

Batchelor R.A (1975): In his study entitled,household technology and the domestic demand for water‟ develop a demand model for the efficient use of water resources. He observes that the contribution of economic principles to efficiency in public water supply management lies in the demonstration of the interdependence among investment planning, pricing policy and demand projection as general attributer of the growth process. The book is a good summary of the issues in water resource management.

Saunders and war ford (1976): Indentified and enlisted potential economic effects and health effects of rural water supply systems. Macroeconomic effects, such as effects on development and output, improved health, increased time for productive work, increase in income. Increase in population and effects related to averted costs to t he economy are systematically examined in the book.

Recognizing the importance of water, United Nations Water Conference (1977): Concluded that a convenient supply of water is an essential ingredient of a healthy, productive life. Water, that is not safe for human consumption, can spread disease, and reduce the productive time and energy of the water carrier. Coupled with mal-nutrition, the water born disease takes a dreadful to toll in developing countries.

Clark, Robert M. And Stevis (1981): Says in their article the cost structure of a water supply system is a debatable topic. Usually the cost of supply of drinking water falls two parts: production cost and distribution cost. The production cost includes cost of treatment, pumping of untreated and treated water and laboratory charges. The distribution cost includes maintenance cost of distribution network, metering system, small line extensions and revenue collection as well as other administrative expenses.

Maduskar B.A (1981): In his study examined that, some infrastructure like water supply and sewage, which can be improved with the help of better financial management. It can be improved through better tariff policy, use of modern techniques and equipments. Mumbai Corporation developed the manpower and creating the awareness of all the factors related to financial control which helped in expanding the things for desire results.

Bowonder B. And Rahul Chettrik (1984): In their studies observed that, India‟ urban water supply system have been declining due to various factors, such as high rural - urban migration, regional disparities in water supply sources and low priority status. Lacks of Administrative and management have further affect the system.

Tripathi P.M (1985): This study is conducted in Dhamdaha bock in purnia district. He confirms the findings of other scholars about the poor maintenance of water supply particularly hand pumps. He has attributed this to the persistent official apathy and indifference.

Gibbons, Dianna C. (1986): Examines the broad issues involved in putting an economic value of water. All chapter of this study covers the demand and value of water in different sectors. Each chapter opens with a broad look at the components of water demand and economic determinants of the demand.

3.0 METHODOLOGY

It is proposed to draw raw water, by constructing an Intake well at reservoir and Laying a pumping main from Palair reservoir to proposed WTP at Madhiripuram in MaripedaMandal of Mahabubabad District. The Raw Water will be treated in and disinfected through post chlorination and will be pumped to OHBR‟s/GLBR‟s on MadiripuramGutta and will be distributed through gravity mains to 17 mandals‟ habitations up to OHSR points and Thirumalayapalemmandal of Khammam District providing some intermediate pumping whererequired.

- Initially, wood chips, leaves, aquatic plants and floating impurities are removed by the screening process.
- After the screening a more compact suspended material will be removed to allow water toflow through the chamber in which it will settle to thebottom.

PURPOSE OF SECREENING PROCESS:

- Restrict the entry of suspended solids such as garbage in the water treatmentplant
- Prevent pump, pipe and equipment from clogging ordamage.
- Launched a water course for the nextprocess.

Fig;-Screens

Raw Water from Intake Well (Source): The Intake well is constructed in Palair reservoir by Palair segment Khammam district of MissionBhagiratha. From the Intake well the raw water will be pumped with (540 HP Pumps), 21.3kms MS Pipe of 1730mm dia.to the 170MLD WTP at Abbaipalem (Madhiripuram) in MariposasMandal of MahabubabadDistrict.

FIG;- Intake Constructed at Palair reservoir

ESSENTIAL STANDARDS OF WATER QUALITY:

The Indian standard (BIS-10500-2012) present the requirement for the essential and desirable characteristics required to be tested for ascertaining the suitability of water for drinking purpose. Some of the essential standards are presented in the following table:

Table: essential physical and chemical and bacteriological standards Bureau of Indian standards Drinking

water -specifications for some of the important parameters IS 10500-2012 (second revision)

S.NO	Characteristics	Unit	Requirement (Acceptable Limit)	Permissible limit in the absence of alternate source
1	Total Dissolved Solids(TDS)	Milligram/litre	500	2000
2	Colour	Hazen unit	5	15
3	Turbidity	NTU	1	5
4	Total Hardness	Milligram/litre	200	600
5	Ammonia	Milligram/litre	0.5	0.5
6	Free Residual Chlorine	Milligram/litre	0.2	1.0
7	pH	Milligram/litre	6.5-8.5	6.5-8.5
8	Chloride	Milligram/litre	250	1000
9	Fluoride	Milligram/litre	1.0	1.5

10	Arsenic	Milligram/litre	0.01	0.05
11	Iron	Milligram/litre	0.3	0.3
12	Nitrate	Milligram/litre	45	45
13	Sulphate	Milligram/litre	200	400
14	Selenium	Milligram/litre	0.01	0.01
15	Zinc	Milligram/litre	5.0	15.0
16	Mercury	Milligram/litre	0.001	0.001
17	Lead	Milligram/litre	0.01	0.01
18	Cyanide	Milligram/litre	0.05	0.05
19	Copper	Milligram/litre	0.05	1.5
20	Chromium	Milligram/litre	0.05	0.05
21	Nickel	Milligram/litre	0.02	0.02
22	Cadmium	Milligram/litre	0.003	0.003
23	E-Coli	Number/100 ml	NIL	NIL

Water Treatment

Water treatment is essential a removal process. Contaminants in water are removed by

i. UnitOperation

Contamination Removed by physical process.

ii. UnitProcess

Contamination Removed by Chemical or Biological process.

Surface WaterTreatment:

RAW WATER FROM SOURCE

↓

AERATION

↓

PLAIN SEDIMENTATION

↓

COAGUALATION

↓

FILTERATION

↓

DISINFECTION

↓

WHOLESOME WATER TO DISTRIBUTION SYSTEM

CascadeAerator:

- Water falls down a series of steps
- utilize the potential energy of water to createinterfaces for efficient gas transfer
- The splashing of the water createsturbulence and water droplets
- Addition of oxygen.
- Removal of dissolved gases(CO2, CH4, etc.,) (degasification)
- Removal of dissolved minerals like iron and manganese.

Fig;- Cascade areator

COAGULATION:

Dirty water is a colloid. Alum acts as and electrolyte and helps in coagulation. However alum purified water is not to safe to drink because of dissolved salts and bacteria which remains unaffected in this process .Alum is used to settle suspended matter in water,this process is called as coagulation. Solids are removed by sedimentation followed by filtration small particle are not removed efficiently by sedimentation because they settle to slowly. They may also pass through filters.

Fig;-Coagulation **Fig;-Mixingofalum**

FLASHMIXING:

After screening out debris and testing raw water chemicals that encourage coagulation are added to the water stream. The mixture is agitated quickly and through in a process called flash mixing. The chemicals introduced into the water stream will attract any very fine particles such as silt,that will not readily settle or filter out and make them clump together. These larger, heavier formations are called floc, which are much easier to remove from the water.

Fig;-Flash mixer

FLOCCULATION: Now that the particles have a neutral charge and can stick together. The water flows into a tank with paddles that provide slow mixing and bring the small particles together to form a large particle called flocs. Mixing is done quit slowly and gently in the flocculation step. If the mixing is to fast the flocs will break apart into small particle that are difficult to remove by sedimentation or filtration.

Fig;- Alum **Fig;- Formation offloc**

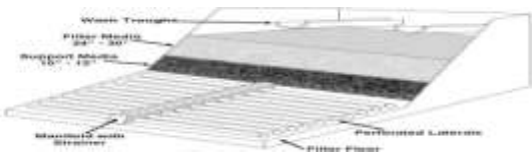
Sedimentation: The process of suspended solid particles settling out (going to the bottom of the vessel) in water.

Following flocculation, a sedimentation step may be used. During sedimentation, the velocity of the water is decreased so that the suspended material, including flocculated particles, can settle out by gravity. Once settled, the particles combine to form a sludge that is later removed from the bottom of thebasin.

Fig;- Clarifier

Filtration: A water treatment step used to remove turbidity, dissolved organics, odour, taste and colour. The water flows by gravity through large filters of anthracite coal, silica sand, garnet and gravel. The floc particles are removed in these filters. The rate of filtration can be adjusted to meet water consumption needs. Filters for suspended particle removal can also be made of graded sand, granular synthetic material, screens of various materials, and fabrics.

Rapid Sand Filters: The rate of filtration of rapid sand filtration is about 3000-6000ltr/sq.m/hr and these filters can accommodate filter rates 40 times those of slow sandfilters.



The filter tank is generally constructed of concrete and is most often rectangular. Filters in largeplants are usually constructed next to each other in a row, allowing the piping from thesedimentation basins to feed the filters from a central pipe gallery. Some smaller plants are designed with the filters forming a square of four filters with a centralpipe gallery feeding the filters from a centre well.

Under drain:

The filter under drain can be one of many types, such as:

- Pipe laterals
- False floor

- Leopold system
- Porous plates or strainer nozzles
- Pipe laterals

Fig;- Filter beds

BACK WASHING:

Proper backwashing is a very important step in theoperation of a filter. If the filter is not backwashed completely, it will eventually develop additionaloperational problems. If a filter is to operate efficiently,it must be cleaned before the next filter run. Treatedwater from storage is used for the backwash cycle.This treated water is generally taken from elevatedstorage tanks or pumped in from the clear well.
During filtration, the filter media becomes coated withthe floc, which plugs the voids between the filter grains, making the filter difficult to clean. The media must beexpanded to clean the filter during the backwash. Thisexpansion causes the filter grains to violently against each other, dislodging the floc from the media.

Backwashing Process: The normal method for back washing a filter involves draining the water level above the filter to a point six inches above the filter media. The surface wash is then turned on and allowed to operate for several minutes to break up the crust on the filter. After that, the backwash valve is opened, allowing backwash water to start flowing into the filter and start carrying suspended material away from the filter. For a filter with an air wash instead of a water-surface wash, the filter backwash water and the air wash should not be used together. This would be possible only if some means of controlling the media carryover is installed.

water treatment filter control panel

Fig;- Back wash tank

Disposal of Filter Backwash Water: Water from the filter backwash cannot be returned directly to the environment. Normally the water is discharged into a back wash tank and allowed to settle. The supernatant, or cleared liquid, is then pumped back to the head of the treatment plant at a rate not exceeding 10% of the raw water flow entering the plant. The settled material is pumped to a sewer or is treated in the solids-handling process of the plant. This conserves most of the back wash water and eliminates the need to obtain a pollution discharge permit for the disposal of the filter back wash water.

Disinfection: Today, most of our drinking water supplies are free of the micro-organisms viruses, bacteria and protozoa. That cause serious and life-threatening diseases, such as cholera and typhoid fever. This is largely due to the introduction of water treatment, particularly chlorination, at the turn of the century.

CLEAR WATER SUMP: After filtration and disinfection, the filtered water is stored in a sump of 30,000KL capacity.The depth of liquid of a sump is 2.75m and free board of 0.3m .The dead storage depth of a sump is 0.5m.size of sump is 95X120X2.75m and the area of sump is 10909.09sq.m.The filtered water is continuously sent to the sump. Then the water enters into manifold (a large diameter pipe) through laterals. Motors are connected to each lateral in a pump house as shown in fig.

Fig;- 30000KL Clear water sump

DISTRIBUTION NETWORK

PUMPHOUSE:

Pumping machinery and pumping station are very important components in a water supply system. A pump house is constructed near the sump. The purpose of pump house is for storing and to supply high peak demands by moving water from sump to GLBR (ground level balancing reservoir), which is located at higher elevation.

INSTALLATION OF PUMP MOTOR ASSEMBLY:

- Place the pump assembly on the foundation pad aligning the anchoring bolts. If necessary use metal spacers to level the unit and check the flange connection for good horizontal and vertical planes
- Tighten the foundation bolts. Check again the level of the assembly and processed with the pump/motor alignment.
- In cases where the pump is installed on a base plate separated from that of the motor (due to expected piping forces, moments or as it often is in cases of large units) it is recommended to first install the pump and then processed with the motor installation and alignment.

Fig:- Motors

The details of pump sets for 4 GLBR S is given in the following table:

s.no	From (pumping station location)	To (delivery location)	Design (prospe)Q in lpm	No of working pumps	No of stand by pumps	Head of pump sets required(m)	LPM of each pump set required	HP of each pump sets required	Total HP of working pump sets
1	**2**	**3**	4	5	6	7	8	9	10
1	Madhiripuram sump(1500 KL)	Madhiripuram-mahubabad GLBR	39003	3	2	86	13001	360	1080
2	Madhiripuram sump(1400KL)	MADHIRIPURAM –GUDUR –NARSAMPET „GLBR"	43813	4	2	111	10953	390	1560
3	Madhiripuram sump(750KL)	MADHIRIPURAM-NARASIMHUL APETA-THORRUR-RAYAPARTHY GLBR	24801	3	2	114	8267	300	900
4	Madhiripuram sump(300KL)	. MARIPEDA GLBR	8576	2	1	79	4165	110	220

Fig;- Distributing water to GLBR'S

GROUND LEVEL BALANCEDRESERVOIR:

 OHBR/GLBR:

i) Capacity of OHBR/GLBR (approximate): 1 to 2hours of inflow/outflow, in General.

ii) The capacity shall be designed to avoid over flow/empty conditions during the normal pumping.

iii) The tall OHBRs with shaft staging are very costly, the staging can be reduced by considering the optimum pumping hours with respect to the increased cost of gravity/pumping mains.

iv) The intermediate OHBRs can be avoided by considering the optimum pumping hours with respect to the increased cost of gravity/pumping mains/main OHBR.

Ground level balanced reservoirs are the structures constructed on the ground surface to store and distribute the water through gravity. In mission bhagiratha water treatment plant, the entire distribution process is carried out through gravity only. For this purpose, GLBR are constructed on madhiripuramgutta so as to distribute the water easily through gravity.

Through these 4 GLBR supply drinking water to Mahabubabad and Warangal districts.In mission bhagiratha water treatment project there are 4 GLBR‟S are constructed on madhiripuramgutta, they are:-

a.1500kl GLBRb. 1400KL GLBR c.750 KLGLBR

d.300 KLGLBR

Fig;- Pumping of water to GLBR'S

a. 1500 KLGLBR: The clear water from the sump is lifted to 1500 KL GLBR by using 1100mm diameter DI pipe. This GLBR supplies water to

1. Mahabubabad
2. Kuravi
3. Dornakal
4. Kesamudram. Mandals

A 400mm dia. DI pipe is connect to gravity main to draw and supply the water to koravmandal tapping point (dornakal constituency) which covers 120 habitations. A break pressure tank (BPT) is constructed at gollacharla to reduce the pressure in gravity main. The capacity of BPT is 200 KL and it covers 96 habitations in dornakalmandal tapping point (dornakal constituency). From this GLBR water is conveyed to Mahabubabad urban sump of 3500 KL capacity through gravity main of 1100 mm diameter MS pipe.

And also the water is stored in nizamcheruvu sump of 3100 KL capacity and then this water is lifted to OHBR of 400 KL capacity on nizamcheruvugutta through pressure main of 600 mm dia. DI pipe. This OHBR supplies water to kesamudrammandal tapping point (Mahabubabad constituency), which covers 181 habitations and it also supplies water to Mahabubabadmandal rural tapping point that covers 139 habitations.

From this project the water is supplied to over head service reservoirs (OHSR) and from OHSR s the water is distributed to households.

b. 1400 KL GLBR:

The clear water from the sump is lifted to 1400 KL GLBR by using 1100mm diameter DI pipe. This GLBR

supplies water to 9 mandals they are 1. Gudur

1. Narsampet
2. Kothaguda
3. Gangaram
4. Chennraopet
5. Nekkonda
6. Diggondiand
7. Nallabelli

The water from 1400 KL GLBR is directly conveyed to boddhugonda sump through gravity main. The capacity of sump is 1100 KL by using pressure mains the stored water from this sump lifted to 1350KL GLBR. It covers 608 habitations. From this GLBR the water is send to 1000 KL sump at yellapur. From this sump the water is lifted to OHBR of 150 KL capacity with a staging of 30m. To lift this water 400mm dia. DI pipe is used as a pressure main. The length of this pressure main is 6800m. This OHBR supplies water to kothagudamandal by using 400mm dia. Pipe. The water from this OHBR is then stored in gangaram sump of 300KL capacity. From this sump the water is lifed to 40KL OHBR with a staging of 22m. At bavurgonda. It supplies water to 40 habitations. This OHBR also supplies water to gangarammandal (mulugu constituency) which covers 28 habitations.

C.750 KL GLBR: The clear water from the sump is lifted to 750 KL GLBR by using 800mm diameter DI pipe. This GLBR supplies water to 6 mandals they are.

1. Narasimhulapeta
2. Nelikudur
3. Thorrur
4. Rayaparthi
5. Dhanthalalpalli
6. Chennaguduru

This GLBR covers 441 habitations. It supplies water to 78 habitations in narasimhulapeta taping point (dornakal constituency) and then it supplies water to 34 habitations in dhanthalalpalli taping point (dornakal constituency) this water is conveyed to dhanthalapalli (bodlada) sump of 4500 KL capacity (Mahabubabad constituency). From this sump the water is lifted to OHBR of 600KL capacity with a staging of 30m. And then this water is distributed to thorrur taping point (palakurthy constituency) which covers 95 habitations. It supplies water to nelikuduru through online connections. It also supplies water to peddavangara taping point(palakurthy constituency). From gravity main the water is conveyed to sump of 1300 KL capacity and then lifted to OHBR of 200 KL capacity in muripirala to supply water to rayaparthimandal this OHBR supplies water to 20 habitations in rayaparthymandal and then this water is stored in a sump of 1000 KL capacity from this sump the water is lifted to GLBR of 120KL capacity at kondurugutta for rayapathimandal (palakurthyconstituency). This GLBR covers 56 habitations.

KLGLBR: The clear water from the sump is lifted to 300 KL GLBR by using 500mm diameter DI pipe. This GLBR supplies water to 1 one mandali.emaripeda. It covers 148 habitations inmaripeda and 13 habitataions in narsimhulapeta for tapping point (dorndakal constituency) and 22 habitations for chennaguduru taping point.

Ground level balanced reservoir pipe lines from GLBR outlet

CASE STUDY OF DISTIBUTION OF WATER IN MARIPEDA MANDAL:

- For our case study we have selected 300KL GLBR which supplies water to maripedamandal
- In mission bhagiratha the water is supplied to over head service reservoirs (OHSR). The number of OHSR"S constructed in habitations depends on population of that habitation.
- Maripedamandal has 182 habitations. Out of these we have selected one habitation i.emaripeda village. The following are the details of distribution of water from 300 KL GLBR at madhiripuram to maripeda village.

DISTRIBUTION OF WATER TO OHSR IN MARIPEDA:

300KL GLBR AT MADHIRI PURAM

⇩

GLBR foot at madhiripuram

⇩

Maripeda „X" junction

⇩

Gugulothunanyathanda junction

⇩

Gugulothunanyathanda

⇩

Maripeda junction

⇩

Maripeda (GP) OHS

Fig;- OHSR

TYPES OF PIPES USED IN DISTRIBUTION SYSTEM:

1. MS PIPE (mild steel)
2. DI PIPE (ductile iron)
3. HDPE (high density poly ethylene)

TYPES OF VALVES: Sluice valve and knife gate valve &Air valve

4. Check or reflux or non-return valve
5. Pressure relief or cut-off valves
6. Drain or scour valve
7. Butterfly valves
8. Foot valve.

This whole process will see in the ''SCADA PANAL''

SCADA:SCADA (supervisory control and data acquisition) system refers to the combination of telemetry and data acquisition.it consists of collecting information. Transferring it back to a central site carrying out necessary analysis and control and then displaying this data on a number of operator screens the SCADA system is used to monitor and control a plant or equipment control may be automatic or can be initiated by operator commands.

Components of SCADA system:

A SCADA system is composed of the following

1. Field instrumentation.
2. Remote stations.
3. Communications network.

A SCADA system will typically include a central computer, an operator interface, mass data storage, control software, and an integrated communication network..

Central Computer: The heart of any SCADA system is the central control computer. The central computer is used to control the SCADA system data communications as well as providing a usable operator interface for monitoring and implementing any control decisions.The central computer may also be used to manage the real time and historical database as well as generate any associated system trends orrelevant reports (Clingenpeeland Rice,1900). Where one large computer is used, the system will normally employ a dual-redundant operating environment in which all operations are transferred to an equivalent backup computer in the event of a failure of the primary system. Under normal operations the backup computer can be used for optimal control applications such as demand calculations, demand forecasting, network models and automatic optimization strategies. This arrangement allows for the separation of the real-time SCADA functions from the heavy processing requirements of optimal control applications and thus allows both systems to be tuned for peak performance (Clingenpeel and Rice, 1990).

- Point and pick command structure using interactive graphics.
- Simultaneous graphical display trending of multiple variables.
- Real time annunciation of system alarms utilizing single key graphic access
- Historical trending of all database parameters
- Alarm and system status differentiation.
- Advisory statements on critical system status.
- Ability for authorized operator to remotely change set points in remote stations
- Ability for authorized operator to create new or modify existing displays, and create new or modify existing report format with minimal computer programming skills.
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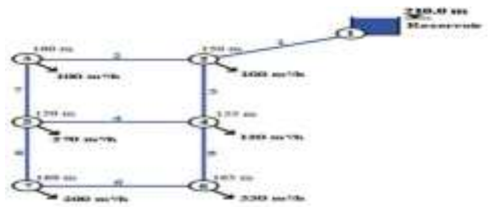
Fig;- Scada panal

EPANET:

Epanet is used throughout the mission bhagiratha to modal water distribution system. Epanet is a computer program that performs extended period simulation of hydraulic and water quality behaviour within pressurized pipe networks. A network consists of pipes, nodes (pipes 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.



Fig;- Epanet

RESULTS & DISCUSSION

EPANET helps water utilities maintain and improve the quality of water delivered to consumers. It can be used for thefollowing:

- Design sampling programs
- Study disinfectant loss and byproduct formations
- Conduct consumer exposure assessments
- Evaluate alternative strategies for improving water quality.
- Assist with pipe, pump, and valve placement and sizing.
- Energy minimization

CONCLUSIONS:

It is one of the greatest among this schemes launched by the governments this is the major step taken towards the people of this state. Many parts of the state are facing the problems of drinking water and people also facing the diseases including cholera, typhoid, and dysentery, fluoride are caused by drinking water containing infectious viruses or bacteria, which often come from human or animalwaste. The bhagiratha project is successfully completed and the distribution process is going on to every village in Warangal and Mahabubabad district. In this for our case study we have selected maripeda mandal and in that we have selected Gugulothunanya thanda. There is no facility of drinking water supply to this village before supply of mission bhagiratha water to this village ground water is the majar source of drinking water to these people as a result of decreasing in water level, the scorcity of drinking water is arised.

REFERENCES

- Environmental engineering Part -1, water treatment process by Dr.S.R LAXMI PRASAD
- Literature Review of water treatment process by BATCHELOR R.A (1975) household technology and the domestic demand for water, land economics
- United Nations (1977): Global water conference, MAR DEL PLATA, Argentina
- Literature Review of distribution network by P.M TRIPATHI (1985)
- The National water policy (1987)