
UNACCOUNTED FOR WATER (UFW) REDUCTION & CONTROL AND WATER DISTRIBUTION SYSTEM REHABILITATION (WDSR)

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1. Background

Bangalore Water Supply and Sewerage Board (BWSSB) proposes to draw the final installment of allocated water from River Cauvery under Cauvery Water Supply Scheme(CWSS) Stage , Phase . Government of Karnataka (GoK) in India has allocated 1,469 Mld of Cauvery Water to BWSSB. Under CWSS Stages , , and , BWSSB is drawing about 614 Mld of raw water. OEFF funded, now known as Japanese Bank for International Cooperation(JBIC), CWSSB Stage , Phase at the final stages of completion. Water supply components have been already commissioned and an additional 315 Mld is being drawn from Cauvery river. Under CWSS Stage Phase , BWSSB proposes to draw the balance 540 Mld.

Bangalore, the capital city of Karnataka state, is one of the fastest growing cities in India. The present population of about 5,7 million is expected to increase to over 7 million by the year 2011 and the area covered by the city is projected to increase from the present 446 km² to 594 km² in the same period.

Meanwhile, the major problem BWSSB is facing at present is the high level of unaccounted-for water (UFW). UFW rate is estimated at approximately 50 % of water supply. These high losses increase the cost of supply and contribute to the substantial operating subsidies required from GoK. As a consequence of high UFW, especially due to leakage, consumers are not able to obtain sufficient quantity of water with adequate pressure for their needs. The water supply duration in the project area is around 6 hours on alternative days. Hence it is essential that UFW levels be reduced to acceptable levels as rapidly as possible. The additional revenue generated because of reduced leakage/UFW will improve financial status and ensure sustainability of waterworks.

BWSSB has taken up a pilot project in UFW and the estimated cost of the works is about Rs 480 Millions. In addition to CWSSB Stage , Phase , JBIC has also funded this project , specifically valves, meters and leak detectors, and the consulting services as technical assistance.

2. Description of the Works

Table. Statistics of the Pilot Project Area

	Pilot Project Area	Bangalore
Area	30 km ²	1,279 km ² (565 km ² Urban, 714 km ² Greenbelt)
Population	400,000	4.84 million
Water supply volume	70 MLD	850 MLD
No. of connections	32,000	380,000
Length of mains	302 km	-

The scope of the work includes carrying out UFW survey and remedial measures for about 35,000 service connections and 302 km water of Distribution network. The work comprises establishment of District Meter Areas (DMAs) within the pilot area for the purpose of monitoring of UFW and detection of leakage. Provide bulk meters to measure water consumption, inspection of all consumer meters, fixing of new meters on unmetered water connections or on connections where meters are not working, testing of meters for accuracy, recording of consumptions on revenue meter to measure water supplied to the consumers. The difference between the input into DMA and water supplied to consumers is the total loss of water in the DMA. Decide permissible loss to get target levels and carryout leak detection survey, identify leaks, repair leaks and retest the DMA till loss of water is reduced to target leakage level.

Also, carryout condition assessment survey of water distribution network in the DMA / pilot area and rehabilitate water pipelines prone to leaks.

Work also includes renewals/replacement of service connections using MDPE pipes where necessary.

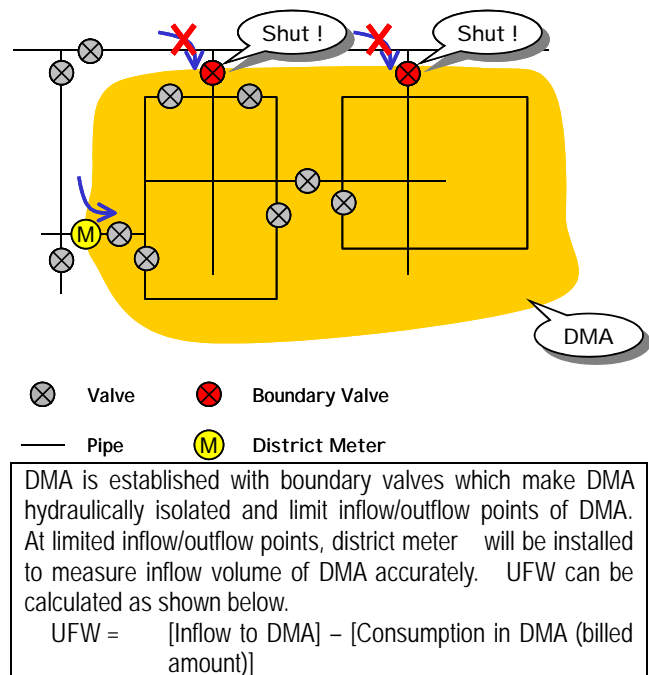


Figure. Concept of DMA

Design of DMA shall be done with the aid of computer network models, high level model covering the project area and low level models for each DMA to ensure and demonstrate that the proposed DMA establishment works will be able to maintain adequate hydraulic capacity of the DMA under 24 hours satisfied demand conditions as well as ensuring no unacceptable detrimental impact on supplies to areas adjacent to the DMA. The boundary of the DMA shall be watertight.

Circulating valves, i.e. those valves that are closed in order to remove all loops from within the DMA thus producing a tree-like mains layout, shall be identified and new valves installed where necessary, which will make leakage detection works more easily and efficiently.

The size and extent of areas within the DMA that can be progressively isolated in order to identify leakage levels across the DMA shall be determined to minimize the need for step valves commensurate with best step-testing practice. New step valves shall be installed where necessary.

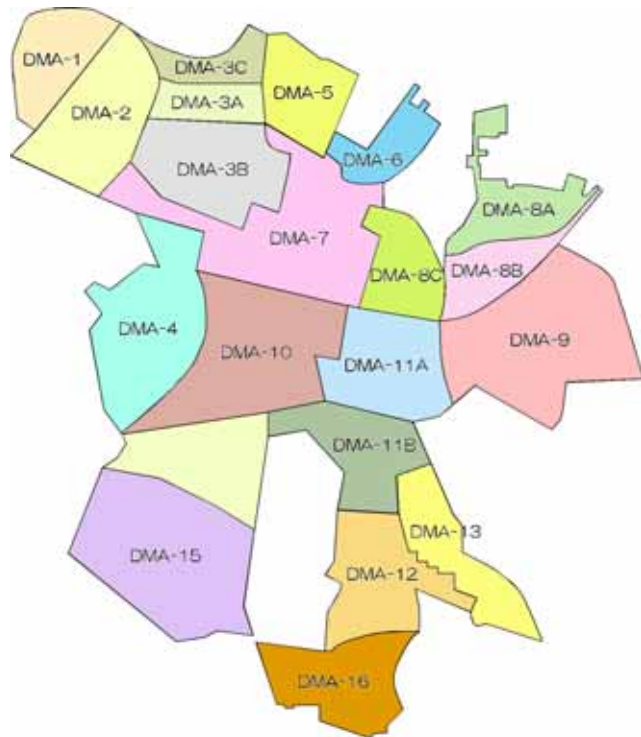


Figure. DMA

3. Current Status of the Project

Progress of the project is about 60 % as of the end of May. 2004. The current result is encouraging. In progressed DMA (DMA-3A), UFW has been reduced down to 53% of initial volume. Besides in DMA-1, UFW has been reduced down to 54%. And in DMA-3C, UFW has been reduced down to 70%. The status of the project is based on the data prepared by BWSSB and its consultant team.



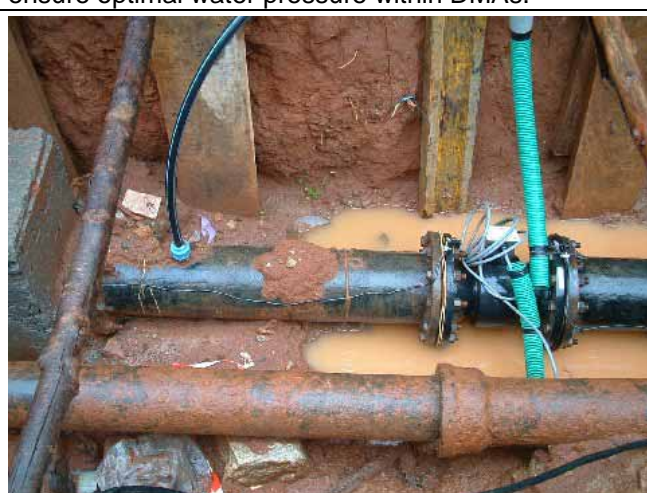
Leakage
UFW rate is estimated at 50% of water supply volume



Restructuring distribution networks
Based on the hydraulic analysis, restructuring work such as re-connection etc, is being done so as to ensure optimal water pressure within DMAs.



Installation work of DM (district meter)
Bulk meters, called district meter, are installed at inlet points of DMAs to measure supply volume to eachDMA.



Installation work of DM
Water flow meter (right) and Pressure gauge (left)



Revenue meter box
To prevent physical damage, water meter is installed with meter box.



Data logger box

Monitoring actual water flow and pressure, DMA design is reviewed.



Site survey

Confirm the data on existing facilities such as location of valves, junctions of distribution pipes, house connections, etc.



Listening stick

Checking watertight of boundary valves of DMA. DMA should be hydraulically isolated.



Pressure gauge

Pressure gauges are installed at strategic points of DMA in order to know water supply condition. Logged data is used for computer simulation model and design review.