NRW REDUCTION STRATEGY

- **PREAMBLE :**

Potable water is becoming scarcer; often making it more energy intensive to procure. More energy is required to pump water to greater distances and from deeper depth in the ground. This alarming situation and ever increasing population has cautioned everybody to conserve the available water resources and adapt oneself to optimum use of available water. The water supply, as an essential commodity, has to be looked upon from demand side as well as supply side. The urban local bodies, which form the supply side, will have to play a vital role in managing this often-scarce resource. As global urbanization continues, they have the complex task of cost effectively providing water to keep cities functioning. Further in the process of improving overall water system efficiency, energy & water consumption have to be viewed as linked inputs rather than viewing them as separate and unrelated. On the other hand, the demand side which consists of consumers have to be made aware of the present situation of the available water resources, necessary habitual changes required to be made by adopting various means of water conservation, optimal use of available water, re-use and re-circulation of waste water for some activities, frequent inspection and rectification of home appliances to reduce leak & wastage, restricted use of appliances requiring more water, etc.

- **EXISTING WATER SUPPLY SYSTEM :**
- Vasai-Virar Municipal Corporation was created on 3 July 2009 by including 4 Municipal Council's (Vasai, Virar, Navghar-Manikpur and Nallasopara) & 55 Gram Panchayat's.
- The existing water supply to the Vasai-Virar city is managed by Vasai-Virar City Municipal Corporation (VVCMC). Vasai-Virar City lifting water from four sources 1) Surya Water Supply Scheme (100 MLD), 2) Usgaon Water Supply Scheme (20 MLD), 3) Pelhar Water Supply Scheme (14 MLD)& 4) Phoolpada Water Supply Scheme (1.5 MLD).
- Main source of Vasai-Virar water supply system is K.T. weir at Maswan on Surya River is 32 Km. away from the city and Situated North side of the Vasai-Virar City. Scheme is located on the left bank of Surya River adjacent to the Maswan weir on upstream side and on downstream side of Manor-Palgharroad.
- Water is pumped from the pickup weir at Maswan dam and conveyed to water treatment plant by 1168 mm dia. MS pipe line, L- 3.4 Km. above the ground and 1200 mm dia underground PSC pipe line, L- 0.6 Km. i.e. total 4.00 Km. length from Maswan HW to Dhuktan WTP along with Palghar-Manor Rd. and Dahisar Rd.Dhuktan WTP is supplied pure water to nearest 1.4 Km Dhuktan BPT at Tryambakpada through 1400 mm dia MS pipeline. Capacity of BPT is 1.25 MLwhich is capacity of 1.24 ML. and then transmitted by gravity through the transmission mains of 1500 mm PSC pipeline which is 15 Km. and 1200 mm MS & PSC pipeline which is 12.80 Km.(total 27.80 Km.) to Kashidkopar MBR which is capacity of 20 ML (10 ML X 1 and 5 ML X 2) at Vasai-Virar city.
- Kashidkopar MBR supply pure water to 4 towns along with NH-8, Virarphata, Nallasoparaphata and Vasai phata through 2050,1550,1540,1500, 1296 & 788 MS pipeline which is total length of 41.55 Km. to MBR’s and ESR’s at 4 towns.
- This water from the ESR’s is distributedthrough the different types of dia i.e. 25 mm dia to 1550 mm dia and different types of material i.e. MS, CI, DI, PVC, AC & GIdistribution networkwhich is total 579 km. The system presently covers 48% of the developed areas including the villages.

- There are total 38743 service connections in entire VVCMC area as per details shown in Table below;

Table No 1. Details of House Connections

Consumer Category	Connection Size	Zones					Total Connections	
		Virar (Zone-A)	Pelhar (Zone-B)	Nalasopara (Zone-C)	Navghar-Manikpur (Zone-D)	Vasai (Zone-E)		
Residential	1/2"	5371	1242	11901	7236	3921	29671	37187
	3/4"	6564			86	777	7427	
	1" & Above				38	51	89	
Non-Residential	1/2"	208	95	190	635	40	1168	1207
	3/4"					38	38	
	1" & Above					1	1	
Industrial	1/2"				131	4	135	192
	3/4"	26					26	
	1" & Above					31	31	
Institutional	1/2"				95	39	134	157
	3/4"				3	19	22	
	1" & Above					1	1	
Total Connections		12169	1337	12091	8224	4922	38743	

- ## NON REVENUE WATER (NRW) :

- ### What is Non-Revenue Water (NRW)?

  The difference between the amount of water put into the distribution system and the amount of water billed to customers is known as Non-Revenue Water (NRW). NRW is made up of real losses and apparent losses. Real losses occur in distribution systems, service connections, bursts and storage tanks (including

overflow). Apparent loss includes meter and record inaccuracies and unauthorized water uses such as theft and unauthorized connections authorized unmetered uses can also be considered as one of the components of NRW.

- The service level benchmark for NRW is 20%. There is considerable scope for reduction of NRW in almost all cities of the country. Though reduction of NRW is a very big challenge, there have been examples of successful reduction of NRW.

- **Different Elements of NRW Reduction Strategy identified are :-**
    - Water Audit & Water Balance
    - 24x7 Water Supply
    - District Metered Area (DMA)
    - Supervisory Control & Data Acquisition (SCADA)
    - Network Mapping
    - Leakage Mapping
    - Regularization of Public Stand Posts (PSP)
    - NRW Cell
    - Capacity Building
    - Tariff Structure

- **VVCMC's NRW REDUCTION STRATEGY :**

- **24 X 7 Continuous Pressurized Water Supply Project**

Vasai-Virar Municipal Corporation has planned to undertake the prestigious project of Converting existing Intermittent Water Supply System to Continuous Pressurized 24x7 Water Supply System for the entire city.

In the first phase, VVCMChas proposed to convert intermittent water supply system to continuous (24x7) water supply system in the 40% area covering a population of about 12 lakhs. The improvement work will be executed under AMRUT sanctioned funding for indicative project cost of Rs. 130 Crore for the selected 40% project area of VVCMC. The area is so selected that there is enough storage and no new tanks are required to be constructed. The project

would aim at improving Technical & Commercial efficiencies and upgrading existing intermittent supply for continuous pressurized water supply & reduction in non-revenuewater & demand management to bringdown the gross water consumption as per the norms. At present, the selection of Operator for the said project is in its final stages.

In the second phase, a project under water supply for 100% Coverage and Reduce NRW has been sanctioned for VVCMCunder Central Government's AMRUT Mission. VVCMC plans to undertake this project wherein the final objective of the project shall be to convert intermittent water supply system in the remaining 60% area of VVCMCto continuous (24x7) water supply system. At present, Detailed Project Report for the said project is being prepared.

- **Components included in the 24x7 Water Supply Project for achieving NRW Reduction :**
    - Setting up correct zones for each ESR/ GSR: Operational zones are demarcated with respect to ESR/ GSR's capacity and serviceability.
    - Setting up District Metering Areas (DMA): District Metering Areas are set up for each correct operational zone for the number of customers between 500 to 2000. These DMA's shall be made hydraulically discrete (isolated) by carrying out zero pressure tests. Flow into the each DMA shall be metered and continuously monitored. Also, Pressure Control Valve's (PRV's) shall be installed at more than one point as per the site requirements. Analysis of water flow and pressure, particularly in the night when most users are not drawing water will enable Leakage Specialists to identify leakages and calculate the level of leaks in that particular DMA.
    - Detailed survey and investigations of transmission and distribution network shall be carried out. The entire Transmission and Distribution Network shall be mapped by using GIS Mapping tool and this shall facilitate to carry out effective and accurate Hydraullic Modelling of the entire system. Out of the total selected area of distribution pipe network, a few kilometers of pipeline shall be replaced. Thus, after replacement,

NRW can be brought down considerably as thepipes will be new with good joint system.

- House service connections: All house service connections shall be replaced by using MDPE pipe. It is a known fact that more than 50% of the leaks appear from Service Connection, old discontinued connections and leaks at ferrule points. Also, the service connections are made of Galvanized Iron (GI) pipes which have effective life of less than 15 years depending upon the soil condition in which it is laid. The age of connections in the maximum VVCMC area is more than 15 years which would mean that many of the service pipes have live their life and need replacement. Thus, this House Service Replacement program will amount to a huge NRW Reduction.
- Bulk and consumer metering: Bulk meters shall be installed with a provision of creating agraph of minimum net night flow V/s. hours by sending SMS to the control room.
- Leak identification: Identify the leakage areas by conducting step tests and gathering data from the data loggers. Exact location of leak spots shall be thenfixed using leakage identification instruments such as injection of helium gas, sounding rods, noise-corelator etc.
- NRW reduction: Once the commercial and physical losses are known, measuresshall be taken up to bring them in accepted limit.
- Water Balance: Components of water balance such as authorized billed meterconsumption, authorized billed unmetered consumption, unauthorized consumption due to thefts, metering inaccuracies, leakage in transmissionmains, distribution house service connection shall be computed and water audit will be carried out.

- **Consumer Awareness Programs :**
  - VVCMC plans to undertake all measures which shall promote the benefits of project and create public awareness about 24x7 water supplies. A separate Public Relation team shall be appointed which will ensure cordial

communication between Contractor, VVCMC, Public Representatives, NGOs, consumer forum, Media, other Government Authorities, etc.

- Public Campaigns for the project & water conservation while conversing DMA's in to 24x7 Water Supply shall be undertaken.
- Internal water audit or leak test for consumers those having history of high consumption shall be conducted. A list of such consumers shall be identified and maintained.
- Checklist of probable leak points to consumers of DMA's shall be provided as a part of awareness program.
- Residents Welfare Association (RWA) / notified societies shall be informed about time table for digging & restoration work within the colony.