



# Management of urban water cycle in Kolkata Municipal Corporation

**Shri B K Maiti**  
**Director General - Water Services**  
**Kolkata Municipal Corporation**  
**Date: 31<sup>st</sup> August, 2012**

## Water Supply in City Today – Fact Sheet...



- **No. of House Connections** : 2,45,019
- **No. of Stand Post** : 17,000
- **No. of Bulk Meter Connections** : 245
- **No. of I.C.I. Connections** : 8,865
- **Coverage of Household Connection** : 92.70%
- **Realisation of Water Charges :**
  - 2011-2012** : Rs. 31.71
- **Collection from Bulk Meter Consumers** : Rs. 6.45 Crore
- **Total Expenditure :**
  - 2011-12** : Rs. 254.15 Crore



Cont.....

- **Average supply hours** : *8 hours*
- **% of household covered by Surface water** : *82.70%*
- **% of household covered by Ground water** : *10%*
- **Water demand (2012)** : *293 Million gallon / day*
- **Water demand (2026)** : *402 Million gallon / day*
- **Per capita supply** : *200 litre including 35% UFW*
- **Unaccounted for water** : *35%*
- **Non Revenue Water** : *97.46%*
- **Treated surface water supply** : *271 Million gallon / day*
- **Ground water supply** : *25 Million gallon / day*



**Cont.....**

- No. of Booster Pumping Station : 17 + 1 (Tallah)**
- Nos. of Booster Pumping Station : 3**  
**(under construction)**
- Nos. of Booster Pumping Station : 5**  
**(Proposed)**
- Length of Distribution Network : 5800 Km**
- No. of Tubewells :**
  - Big Dia Tube-well : 439 [Power driven]**
  - Small Dia Tube-well : 10,050 [Hand driven]**



## **TARIFF (2011-12)**

For bulk supply (Volumetric) -

Domestic : Rs.7.00 per KL

I.C.I. : Rs.15.00 per KL

Domestic Ferrule Connection : **No Charge**

I.C.I. Ferrule Connection Per Month (Flat Rate)

10mm : Rs.525/-

15mm : Rs.1,200/-

20mm : Rs.2,000/-

25mm : Rs.3,000/-





In 2004 capacity was further augmented to 220 MGD...  
In 2006 capacity was still further augmented to 260 MGD





5 MGD capacity  
water treatment plant  
at Wattgunge Sq.



8 MGD capacity  
water treatment  
plant at Jorabagan.





<i>Name of Water Treatment Plant</i>	<i>Capacity in Million Gallon per day</i>
.. Indira Gandhi Water Treatment Plant (K.M.C. Plant), Palta :	260
Garden Reach Water Works:  <i>[For Budge Budge, Mahestala, Pujali &amp; K.M.C.]</i>	120
Jorabagan Water Treatment Plant :	08
Watgunge Water Treatment Plant :	05



# Kolkata Municipal Corporation Water Supply Profile

**IGWTP, PALTA**

JNNURM ON GOING PROJECT OF TALLAH--PALTA  
DEDICATED TRANSMISSION MAIN

Source of Water		
Location	Capacity in Mgd	
A Tallah Palta Filter Water Source	260.0	
B Garden Reach Filter Water Source	91.0	
C Watgunge Karbala Tank Filter Water Source	5.0	
D Jorabagan Park	8.0	

## Booster Pumping Stations with U.G.R.

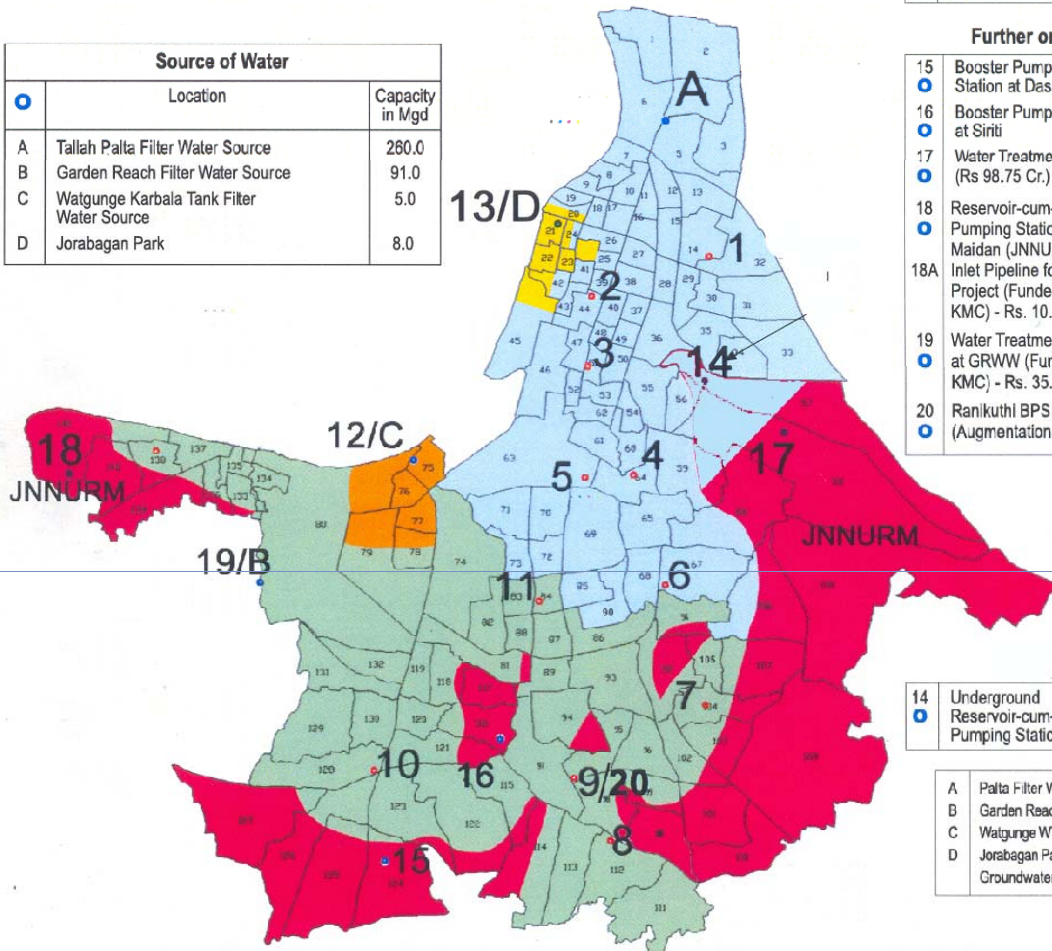
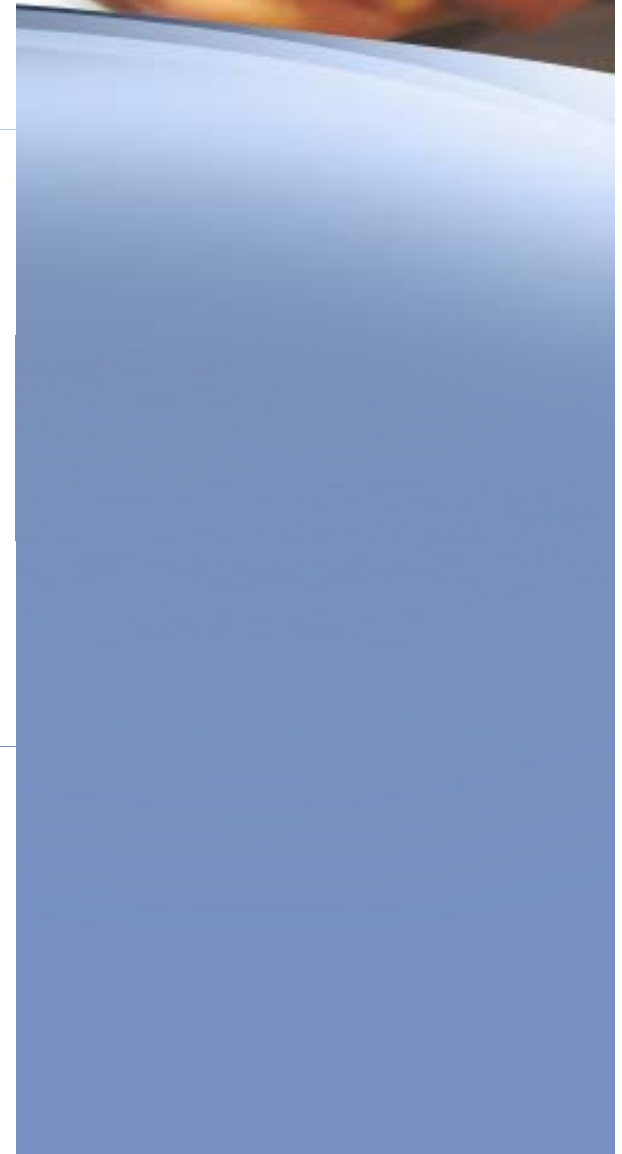
No.	Name of Booster Pumping Stations	Capacity In Mgd
1	Bagmari	6.0
2	Md. Ali Park	4.0
3	Raja Subodh Mullick Square	6.0
4	Park Circus	3.5
5	Auckland Square	6.0
6	Kasba	3.5
7	Garfa	3.5
8	Bansdrani	2.0
9	Ranikuthi	3.5
10	Behala	4.5
11	Kalighat	4.0
12	Watgunge	2.5
13	Jorabagan Park	3.5

## Further on-going Projects

15	Booster Pumping Station at Daspara, Behala	3.0
16	Booster Pumping Station at Siriti	2.0
17	Water Treatment Plant at Dhapa (Rs 98.75 Cr.) (JNNURM)	30 Mgd
18	Reservoir-cum-Booster Pumping Station at Gandhi Maidan (JNNURM) - Rs. 10.5 Cr.	3.0
18A	Inlet Pipeline for the above Project (Funded Wholly by KMC) - Rs. 10.5 Cr.	6 KM
19	Water Treatment Plant at GRWW (Funded Wholly by KMC) - Rs. 35.0 Cr.	15 Mgd
20	Ranikuthi BPS (Augmentation of Capacity)	

14	Underground Reservoir-cum-Booster Pumping Station at New Park	3.0
----	---	-----

A	Palta Filter Water Fed Zone	
B	Garden Reach Filter Water Fed Zone	
C	Watgunge WTP Filter Water Fed Zone	
D	Jorabagan Park Filter Water Fed Zone	
	Groundwater Fed Zone	



# Schematic Water Supply Distribution System

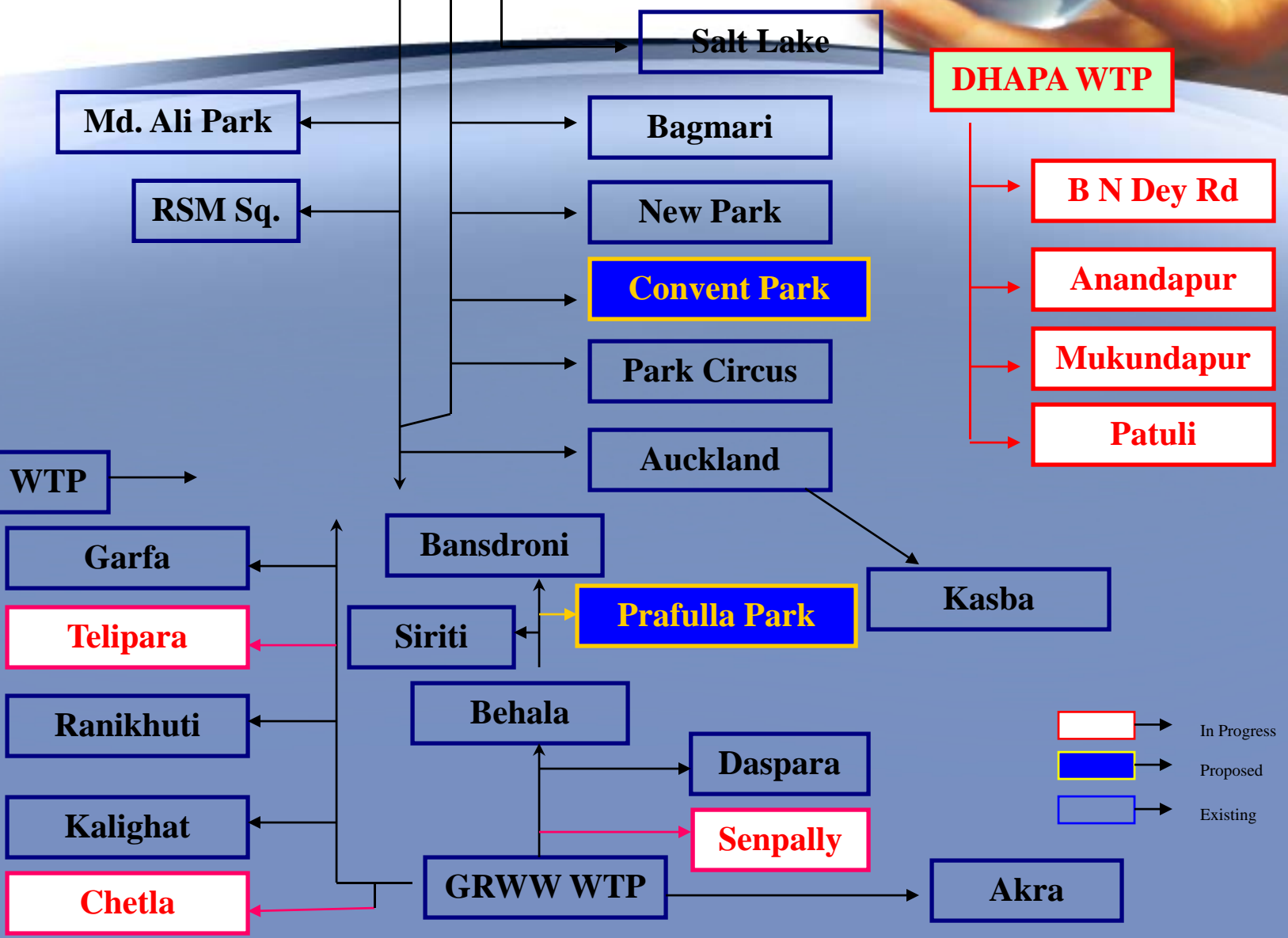


Jorabagan WTP

DHAPA WTP

Wattgunj WTP

GRWW WTP



In Progress  
 Proposed  
 Existing

# Challenges in Management



- i) Absence of consumer meter at household connection
- ii) Absence of District Meter
- iii) Very old net work
- iv) GIS Map
- v) Intermittent supply
- vi) Frequent complaint of contamination
- vii) E-customer management system
- viii) Problems of ground water feeding system
- ix) High UFW – 35%
- x) Low realisations of service charge



## Absence of consumer meter at household connection



- No limit on water usage in water usage in the consumer end.
- Very little awareness in saving water as there is no charge for using water.
- There is a notion among citizens that water is an abundant resource.
- Resulting in wastage of large amount of water.

## However if water is metered like electricity



- Awareness will be raised.
- Consumption can be tracked.
- Water will be used judiciously and will be treated as a scarce resource.



## Problems with distribution network

- Wastage at consumer end.
- Network mainly rests on Booster Pumping Stations and not on overhead reservoirs.
- Intermittent supply.
- Leakage.



## Wastage at consumer end



- Wastage at consumer end is biggest drawback of the system.
- Even though per capita supply of water is above required, wastage by one person denies water to other person in reality.

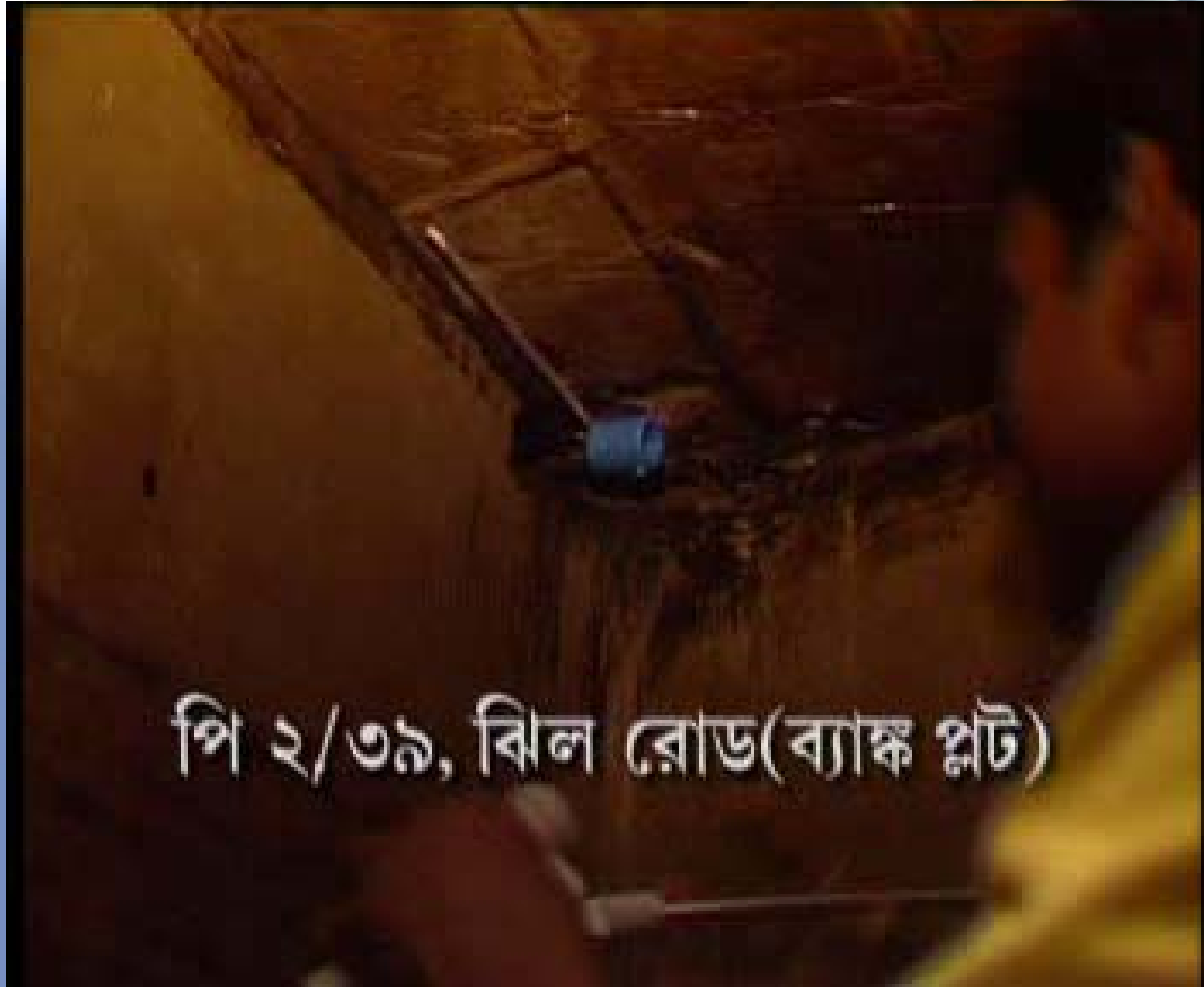
# Wastage at consumer end

Wastage at Household underground reservoir



# Wastage at consumer end

## Prevention of Wastage



পি ২/৩৯, বিল রোড(ব্যাঙ্ক প্লট)



Wastage at consumer end

Wastage at Street Stand post



# Network mainly rests on Booster Pumping Stations



- An ideal city would have overhead reservoirs servicing designated part of the city.
- Such overhead reservoir system is both practical and economical.
- Due to organic growth of the city such system is not in place.
- The system of booster pumping stations is uneconomical and not effective like reservoir system.

# Salt lake City has such system in place.

Distribution system is more streamlined and efficient there. However water wastage is still rampant because of lack of awareness and absence of metering.





## Intermittent supply

- Lack of 24 hours supply means seeping of outside matter into the distribution system.
- Formation of Air Pockets in the distribution system and there by causing pipe damage.



# Leakage

- Much of water is wasted in transmission due to leakage.
- Remedial measures would include overhauling of the age old distribution network.



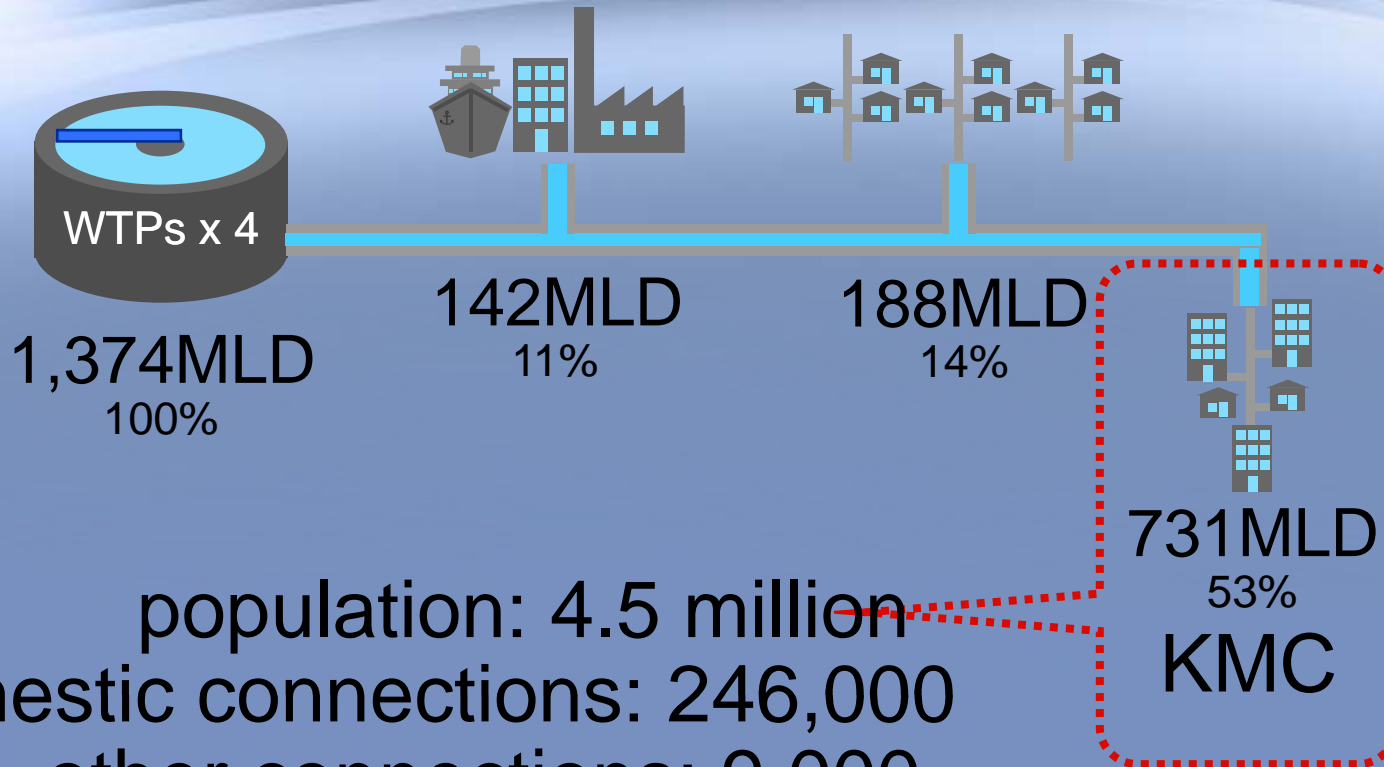
# ADB's Pilot Study under KEIP



# Production and Distribution - KMC's Estimate

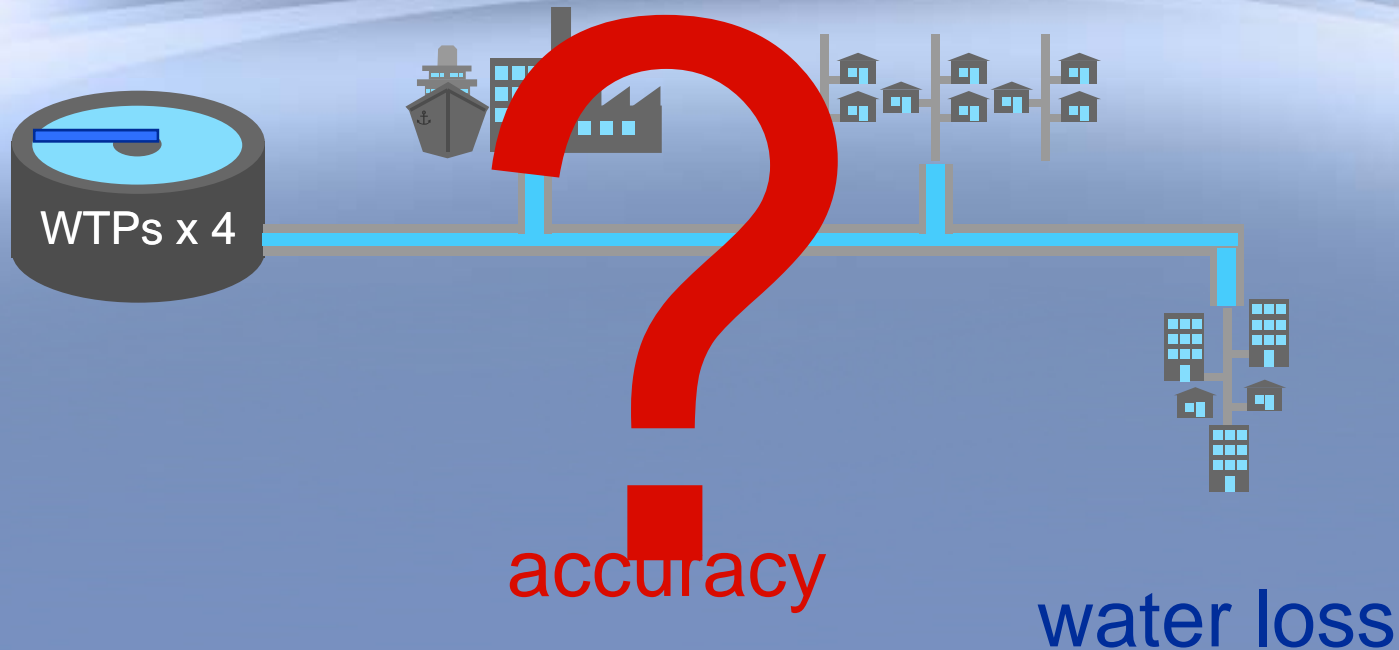


industries other ULB



population: 4.5 million  
domestic connections: 246,000  
other connections: 9,000  
area: 185km<sup>2</sup>

# Water Loss - KMC's Estimates

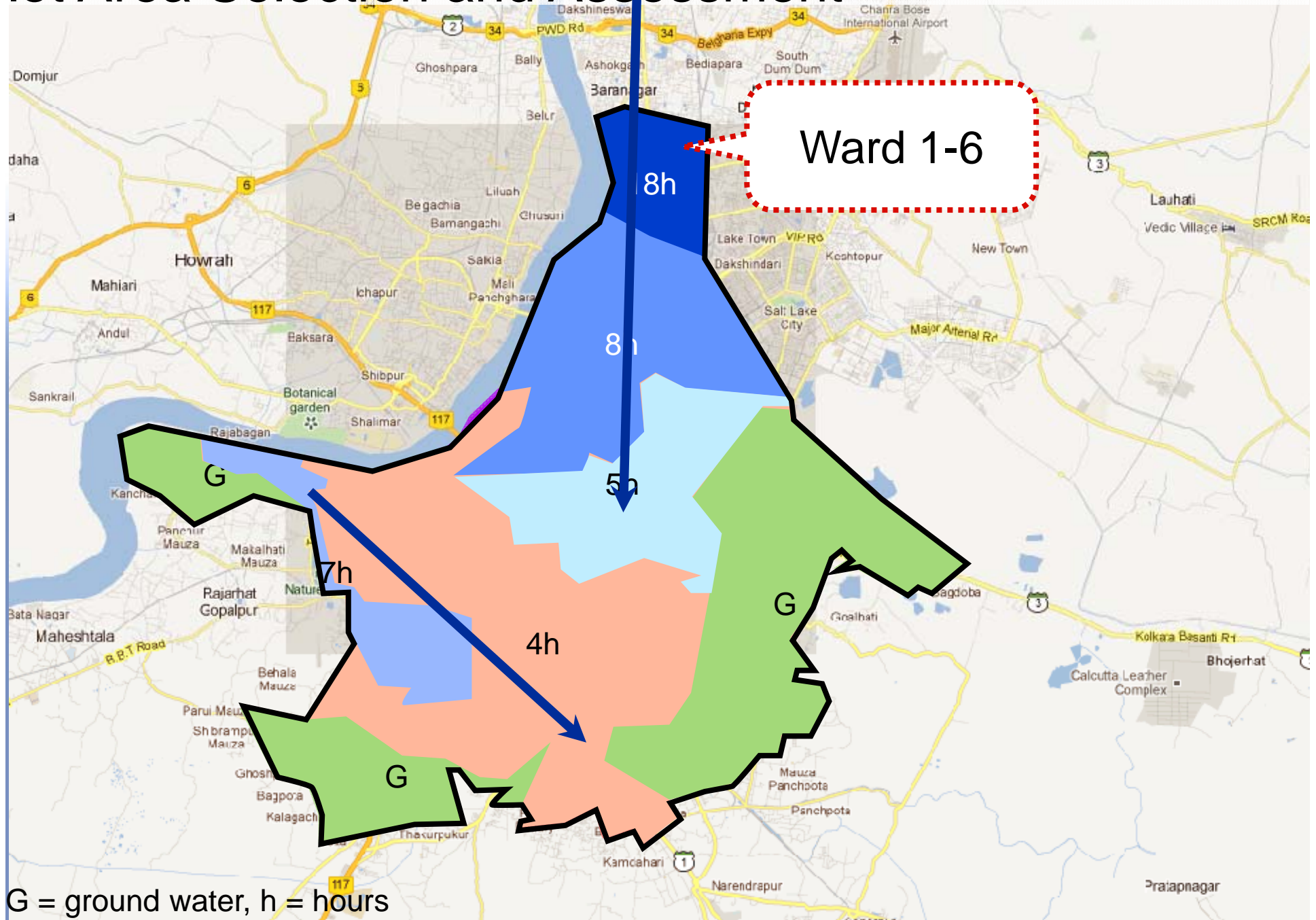


$$1,374\text{MLD} = 142\text{MLD} + 188\text{MLD} + 731\text{MLD} + 313\text{MLD}$$

100%                      11%                      14%                      53%                      22%

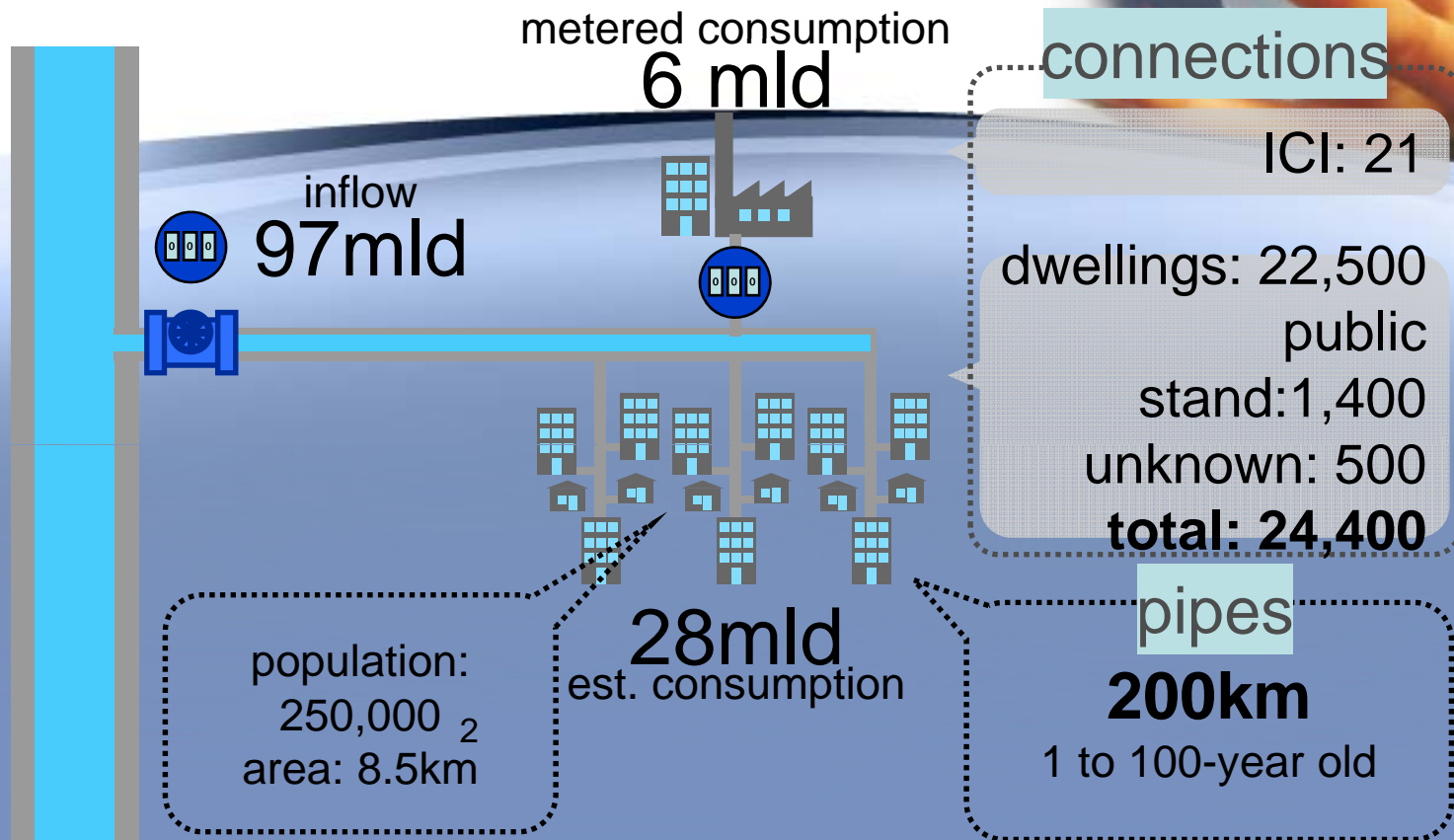
... but estimates is from unmetered network  
as good as 'guesstimate'

# lot Area Selection and Assessment





# Pilot Area Assessment Results



Ward	Length (km) per Diameter (mm)																Total
	100	125	150	200	225	250	300	350	375	400	450	500	525	600	750	900	
1	18.4	2.5	9.3		2.4	0.6	2.6		0.5		0.5						37
2	34.6		12.1	0.9	3.4	0.6	2.6	0.4		0.5		1.2					56
3	24.7		6.9		1.7	0.8	0.9										35
4	13.1	2.5	5.2		1.3		2.2					0.7		0.4			25
5	7.4	9.6	0.2		0.6	0.9	3.2			0.9	0.1	0.4	0.1		0.7	0.4	25
6	8.2	2.9	8.8		0.9	1.1				0.6	0.5		0.7	0.3		0.5	25
<b>Total</b>	<b>106.3</b>	<b>17.6</b>	<b>42.5</b>	<b>0.9</b>	<b>10.4</b>	<b>4.0</b>	<b>11.4</b>	<b>0.4</b>	<b>0.5</b>	<b>2.0</b>	<b>1.2</b>	<b>2.3</b>	<b>0.9</b>	<b>0.7</b>	<b>0.7</b>	<b>1.0</b>	<b>203</b>



# Assessment Results



$$97\text{mld} = 28\text{mld} + 6\text{ mld} + \mathbf{63\text{MLD}}$$

100%                      29%                      6%                      65%

water loss

# Internationally Standardized Measurement



**liters/service connection/day** ..... better = less volume  
when the system is pressurized

=loss volume adjusted as if 24x7 supply achieved




**infrastructure leakage index** ..... better = close to 1.0

$$= \frac{\text{current annual real losses (CARL)}}{\text{unavoidable annual real losses (UARL)}}$$

(how many times is CARL higher comparing with UARL)

# Norms vs Assessment Results



	Kolkata pilot area	IWA norms for low- and middle income countries			for comparison Delhi pilot areas
		 acceptable	 good	 excellent	
I/conn./d w.s.p	3,400	200	100	<50	1,124
ILI	600	16	8	<4	304

I/conn./d w.s.p = liters per service connection per day when system is pressured

ILI = infrastructure leakage index

Kolkata will have **3,400 I.conn.d** if 24x7 supply achieves

Kolkata's **ILI is 600 times** as high as a system

with the same length of mains, number of connections and customer meter location, under the same pressure management regime

# OUR VISION



- To supply treated surface water to the whole city of Kolkata
- Phasing out of big diameter tubewells and other sources of ground water
- To construct more Booster Pumping Stations both in scarcity zone and groundwater fed zones.
- Refurbishment/Replacement old Mains
- Installation of Consumer Meter and to develop Flow & Pressure Monitoring System
- To minimise '*Unaccounted For Water*' as per CPHEEO Standard

Thank You

