Chapter 13

WATER SUPPLY AND SANITATION

1. Water and sewerage are an essential component of the basic infrastructure for urban settlements. As per Census 2001, Delhi had a population of 137.83 lakhs as on March, 2001. The number of households has increased from 18.62 lakhs in March, 1991 to about 27.57 lakhs in March 2001. Besides domestic use, water is also required for industrial, commercial, and other institutions, and fire fighting purposes.

WATER CONSUMPTION

2. As in January 2000, estimated water consumption in Delhi was about 731 MGD. DJB was supplying 609 MGD and the balance 122 MGD was being met mainly through commissioning of tube wells/ hand pumps by the public. The number of metered water supply connections by DJB in Delhi increased from 9.58 lakhs as on 31.03.99 to 10.32 lakhs as on 31.03.2001. At the same time unmetered water connections from DJB also increased from 2.97 lakhs as on 31.03.99 to 3.12 lakhs as on 31.03.2001. The details may be seen at Table No.13.1 and 13.2.

3. **DISPARITY IN WATER SUPPLY**

3.1 There is a significant inequity in the availability of water in different zones in Delhi as could be seen in MAP 13.1.

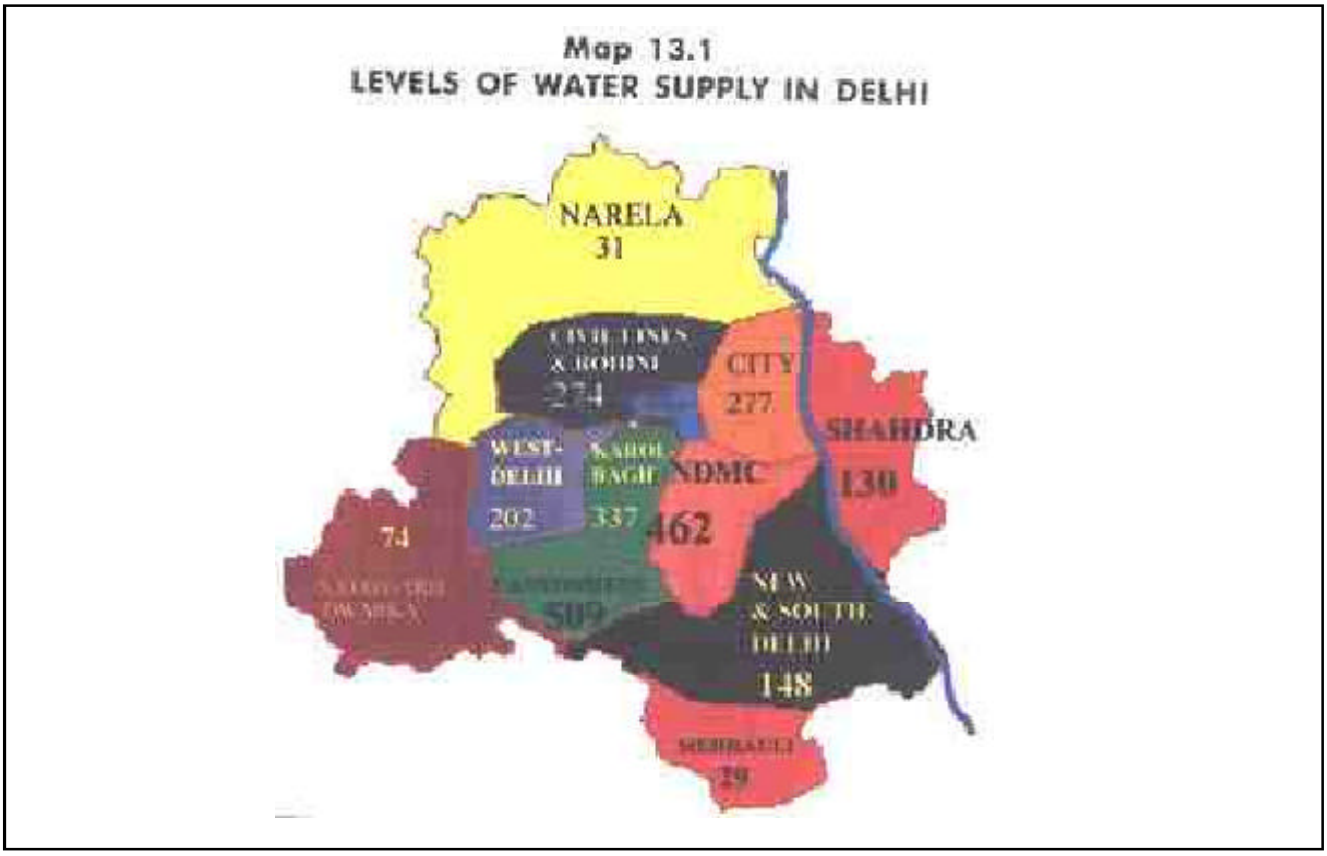
This distribution position indicates:-

(i) The level of supply in the Cantonment area is the highest and is almost 18 times the level of supply in the Mehrauli area.

(ii) If NDMC and Cantonment areas are excluded, being bulk supply, the level of supply in Karolbagh is highest 12 times the level in Mehrauli and 11 times the level of supply in Narela.

(iii) The overall low level of supply in Narela and Mehrauli is to some extent logical since these areas include a large number of rural villages where the supply norm is less than for planned colonies.

(iv) The level of supply in South and New Delhi is too low (148 lpcd) considering the high demand expected from a largely medium / high income residential area.



Source : "Delhi-1999, Fact-Sheet" published by NCR Planning Board

3.2 All water production centres - Haiderpur, Wazirabad, Nangloi, and Chandarwal, are located in the North. Thus, the trunk mains have carry water long distances resulting in pressure and flow losses. Illegal tapping is also very common. Little attention has been paid in the last three decades to create a production centre (WTP) of adequate size in the South Zone and New Delhi Zone.

3.3 In order to rationalize distribution of water, underground reservoirs and booster pumping stations have been constructed at Dakshinpuri, Faridpuri, Shadipur, Mangolpuri, and Chitranjan Park, and others are being constructed at Srinivashpuri, Malviya Nagar, Baljit Nagar, Nand Nagari, Kondli, and Brahmpuri.

UNACCOUNTED FOR WATER (UFW)

4. The analysis of the water supply situation would be incomplete without an assessment of the unaccounted for water. Assessment for the year 1998-99 based on DJB data indicates the UFW position as in statement 13.1.

Statement 13.1

Production

Total water production and pumped in 1998 - 99 = 545 MGD = 2475 MLD

Supply of Water

a)	Total consumption to Cat-I, Cat-II, Cat-III	1153 MLD
b)	Water supplied for fire fighting purposes	27 MLD
c)	Supplied through Public Hydrants	20 MLD
d)	Supplied through Tankers	23 MLD
e)	Supplied to NDMC	141MLD
f)	Supplied to MES	29 MLD
	Total	1393 MLD

Thus, quantity of water which cannot be accounted for = 1082 MLD

Percentage of unaccounted for water (43.69%) or, say, 44%

5. **WATER REQUIREMENT**

5.1 Based on a norm of 70 gallon per capita per day as prescribed in MPD 2001, the water requirement for 2001-02 would be 965 MGD. As per CPHEEO manual, the per capita per day water requirement is 60 GPCD as per details given in the Statement No.13.2.

Statement No.13.2

PER CAPITA PER DAY WATER REQUIREMENT - CPHEEO NORMS

1.	Domestic	172 lpcd
2.	Industrial, Commercial and Community requirement based on 45000 litres per hect. per day	47 lpcd
3.	Fire protection based on 1% of the total demand	3 lpcd
4.	Floating population and special uses like hotel and Embassies	52 lpcd
	Total	274 lpcd (60gpcd)

5.2 Based on this norm of 60 GPCD, water requirement of Delhi in March, 2001 comes to 827 MGD against the supply capacity of 650 MGD of DJB. DUEIIP-2021 has estimated Delhi's water requirement of 4752.63 MLD (1056 MGD) in 2021 for 22 million projected population. (Table 13.3). DDA's working group on physical infrastructure for preparation of MPD-2021 has estimated Delhi's water requirement as 1500 MGD by 2021 based on 50 GPCD norm for 30 million projected population.

6. **WATER SUPPLY TARGETS 2001-02.**

Delhi Jal Board has proposed to increase the Water Supply capacity from 650 MGD as on 31.03.01 to 675 MGD as per details given below:

Statement No.13.3

WATER SUPPLY CAPACITY

S.No.	Name of Plant	Existing Capacity as on 31.03.2001	Proposed Capacity at the end of 31.03.2002.
1.	Chandrawal Water House no. I & II	90	90
2.	Wazirabad I,II & III	120	120
3.	Haiderpur	200	200
4.	North Shahadra (Bhagirathi)	100	100
5.	Bawana		20
6.	Nangloi	40	40
7.	Plant for iron content removal for Ranney Wells Water at Okhla	--	12
8.	Renney Wells and Tube Wells	81	93
9.	Optimization of WTPs	19	--
	Total	650	675

7. **WATER RESOURCES**

7.1 The water supply treatment plants of DJB treat 550 MGD surface water and 81 MGD ground water as on March, 2001. The water resources of DJB are indicated in Statement No.13.4.

Statement No.13.4

WATER RESOURCES OF DJB

Sl.No.	Source	Quantity (MGD)
1.	Yamuna	210
2.	Ganga	100
3.	Bhakra Storage	240
	Subtotal (Surface Water)	550
4.	Ranney Wells/Tube Wells	81
	Total	631

GROUND WATER

7.2 The falling ground water level in Delhi has become a matter of serious concern. At some places in south and south west Delhi, the water level has gone below the 20-30 meter mark below the land surface. The quality of underground water is deteriorating and in several places it has been found to be unfit for human consumption. The salinity of ground water is increasing in south-west and north-west Delhi. In some areas of Shahdara and Kanjhawala, nitrate content has been found to be more than 1000 mg/litre. Fluoride and chemical concentrations, more than prescribed limits, have also been found in ground water at various locations in Delhi (Table No.8.7). To tackle these problems, the Central Ground Water Board has taken steps to regulate the number of tube-wells being commissioned in Delhi.

7.3 As on January-2002, DJB has 2269 Tubewells and 21 Ranney Wells. The Flood prone area upstream of Wazirabad barrage is being exploited for commissioning of more tube wells by DJB. The deepening of the Najafgarh drain between Kakrola and Dhansa Regulator, preserving and developing old lakes and other water bodies, preserving and developing the forest area in Delhi, construction of check dams at Asola Wild Life Sanctuary and plantation of trees, are some of the steps being taken to improve ground water resources.

7.4 A beginning has also been made towards harvesting roof top rain water and waste water re-cycling in Delhi. PWD and DJB has already started rain water harvesting measures in Govt. office buildings. Cooperative Group Housing Societies are also being persuaded to adopt rain water harvesting in their complexes. Building bye-laws have also been amended to ensure rain water harvesting measures in all new buildings with 1000 sq. meter and above size plot area.

SURFACE WATER

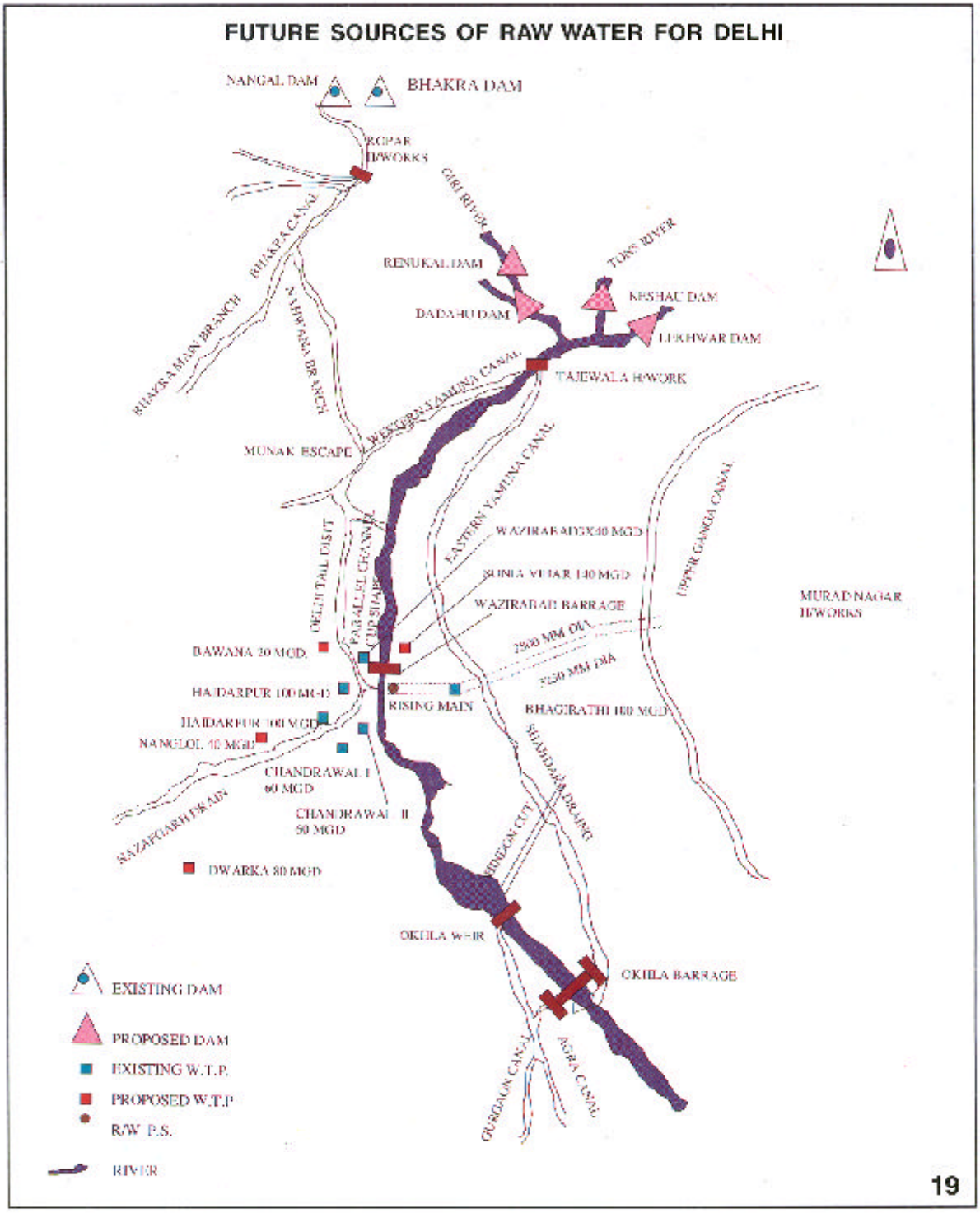
A PARALLEL CHANNEL FROM MUNAK TO HAIDERPUR

7.5 About 30% of the raw water discharged from Tajewala headworks is lost in the present water carrier system through the Yamuna river and the Western Yamnua Canal system. To prevent this loss, construction of a parallel pucca channel is proposed from Munak to Haiderpur. This channel will be constructed by the Haryana Government. After a lot of persuasion, the Government of Haryana has agreed to start construction of this pucca channel of 102 kms length. The estimated cost is Rs. 380.18 crore and it will be completed in the next three years. The entire cost of the project will be financed by Delhi Govt. Water availability will increase by 80 MGD on construction of this channel.

RESERVOIRS

7.6 Renuka Dam, Kishau Dam and Lakhwar Vyasi Dam are proposed to be constructed so that Delhi gets its share in Yamuna water as per the Yamuna Water Sharing Agreement signed in May, 1994. About 275 MGD of water will be available to Delhi from Renuka Dam. Delhi will also get 372 MGD water from Kishau reservoir and 135 MGD from Lakhwar Vyasi reservoir (Map 13.2).

Map 13.2



Source : NCR Fact sheet

7.7 About 300 cusecs of raw water will be available for Sonia Vihar plant from Tehri Dam. To carry this raw water a 3250 mm dia conduit is being laid from Murad Nagar to Sonia Vihar through UP Jal Nigam at an estimated cost of Rs 110.00 crore. This work is also likely to be completed in December, 2003

8. **NEW WATER TREATMENT PLANTS**

8.1 A 40 MGD Water Treatment Plant was constructed at Nangloi but it could not function to full capacity as raw water for this plant is not available; at present it is functioning at 24 MGD capacity. Another new water treatment plant of 20 MGD at Bawana is likely to be completed in 2002-03.

8.2 Construction of 140 MGD Water Treatment Plant at Sonia Vihar at an estimated cost of Rs 330.00 crore has been started and will be completed by December, 2003.

8.3 Two new Water Treatment Plants are proposed to be commissioned at Dwarka (40 MGD) and Okhla (20 MGD) during the 10th Five Year Plan. Raw water for the two plants will be available on construction of the pucca parallel channel from Munak to Haiderpur.

9. **WASTE WATER MANAGEMENT**

Due to the continuous inflow of migrants and the mushrooming of unauthorized colonies and JJ clusters, the landscape of Delhi is spotted with different types of settlements. More than 45% population are residing in such unplanned settlements where a sewerage system is not provided. The estimated waste water generation in Delhi in January, 2000 and the population served with sewerage system may be seen at Table No.13.2. Now, plan schemes to provide sewerage systems in regularised-unauthorised colonies, JJ resettlement colonies, and urbanised villages, are being implemented and the present status of these colonies may be seen at Table 13.4. DUEIIP projections for waste water generation in Delhi in 2021 are indicated in Statement No.13.5.

Statement No.13.5

WASTE WATER GENERATION IN DELHI IN 2021

• Predicted population in 2021	=	220 lakh
• Total water demand (excluding losses)	=	4370 mld
• Total wastewater generation (assumed at 80% of demand)	=	3500 mld
• Wastewater going to STPs*	=	3150 mld
• Wastewater going to CETPs*	=	350 mld

* ignores any local recycling and reuse of wastewater, etc., but allows for future transfer of some existing industries in non-conforming areas to conforming areas

10. **SEWAGE TREATMENT CAPACITY**

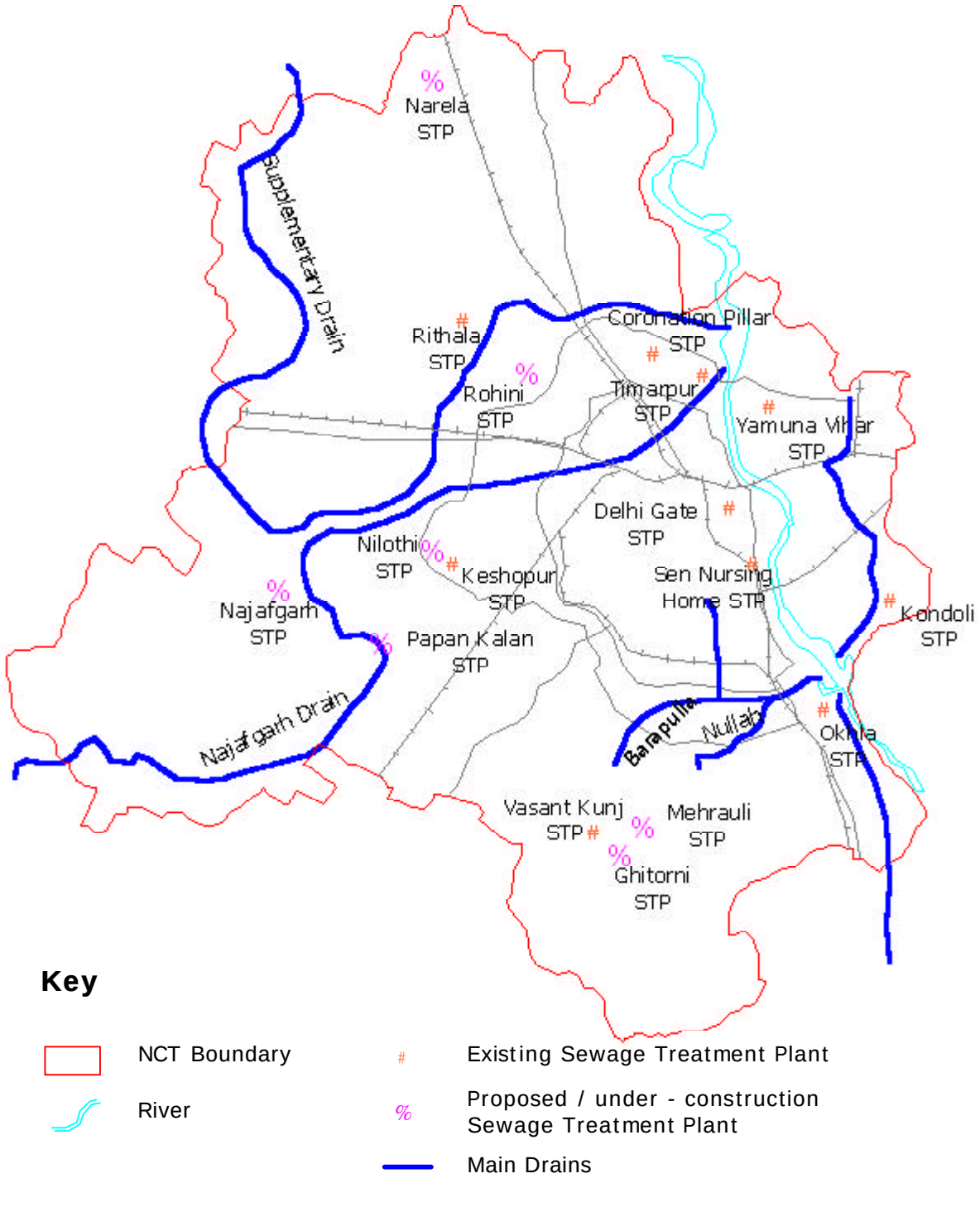
10.1 The sewerage treatment capacity of DJB is proposed to be increased from 402.4 MGD as on 31.3.2001 to 497.4 MGD by March, 2002 as per details given below:

Statement No.13.6

SEWAGE TREATMENT CAPACITY

SN	Name of STP	Capacity (MGD) as on 31.3.2001	Capacity (MGD) proposed by 31.3.2002
1.	Okhla	140	140
2.	Keshopur	72	72
3.	Coronation Pillar	40	40
4.	Rithala	40	80
5.	Kondli I, II, III, IV	45	45
6.	Yamuna Vihar I, II	10	10
7.	Vasant Kunj	5	5
8	Ghitorni	5	5
9.	Pappankalan	20	20
10.	Narela	10	10
11.	Najafgarh	5	5
12.	Delhi Gate	2.2	2.2
13.	Sen Nursing Home	2.2	2.2
14.	Rohini	---	15
15.	Timarpur	6	6
16.	Nilothi	--	40
	Total	402.4	497.4

MAP (13.3)


Narela STP
Supplementary Drain
Rithala STP
Rohini STP
Coronation Pillar STP
Timarpur STP
Yamuna Vihar STP
Delhi Gate STP
Nilothi STP
Keshopur STP
Sen Nursing Home STP
Kondoli STP
Najafgarh STP
Papan Kalan STP
Najafgarh Drain
Barapulla Nullah
Okhla STP
Vasant Kunj STP
Mehrauli STP
Ghitorni STP
Key
NCT Boundary
River
Existing Sewage Treatment Plant
Proposed / under - construction Sewage Treatment Plant
Main Drains

10.2 These STPs are not functioning up to their full installed capacity due to various reasons such as low flow of sewage to STPs, trunk and peripheral sewer lines still to be connected to STPs, etc. The sewage generation at present is estimated to be around 610 MGD and treatment is around 360 MGD only. This untreated sewage (250 MGD) falling in river Yamuna is the major cause of river pollution.

10.3 DJB has a network of branch, peripheral and trunk sewers of about 5600 kms length out of which 130 kms is trunk sewers. About 91 kms of trunk sewers require immediate desilting and rehabilitation as this part is settled and silted. The status of Trunk Sewers may also be seen at Table No.13.5.

11. WASTE WATER REUSE

11.1 The main opportunities for reuse of treated wastewater in and around the city are considered to be irrigation and horticulture. There is also some demand for use as cooling water in the power stations. Other options include groundwater recharge, return to the raw water source, and the treatment and reuse of sullage water, i.e. water that does not contain human excreta, for flushing toilets, etc.

11.2 Presently DJB supplies about 85 MGD (385 Mld) of treated wastewater to the Irrigation Deptt. This is discharged directly to the irrigation channels from the sewage treatment plants. 1,160 Mld (approx.) is available for reuse in some way.

Location of Sewage Treatment Plants

11.3 A number of small effluent reuse projects are in the planning or implementation stages. They comprise horticultural, irrigation and industrial uses, and will use up to 46 MGD (210 Mld).

11.4 DDA is responsible for 4,451 hectt. of open spaces, all of which are irrigated via tubewells. There is also irrigation of MCD open spaces, central government properties, private parks and properties, road verges, sports stadiums, etc. The details of the green areas being maintained by the various agencies is indicated in Statement No.13.7.

Statement 13.7

AGENCY-WISE GREEN AREA

Agencies	Green Areas(in Hectare)
NDMC	445
MCD	2,428
DDA	4,451
CPWD	2,200
FOREST Department	11,000
Total	20,524

Source : DUEIIP-2021