

CHAPTER 13

WATER SUPPLY AND SEWERAGE

Access to safe, adequate and affordable potable drinking water, accessible and hygienic sanitation is the basic public services required to be ensured by the Government for its citizen for a healthy life. Government has been consistently trying to ensure 24X7 clean water supply to all households, treatment of both waste water and solid waste to a high proportion of the volume generated, treatment of all industrial effluent. One of the important Sustainable Goal under SDG-6 is “Availability and sustainable management of water and sanitation for all”.

- 1.2 The Delhi Government ensured free lifeline water up to 20 kilolitres to every household having metered water connection and around 6 lakhs consumers have benefitted under this scheme since its inception. Recently Government has started implementing the scheme for a limited period for providing regular sewer connection free of cost to keep the city and Yamuna clean by motivating unwilling residents in unauthorized colonies to connect their houses to the sewer lines. By exempting development charges required for taking sewer connection, more and more households are now being motivated to take sewer connection.
- 1.3 Priority areas of GNCTD in water and sanitation sector is to augment water supply from sources outside Delhi such as: Renuka Dam in Himachal Pradesh, and Kishau Dam and Lakhwar-Vyasi Dam in Uttarakhand getting underground-water from Yamuna flood plains by way of recharging the ponds, augmenting internal sources including through recycling of water, water harvesting, plugging leakages of water, reducing non-revenue water through proper water accounting, installation of bulk meters etc. In a remarkable achievement, GNCTD has been able to provide the regular water supply to the un-served and under-served areas and has covered 1583 un-authorized colonies, which is about 88% of total un-authorized colonies in Delhi and very soon, the remaining un-authorized colonies will also be covered.
- 1.4 There are still many issues in Water and Sanitation sector that needs focused attention: depleting groundwater level due to excessive exploitation, a high concentration of fluoride and salinity at some places, distribution losses in water supply estimated at about 40 percent (Non-Revenue Water), wider implementation of rain water harvesting etc. inadequate sewage treatment capacity, uneven flow of sewage waste to pumping stations: non availability of land for constructing new infrastructure, inter-mixing of sewage pipes with storm- water drain etc.

- 1.5 Delhi depends on neighboring states to meet around 90 percent of drinking water demand of its residents. The city being located in a semi-arid zone depends to a great extent on raw waters from the Ganga basin, Yamuna sub-basin, Indus-basin, in addition to its own internal aquifers and its groundwater resources. The water is then treated before distribution. Next, both liquid and solid wastes are generated in large volumes. All liquid as well as solid wastes are expected to be treated and then disposed or recycled. Delhi treats and also recycles both forms of wastes though in limited capacities and remaining flows to other states. Growth of the city beyond reasonable limits imposes unbearable strain for provisioning of two most basic services: water and sanitation.
- 1.6 DJB had managed to improve upon its working and monitoring vis-a-vis water and sewage management. It has an increased revenue collection despite poor economics as the positive outcomes of good governance. DJB has launched “Seva App” for bill generation, online payments and the resolution of inflated bills to deliver efficient and transparent services and to instill more confidence in the citizens of Delhi. Factors attributable to the increased DJB’s revenue Price of the non-free water was increased by 10%, increase in the number of connections/meters, One-time window was offered to people to clear of their previous dues, several water leakages were fixed. There are several other revenue- generating measures such as advertisement on water tankers, renting out property and tap solar power, new schemes such as: water ATMs, “toilet to tap” and GPS-tracking of DJB water tankers.
- 1.7 About 93% households of Delhi now have access to piped water supply. Water production during summer season is being maintained at 953 MGD consistently. Water is supplied to about 20 million population of Delhi through existing water supply network comprising of 15041 km long pipelines and about 125 underground reservoirs (UGRs). Besides, a total of 407 new water tankers with stainless steel containers fitted with GPS have been engaged in improving the water tanker supply delivery system in the city. Apart from these approx. 530 Mild Steel hired tankers (during peak summer), 250 newly purchased Stainless Steel tankers are being added to the existing fleet to supplement water supply in water deficit areas.

2. Water Requirement

- 2.1 Based on the norm of 60 Gallon Per Capita per Day (GPCD), the total requirement of water for NCT of Delhi in March 2021 is 1380 MGD for the projected population of 23 millions. The per capita water requirement norms for various usages are presented in Statement 13.1.

STATEMENT 13.1

S.No.	Details	Requirement of Water
1	Domestic	172 LPCD
2	Industrial, Commercial and Community requirement based on 45000 liters per hectare per day	47 LPCD
3	Fire protection based on 1% of the total demand	3 LPCD
4	Floating population and special uses like Hotels and Embassies	52 LPCD
	Total	274 LPCD (60 GPCD)

(LPCD- Litres Per Capita Per Day & GPCD- Gallon Per Capita Per Day)

Source: - Delhi Jal Board

- 2.2 Master Plan of Delhi - 2021 prepared by Delhi Development Authority proposed water requirement with the norm of 80 Gallon Per Capita Per Day (GPCD), out of which 50 GPCD is for domestic requirement and 30 GPCD for non-domestic purposes. The domestic water requirement of 50 GPCD comprises of 30 GPCD for potable water and 20 GPCD for non-potable water.
- 2.3 The estimated demand of water in Delhi based on the norm of 60 GPCD by 2021, is 1380 MGD to meet the requirement of population of about 230 Lakhs as per the DDA's MPD- 2021.

3. Water Supply Capacity

STATEMENT 13.2

(As on 31st March 2021)

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S. No.	Name of Plants	Capacity (MGD)												
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
9	Recycling of Water at Bhagirathi, Haiderpur & Wazirabad	--	37	37	37	45	45	45	45	45	45	45	45	45
10	Commonwealth Games Village	--	-	1	1	1	1	1	1	1	1	1	1	1
11	Okhla	--	-	--	--	--	20	20	20	20	20	20	20	20
12	Dwarka	--	-	--	--	--	50	50	50	50	50	50	50	50
	Total	810	847	848	848	836	906	906	906	906	906	911	916	921

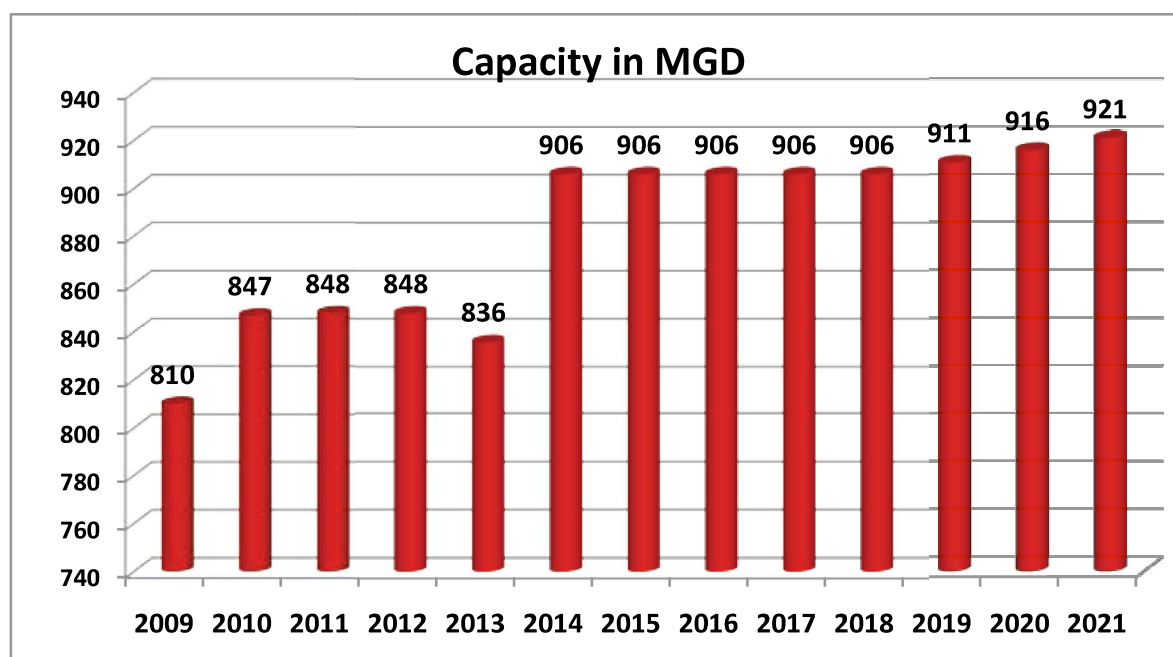
(MGD = Million Gallons Per Day)

Source: - Delhi Jal Board

- 3.1 The installed treatment capacity of Water in Delhi during 2009-2021 is depicted in Chart 13.1. The installed capacity of DJB has been augmented by 14% during last 13 years. The capacity, which was 810 MGD in 2009, has been increased to 916 in 2020. This has further increased to 921 MGD in the year 2021.

CHART 13.1

INSTALLED TREATMENT CAPACITY OF WATER TREATMENT PLANTS DELHI- 2009-2021



- 3.2 Two new Water Treatment Plants constructed at Dwarka (50 MGD) and Okhla (20 MGD). Raw water for these two plants has been made available with the commissioning of the pucca parallel channel from Munak to Haiderpur. Further Bawana Water Treatment Plant (20 MGD) has been constructed and is commissioned.

4. Water Consumption

Water supplied and billed to various categories of consumers by Delhi Jal Board during 2020-21 is presented in Statement 13.3.

STATEMENT 13.3

CATEGORY-WISE WATER CONNECTIONS, SALES AND % OF SALES

S.No.	Category	Connections (in lakh)		Sales (MGD)		% of Sales	
		2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
1.	Domestic (Active)	22.84	24.98	492.76	425.44	93.88	93.08
2.	Commercial & Institutional (Active)	0.81	0.79				
3	Supply to NDMC & MES (Active)	-	-	32.15	31.63	6.12	6.92
	Total	23.65	25.77	524.91	457.07	100.00	100.00

Source: - Delhi Jal Board

5. Sources of Water Supply

Present average potable water productions is 953 MGD with raw water available from various sources: (i) Yamuna and Ravi-Beas Water (389+221= 610 MGD), Ganga Water (253) MGD and Ground Water (90 MGD). Delhi Jal Board was able to commission Water treatment Plants at Dwarka, Okhla & Bawana because of the commissioning of efficient conveyance system to carry allocated Yamuna and Ravi-Beas Water to Delhi from Munak to Haiderpur, known as Carrier Lined Channel (CLC)/ Munak Canal. The raw water resources are indicated in statement 13.4.

STATEMENT 13.4

WATER RESOURCES OF DELHI JAL BOARD

S. No.	Resources	Quantity (MGD)
1	Yamuna River Water	389
2	Ganga River Water	253
3	Ravi-Beas Water from Bhakra Storage	221
4	Ground Water from Ranney wells/ Tube wells	90
	Total	953

Source: - Delhi Jal Board

6. Ground Water

- 6.1 To meet increasing demand of water, limited surface water sources and frequent pollution in raw water sources at Wazirabad, dependence on Ground water sources has increased in city and augmentation of new tube wells is planned to meet the demand by blending Ground water with surface water to achieve the permissible limits for drinking purpose. However, deterioration of Ground Water quality is continuing to observe. All efforts to stop further deterioration as suggested by Monitoring Committee constituted by Hon'ble NGT in OA-496/2016 which include revival of water bodies and sealing of illegal bore wells are being done by concerned divisions. Quality Control Division of DJB regularly monitoring the Ground Water Quality to ensure its fitness for drinking purposes.
- 6.2 Apart from in-house testing, Delhi Jal Board, further confirmed Ground water quality through independent agency NEERI (National Environmental Engineering Research Institute) Ministry of Science & Technology, Govt. of India.
- 6.3 Delhi Jal Board has 151 functional tube wells in Palla and 4281 Tube Wells in various parts in Delhi. In addition, there are 09 functional Ranney Wells along Yamuna River. The Flood plains of River Yamuna and the area adjacent to Najafgarh Lake are being explored for extraction of water on sustainable basis. Pre-feasibility studies for ground water recharge through the abandoned Bhatti Mines and Canal System in the North Western region of Delhi have also been taken.
- 6.4 Delhi Jal Board, in consultation with Govt. of NCT of Delhi has prepared an Action Plan for rejuvenation of 155 numbers of Water Bodies and creation of water bodies to improve ground water resources. The work of creation of water body at Timarpur oxidation pond, Dwarka, Pappankala, Rohini, Nilothi, revival of Satpula Lake and creation of lake at the abandoned land of Ash ponds owned by DDA, revival of Roshanara Lake is being taken up.
- 6.5 The process to implement the proposals was started in September 2018. The scheme amounting to ₹ 376.79 Cr for revival of 155 water bodies is already approved by Delhi Jal Board in its meeting held on 24.12.2018. The work of consultancy of 83 water bodies has been given to CSIR-NEERI-Nagpur (Council of Scientific and Industrial Research- National Environment Engineering Research Institute - Nagpur) on rejuvenation of water bodies in Delhi.

- 6.6 Out of 83 Water Bodies entrusted to M/s CSIR-NEERI, 81 DPRs of 83 water bodies are received which are divided into phases, depending on nature of water body and receipt of DPRs in phased manner, Work of Revival of 50 water bodies is awarded and under execution in phased manner. The work is likely to be completed by October 2022 in phased manner.
- 6.7 Delhi Jal Board has initiated proposal for revival and rejuvenation of 155 Water Bodies, owned by Revenue department/other Government agencies in Delhi. The aim of the prestigious project is to clean the existing Water Bodies, restoring its Ecological values and putting in management regimes that are sustainable for long term.

7. Parallel Channel from Munak to Haiderpur

- 7.1 About 30-50 per cent of the raw water discharged from Tajewala Head works got lost through seepage during transit in the present water carrier system comprising of Western Yamuna Canal system and River Yamuna. To minimize the en-route losses, a parallel pucca channel (CLC) has been constructed from Munak to Haiderpur by the Haryana Govt as a deposit work on behalf of Govt of Delhi. Commissioning of CLC has resulted in increased availability of water of Delhi within the existing releases at Munak and WTP at Dwarka (50 MGD) and Bawana (20 MGD) & Okhla (20 MGD) have been commissioned.
- 7.2 **Reservoirs** Renukaji, Kishau and Lakhwar Vyasi Dam Projects are proposed to be constructed on the River Yamuna and its tributaries. These upstream Projects have been declared as National Projects. The interim seasonal allocation of Yamuna water to each State as per the MOU of 12th May 1994 is presented in Statement No. 13.5. On completion of the upstream storages, seasonal allocation of Yamuna Water will be revised by the Upper Yamuna Board and Delhi will get its share in Yamuna water from these storages as per the MOU of 12th May 1994 and interstate agreements on these National Projects.
- 7.3 The interstate agreements on Renukaji and Lakhwar Dams have been signed on 28.08.2018 and 11.01.2019 respectively. Delhi has already conveyed its consent on the interstate agreement for the Kishau Dam Project vide letters dated 24.10.2017 and 21.06.2018 from the Hon'ble Chief Minister, Delhi. The work has been awarded on 07.06.2019 to National Institute of Hydrology, Roorkee for carrying out, Water Availability Study at Hathnikund Barrage Pre & Post Construction of three storage projects viz Lakhwar, Kishau & Renukaji in Upper Yamuna Basin.

STATEMENT 13.5
APPROVED INTERIM ALLOCATION OF WATER FROM YAMUNA RIVER TO STATES

SN	States	Allocation (BCM)			Annual Allocation (BCM)
		July to Oct.	Nov. to Feb	March to June	
1	Haryana	4.107	0.686	0.937	5.730
2	Uttar Pradesh	3.216	0.343	0.473	4.032
3	Rajasthan	0.963	0.070	0.086	1.119
4	Himachal Pradesh	0.190	0.108	0.080	0.378
5	Delhi	0.580	0.068	0.076	0.724

Source: - MOU of 12th May, 1994

Note: - BCM Billion Cubic Meter.

7.4 Upstream Storages on River Yamuna-Renukaji, Lakhwar-Vyasi & Kishau Dam Projects:

- 7.4.1 Delhi Jal Board has planned for augmentation of water resources for Delhi. A twin – pronged strategy has been adopted, which focuses on the augmentation of both, ground-water and river (surface)-water resources, while also emphasizing the need for enhanced water conservation measures, rainwater harvesting initiatives, restoration of water bodies etc. While augmentation of ground water resources are in the hands of Delhi only, outcome of initiatives/proposals for augmentation of river (surface) water resources by Delhi is entirely dependent on cooperation and constructive collaboration from the neighboring states and the Union Government. Additional availability of raw water to the National Capital from the Upstream Storages on the river Yamuna is paramount for its planned and orderly development.
- 7.4.2. Delhi is pursuing for early and time bound implementation of three upstream storages on river Yamuna and its tributaries namely, Renukaji Dam, Lakhwar Dam and Kishau Dam, which have been declared as National Projects. As these projects have been declared as national projects, the central government will bear 90% of the water component costs on these projects and basin states have to bear only 10% of the water component costs for these projects.
- 7.4.3. Renukaji Dam is to be constructed on River Giri at Dadhau in Sirmour District in Himachal Pradesh. Kishau Dam is proposed to be constructed on River Tons in Dehradun District of Uttarakhand & Sirmour District of Himachal Pradesh. Lakhwar Dam is being constructed on River Yamuna in Dehradun District of Uttarakhand.

- 7.4.4. Interim seasonal allocations of Yamuna water to each basin state are governed as per the MOU of 12th May 1994. On completion of the upstream storages, seasonal allocation of Yamuna Water will be revised by the Upper Yamuna Board and Delhi will get its share in Yamuna water from these storages as per the MOU of 12th May 1994 and interstate agreements on these National Projects. The interstate agreements on Renukaji and Lakhwar Dams have been signed on 28.08.2018 and 11.01.2019 respectively. Delhi has already conveyed its consent on the interstate agreement for the Kishau Dam Project vide letters dated 24.10.2017 and 21.06.2018 from the Hon'ble Chief Minister, Delhi.
- 7.4.5. Delhi has already paid first installment of its proportionate share of seed money/cost for Lakhwar and Kishau Dam projects Delhi. Delhi has also paid ₹ 214.84 crores to Himachal Pradesh for Renukaji Dam Project and has agreed to bear 90% of the cost of power component in this project. The interstate agreement on the Renukaji Dam Project has prioritized allocation for drinking water needs of Delhi and Upper Yamuna River Board is being pursued to intimate enhanced allocation of Yamuna water to Delhi as per the agreement for Renukaji Dam Project. The agreement on Renukaji Dam Project includes that;
- a. Govt. of NCT of Delhi has agreed to bear 90% of the cost of power component for the project.
 - b. In respect of hydro power, if Himachal Pradesh desires, Power generated and cost thereof can be shared with other beneficiary State (s) through mutual/multilateral agreement to be entered separately.
 - c. Additional water available due to construction of storage as result of implementation of Renukaji Dam Project shall be regulated by UYRB (Upper Yamuna River Board). The additional water available due to construction of this dam will be made available to Delhi on priority to meet the drinking water needs of Delhi as worked out by UYRB. The arrangement will be only until other storages viz. Lakhwar and Kishau MPPs (Multi Purpose Projects) in upper Yamuna catchment are created at which stage releases from Renukaji Dam shall be carried out keeping in view the overall annual allocation of Yamuna water as per MoU dated 12.05.1994 between the States. Interim seasonal allocations given in the said MoU shall be modified accordingly by UYRB and put up to Upper Yamuna Review Committee (UYRC) for approval.

8. Water Accounting and Auditing

8.1 As per JICA report of 2011, assessed NRW was 64.80% in year 2010-11 and JICA had proposed to subdivide entire DJB network into a total 1010 DMAs (of size 1500 - 2000 connections) to improve the system & reduce NRW. DJB is now moving ahead in implementing the DMAs works in entire DJB network comprising of 1010 DMAs as per JICA report. Status of same is as under:

- Improvement works including creations of DMAs & reduction of NRW are in progress in 3 PPP areas of Malviya Nagar, Nangloi and Mehrauli/ Vasant Vihar areas comprising 82 DMAs as per JICA. All 9 DMAs in Malviya Nagar, 20 DMAs in Nangloi and 1 DMA in Vasant Vihar have been completed and further works are in progress. NRW in Malviya Nagar PPP area reduced from 67% to 35%, Nangloi from 79% to 55%, Vasant Vihar from 24% to 8%.
- DJB started in-house Phase-I of DMAs creation in 2016 and 33 (restructured 39) DMAs were taken up, which were further increased to 96 (restructured 102) DMAs.
- 170 DMAs in Chandrawal WTP command areas are planned in JICA funded project.
- Consultancy services to create DMAs in remaining areas to cover entire DJB network was awarded in 2019 and consultancy reports for East & North East Delhi have been received. Scope of consultancy work include survey, verify the existing network/infrastructure, asses the UGR wise NRW and submit the UGRs wise DPR with rehabilitation estimates/capital works for reduction of NRW in Delhi. Though, the preparation of DPR of all the UGRs in a circle will take 15 months completion period but consultant will be asked to submit UGR wise reports in phased manners so that capital works can also be planned /executed simultaneously on priority.

As per consultant reports for East & North East Zone, improvement works under One Zone One Operator are being taken up and tender for the same are expected shortly.

8.2 Delhi Jal Board has initiated projects of installation of flow meters for water auditing. Delhi Jal Board is installing about 3285 nos. bulk flow meters in the primary and secondary system, which comprises of sizes of 100 mm dia to 1500 mm dia. About 3214 nos. flow meters have been installed. One Data/SCADA Center has been established at Jhandewalan, where online data is being received on real time basis. This is helping in real time monitoring and optimum distribution of water.

- 8.3 Complete and correct water supply accounting could not be maintained by Delhi Jal Board. As on 1st April 2019, there were 1.54 Lakh un-metered connections (Table 13.1). Fixing of maximum average of 20 KL/30 KL per month (as the case may be) for domestic consumers, if water meters are non- functional and till defective water meter is replaced.
- 8.4 Delhi Jal Board has streamlined its system for obtaining water meters for metering of unmetered supply of water. The existing system of supply of water meter along with sanction of water connection has been amended and now consumers can purchase water meters of approved specifications from the open market. The consumers having Delhi Jal Board's defective meters have been allowed to get the defective meter replaced with private water meter and have been given option either to get the refund of meter security or get the same adjusted towards water charges in future.

9. Water Tariff

- 9.1 The tariff is based on the principle of "use more pay more". Present water tariff policy acts as a deterrent for consumers consuming excessive water or having wastage of water. DJB had collected ₹ 1773.89 crore during 2020-21.
- 9.2 DJB has provided Rain Water Harvesting in its 594 installations. The Rain Water harvesting cell of DJB provides technical assistance to individuals/ institutions for providing Rain Water Harvesting. DJB has provided the information regarding Rain Water Harvesting on its website for public facilitation.
- 9.3 As per DJB amended tariff Regulations (March 2016) rebate of 10% in the water bills is provided for having functional RWH system and non-provision will make water bills increased by 1.5 time till functional RWH system is installed. These provisions are applicable for plots of 100 sqm and above. However, levy of penalty was deferred upto 31.12.2021.
- 9.4 Special subsidy in water charges has been allowed to resettlement colonies where water charges are being recovered on assumed average of 10 KL per month per floor for unmetered connections. Salient features of existing water tariff are as under:
- Existing water tariff has two parts. One is Service Charge and other Volumetric Water Consumption Charge applicable w.e.f. 1.12.2004 and 1.4.2005 respectively. 60 per cent of water consumption charges are recoverable towards Sewerage Maintenance Charge from such colonies/areas where sewerage services have been provided / maintained by the Delhi Jal Board.

- In case of bulk connection for a Colony / Group Housing Society serving a number of residential premises, water charges will be worked out as per residential unit-wise at the domestic rates applicable from time to time.

CATEGORY –I (DOMESTIC CONNECTIONS)

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per KI in ₹)
Upto 20	146.41	5.27
20-30	219.62	26.36
>30	292.82	43.93
Plus Sewer Maintenance Charge: 60% of water volumetric charge		

- 9.5 **Water Tariff for Un-metered Connections in JJ Resettlement Colonies and Rural Areas:** Water charges are applicable on assumed average of 10 KL Per month per floor for unmetered water connections in JJ resettlement colonies. For unmetered water connections in case of rural areas assumed average 25 KL permonth per connection is charged. Water consumption rates and service charge are levied slab- wise. Sewerage maintenance charge is also recoverable, if sewerage services are being managed by Delhi Jal Board. Besides above, water cess is recoverable from all consumers at the rates determined by the Central Government from time to time.
- 9.6 All domestic consumers of Delhi Jal Board consuming water up to 20 KL per month and having functional water meters are being given 100% subsidy and fully exempted from payment of water bill including all components namely, water charges, sewerage maintenance charge, service charges, meter rent (wherever applicable) and cess w.e.f. 01.03.2015.
- 9.7 **Water Tariff w.e.f. 01.02.2018 is as under : -**

CATEGORY–II (NON- DOMESTIC CONNECTIONS- COMMERCIAL/INDUSTRIAL)

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per KI in ₹)
0-06	146.41	17.57
06-15	292.82	26.35
15-25	585.64	35.14
25-50	1024.87	87.85
50-100	1171.28	140.56
>100	1317.69	175.69
Plus Sewer Maintenance Charge: 60% of water volumetric charge		

9.7.1 Simplification of procedure for sanction of New Water/ Sewer Connection

Procedure for sanction of new Water/ Sewer Connection in all areas of Delhi has been simplified. Now, water / sewer connection may be sanctioned easily. Only last 3 month Electricity Bill will be required along with one Identity Proof and self declaration/ undertaking for domestic connections. Further, only online applications for water & sewer connection will be accepted w.e.f. 06.10.2020.

9.7.2 Provision of Rain Water Harvesting / Waste Water Recycling System

- i. Ground water resources in many parts of the city are over exploited. The extent of replenishment of ground water is much less than what the city as a whole is withdrawing due to its rapid urbanization. There is need to preserve ground water resources and to take effective measures for its sustainable availability.
- ii. Therefore, Rain Water Harvesting is considered as a simple, viable and eco-friendly method of conservation of water and a simple solution for ground water recharge. Ministry of Urban Development and Poverty Alleviation (Delhi Division), Government of India made mandatory in all new buildings on plots of 100 Sq. Mtrs. and above and Waste Water Recycling System for horticultural purposes, in buildings having a minimum discharge of 10000 Ltrs. and above per day.
- iii. To ensure proper implementation of Rain Water Harvesting and Waste Water Recycling norms, following amendments in Regulation 50 of Delhi Water and Sewer (Tariff & Metering) Regulations 2012, has been approved by the Board vide Resolution No.829 dated 19-08-2019 for plots/properties size 100 sq.m. to less than 500 sq.m. except para (iv) & (v) below:
- iv. It will be mandatory for plots/properties having area of 100 Sq. Mtrs. or more to have functional Rain Water Harvesting System, even if the property is constructed prior to 28-07-2001. Such plot/property owning consumers would be required to install functional Rain Water Harvesting System within one year from the date of issue of Public Notice in this regard i.e. upto 25.09.2020 (Public Notice issued on 19.09.2019 and 26.09.2019). In case consumers whose construction was before 28-07-2001, fails to comply with the aforesaid mandatory provision within the time limit prescribed, the tariff as applicable for the respective consumer category will be increased by 1.5 times, till the system is installed and intimated to the respective Zonal Revenue.
- v. Further, in case of properties having area of 100 sq.m. or more, constructed after 28-07-2001 who have not intimated about the Rain Water Harvesting provision made to the respective area ZRO, may also inform the area ZRO by 31st March 2020 which was also extended up to 31.03.2021 failing which, tariff as applicable for the respective consumer category will be increased by 1.5

times, till the system is installed and intimated to the respective Zonal Revenue.

- vi. Besides (i) & (ii) above, Board may disconnect water connection of all consumers who fail to install functional Rain Water Harvesting System or intimate area ZRO within prescribed time limit. This provision will, however, be applicable in case of all properties having area of 100 sq. mtr. and above but after timelines provided in both the aforesaid cases is over.
- vii. New water/sewer connection to the existing and newly constructed properties having installation of functional Rain Water Harvesting System. Necessary functionality Instructional Orders issued by the Rain Water Harvesting Cell, in this regard.
- viii. New water/ sewer connection to newly constructed properties/ buildings having minimum discharge of 10000 Ltrs. and above per day will be sanctioned by the respective Maintenance Division.
- ix. Implementation of (iv) above for plots/properties having area of 100 Sqm and above but below 500 Sqm. would be applicable after timelines provided in (i) and (ii) above are over.
- x. In cases where installation of Rain Water Harvesting System is not technically feasible, for any reason, CEO, DJB may take appropriate decision in respective case, on merits.

10. Rain Water Harvesting

- 10.1 Ministry of Housing and Urban Affairs, GOI has issued guidelines for Urban Water under Jal Shakti Abhiyan. Thrust areas include Rain Water Harvesting (RWH). For Rain Water Harvesting, the guidelines include that ULBs should ensure that all government buildings (Central/State/ULB) must have RWH structures. The guidelines also include that ULBs should ensure that in future all building permissions granted must have RWH structures incorporated, as per building bye laws, and same. Therefore, in urban areas, ULBs have to play major role in ensuring implementation of Rain Water Harvesting systems.
- 10.2 Roof top rain water harvesting has been made mandatory for plots size of 100 sqm and above as per notification issued by the Govt. of India. To promote its implementation Delhi Jal Board has made provisions in its tariff regulations for rebate and penalty in water bills for implementing and non-implementing Rain Water Harvesting Systems.

10.3 The following provisions have been made in the Delhi Water & Sewer Tariff and Metering Regulations, July' 2012 for promoting Rain Water Harvesting:

Regulation 8 (d) of Chapter II provides that for category the consumers, the following rebate is given in tariff for provision of Rain Water Harvesting, Waste Water Recycling or both:

- i. Such plot/properties which have an area of 100 square meter or more and having installed functional rain water harvesting system, shall be granted rebate of 10% in the total bill amount and 15% if both rain water harvesting and waste water recycling systems have been set up and functional.
- ii. If the Rain Water Harvesting system is adopted by a society then the individual member of that society will be entitled to above mentioned rebate in water bill.
- iii. Functionality inspection of every rain water harvesting system will be conducted by the Zonal Engineers before reviewing the certificate in every two years.
- iv. Delhi Jal Board has implemented rain water harvesting system in 594 installations of DJB and more are being targeted for implementation of rain water harvesting. Rain Water Harvesting Systems have been implemented in 3687 schools/colleges out of the 4778. Further in 413 schools /colleges the rain water harvesting systems are under construction and in the 449 schools and colleges action for taking up construction has been initiated.
- v. People are being sensitized for the judicious use of Potable water for the demand side management through public outreach program. There is a dedicated Rain Water Harvesting cell in DJB which is providing technical assistance to facilitate the public in implementation of Rain Water Harvesting system. It also has a dedicated telephone numbers (011-23541223 and 011-23558264) to guide the callers who seek assistance.
- vi. As per the Delhi Government Cabinet decision 2709 dated 02.07.2019 all Govt. departments have to make provision of RWH in their buildings. Delhi Jal Board has been assigned to implement Rain Water Harvesting Systems in Government Building installations which are not maintained by the PWD, GNCTD. For Delhi Government buildings which are maintained by PWD, GNCTD, the implementation of Rain Water Harvesting System is to be carried out by PWD, GNCTD itself.
- vii. To sensitize the citizens of Delhi a continuous process of disseminating information on Rain Water Harvesting through platforms like print, electronic, visual, workshops, exhibitions, seminars, booklets, pamphlets etc. have been done by Delhi Jal Board. Recently interactive workshops (33 in numbers) on

Rain Water Harvesting have been held at the circle level (Superintending Engineers level) and divisional level (Executive Engineer level) by DJB with the RWAs, across Delhi.

10.4 **Incentive:**

- i. Rebate provision in water bills which is given to extent of 10% to the consumers of Delhi Jal Board and is applicable on plots size of 100 sqm and above. Rebate of ₹ 85.22 crores has been given from 01.07.2017 to 16.12.2020.
- ii. Functionality inspection of every rain water harvesting system will be conducted by the Zonal Engineers before reviewing the certificate in every two years.

10.5 **Penalty:**

For all the consumers irrespective of their consumer category Rain Water Harvesting penalty as enhanced tariff of 1.5 times will be applicable if they have plot area 500 sq meter or above and do not have a functional rain water harvesting facility w.e.f. 01.07.2017 (in case of Dwarka sub-city, penalty on account of non-provision of RWH system is applicable w.e.f. 01.11.2018). Rain Water Harvesting penalty was deferred on plot size 100 Sqm. to below 500Sqm. till 31.03.2021.

10.6 **Exceptions:**

- i. If the consumer lives in the area which has rocky ground or it is on the banks of Yamuna River then Rain Water Harvesting penalty will not be imposed if the consumer does not install Rain Water Harvesting system in his/her premises.
- ii. RWH through artificial ground water recharge structures is not recommended where post monsoon ground levels are shallower than 5 Mtrs. Penalties as per the Delhi Water and Sewer (Tariff & Metering) Regulation, 2012 will not be levied on DJB consumers for non-provision of RWH System in such areas. However, in such areas Rain Water Storage for its use in no-portable purposes after required treatment may be carried out as a voluntary option.

10.7 **Water Conservation**

- i. Delhi has a network of about 15041 Kilometers of water supply mains, of which, a significant portion is as old and prone to higher leakage losses. Normally, water losses are calculated by water billed or consumed subtracted from the water produced. In the case of Delhi, water billed or consumed and leakage losses therefore cannot be calculated exactly as a majority of houses do not have working meters. According to the estimates of Delhi Jal Board, the total distribution losses are of the order of 45 per cent of the total water supplied. These are quite high as compared to 10-20 per cent in the developing

countries. The distribution losses include losses due to (a) leaking pipes and (b) theft of water through unauthorized connections.

- ii. Delhi Jal Board has taken several steps to minimize leakage losses. To address this problem, a leak detection and investigation (LDI) cell was set up. The Board has replaced about 1220-km length of the old, damaged and leaking water mains during the last five years. As a result of these initiatives, the Board expects to bring down the distribution losses to 20 per cent level in the near future.
- iii. Delhi Jal Board formulated a programme for recycling of backwash water in four major water treatment plants at Haiderpur, Bhagirathi, Chandrawal and Wazirabad. On commissioning of recycling plant at Haiderpur, Bhagrathi, Wazirabad and Chandrawal, about 45 MGD has been added water supplies without any additional raw water from these four plants. Recycling Plant at Bawana is also proposed for 2 MGD.

11. Sewage Treatment Capacity

- 11.1 Adequate sanitation is essential for the protection & promotion of individual's and community health. Various schemes are being implemented by the DJB to improve sanitation conditions. Sewage treatment capacity of Delhi Jal Board increased from 402.40 MGD in 31st March 2001 to 597.00 MGD in 31st March **2021**. The information regarding the sewerage treatment capacity and percentage of utilization is presented in Statement 13.6.

STATEMENT 13.6

SEWERAGE TREATMENT CAPACITY AND ITS UTILIZATION

S. No	Name of Sewerage Treatment Plants (STPs)	Capacity			Actual Treatment as on 31.3.2020	Actual Treatment as on 31.3.2021	% of Utilization
		31.3.2001	31.3.2020	31.3.2021			
1	Okhla	140.00	140.00	140.00	116.73	120	85.71
2	Keshopur	72.00	72.00	72.00	69.91	72	100
3	Coronation Pillar	46.00	30.00	30.00	27.08	27	90
4	Rithala *	40.00	60.00	60.00	53.21	54	90
5	Kondli I, II, III, IV	45.00	70.00	70.00	71.84	70	100
6	Yamuna Vihar I,II	10.00	45.00	45.00	44.78	45	100
7	Vasant Kunj	5.00	5.20	5	3.04	3	60
8	Ghitorni	5.00	5.00	5.00	0.31	1.20	24
9	Pappankalan	20.00	40.00	40.00	39.80	40	100
10	Narela	10.00	10.00	10.00	4.79	4	40

(MGD)

S. No	Name of Sewerage Treatment Plants (STPs)	Capacity			Actual Treatment as on 31.3.2020	Actual Treatment as on 31.3.2021	% of Utilization
		31.3.2001	31.3.2020	31.3.2021			
11	Najafgarh	5.00	5.00	5.00	4.84	3	60
12	Delhi Gate	2.20	17.20	17.20	17.64	17.69	102.85
13	Sen Nursing Home	2.20	2.20	2.20	2.47	2.50	113.64
14	Rohini	0.00	15.00	15.00	4.96	5	33.33
15	Nilothi	0.00	60.00	60.00	45.92	50	83.33
16	Mehrauli	0.00	5.00	5.00	4.16	4	80
17	CWG Village	0.00	1.00	1.00	0.11	0.11	0.11
18	Molarbad	0.00	0.66	0.66	0.53	0.50	75.76
19	Kapeshera	0.00	5.00	5.00	2.88	2	40
20	Chilla	0.00	9.00	9.00	9.03	9	100
	Total	402.40	597.26	597	524.03	530	88.78

Source : - Delhi Jal Board :

* 20 MGD Rithala STP is presently under renovation.

- 11.2 It is evident from the above statement that the percentage of utilization of sewerage treatment plant in Delhi as on 31st March 2021 was about 89 percent. The sewerage treatment plants are not functioning up to their optimum level due to various reasons such as low flow of sewerage to STPs, trunk and peripheral sewer lines still to be connected to these STPs, Rehabilitation of Silted and settled Trunk Sewer Lines yet to be completed, etc. The sewage generation, at present, is estimated to be around 748 MGD = (935 water production x 0.8) and treatment is around 530 MGD only.
- 11.3 Delhi Jal Board has a network of branching, peripheral sewers of about 9000 kms. Also there is network of 200 kms of trunk sewers. The rehabilitation/de-silting has been completed in a trunk sewer and is in progress in peripheral sewer.
- 11.4 The consultant for World Bank funded, "Delhi Water Supply & Sewerage Project" estimated 5259 MLD water supply requirement for Delhi in 2021 and waste water generation from this level of water supply will be about 3760 MLD. The information regarding the same is presented in Statement 13.7.

STATEMENT 13.7
WATER SUPPLY REQUIREMENT AND WASTE WATER GENERATION
ESTIMATED

S. No.	Details	Volumes (MLD)					
		2004	2005	2006	2011	2021	2022
1.	Total water demand	2685	3763	4090	5181	5611	5700
2.	Total net water supply	2265	2362	2461	3573	5259	4540
3.	Waste water generated	1812	3010	3272	4144	5017	4560
4.	Treated at CETP	200	217	234	346	755	-
5.	Proportion not sewered	14%	13%	13%	10%	5%	21%
6.	Outside sewered area	254	302	302	294	210	210
7.	Net generated waste water	1358	1722	1798	2218	3242	4560
8.	Infiltration	518	518	518	518	518	1140
9.	Gross Wastewater to treatment	1876	2240	2316	2736	3760	5700

Source: - Delhi Jal Board

12 Expenditure Incurred on Water Supply and Sewerage Programmes

12.1 The expenditure incurred on water supply and sewerage programmes in Delhi during 2007-08 to 2020-21 is presented in Statement 13.8.

STATEMENT 13.8
EXPENDITURE INCURRED ON WATER SUPPLY AND SEWERAGE
PROGRAMMES IN DELHI DURING 2007-2021

(₹ in Crore)

S No.	Details	Water Supply	Sewerage	Total
1.	Approved Outlay (2007-2012)	4361.50	3132.50	7494.00
2.	Fund Released			
	a. 2007-08	962.01	383.96	1345.97
	b. 2008-09	1015.17	441.73	1456.90
	c. 2009-10	1080.35	568.55	1648.90
	d. 2010-11	1080.14	527.93	1608.07
	e. 2011-12	1033.02	528.02	1561.04
	Total (a+b+c+d+e)	5179.69	2450.19	7620.88

S No.	Details	Water Supply	Sewerage	Total
3.	Approved Outlay (2012-17)	6087	4913	11000
4.	Fund Released			
	a. 2012-13	964.97	752.40	1717.37
	b. 2013-14	796.77	753.23	1550.00
	c. 2014-15	854.50	934.50	1789.00
	d. 2015-16	646.50	1077.43	1723.93
	e. 2016-17	850.15	534.50	1384.65
	Total (a+b+c+d+e)	4112.89	4052.06	8164.95
5	Approved Outlay 2017-22	939.00	816.00	1755.00
6	Fund Released 2017-18	999.50	730.50	1730.00
7	Approved Outlay 2018-19	1258.00	1092.00	2350.00
8	Fund Released 2018-19	1271.37	1044.61	2315.98
9	Approved Outlay 2019-20	1463.40	906.60	2370.00
10	Fund Released 2019-20	1340.65	1018.85	2359.50
11	Approved Outlay 2020-21	1624.40	2379.60	4004.00
12	Fund Released 2020-21	1319.40	2264.60	3584.00

(Excluding Namami Gange project, Mukhyamantri Muft Sewer Connection & YAP-III State Share)

- 12.2 It may be observed from Statement 13.8 that the fund released for water supply and sanitation to DJB increased from ₹ 1346 crore in 2007-08 to ₹ 3584 crore in 2020-21.

13 Re-use of Waste Water

- 13.1 The major reuse of treated waste water in and around the city is for irrigation, horticulture and industrial use. There is demand for use of treated waste water for cooling in the power stations. Other options include ground water recharge, return to be raw water source, and the treatment and reuse of treated waste water, for flushing of toilets, i.e. use for non-potable purposes like washing of Railways, Buses, Construction industry.
- 13.2 Presently, Delhi Jal Board supply about 89 MGD of treated waste water to the Irrigation Department, Power Plants and for irrigation purposes by CPWD and in Rohini area by DDA & Flood Control and Irrigation Department. Efforts are being made to increase the treated waste water supply from 89 MGD to 210 MGD in subsequent years. Treated water supply to various purposes in Delhi is presented in Statement 13.9.

STATEMENT 13.9
TREATED WASTE WATER SUPPLY FOR VARIOUS PURPOSES

S.No	Details	Units (MGD)
1.	Treated effluent supplied from Keshopur STP for Irrigation, horticulture purposed	5.5
2.	From Okhla STP to CPWD and Irrigation department for horticulture/Irrigation purpose	37.00
3.	From Coronation Pillar STP for DDA Golf Course at Bhalswa, Gammon India for construction purposes. Minor Irrigation Department at Palla	21.52
4.	From Rithala STP to PPCL for their plant at Bawana and NDPL for their owner plant at Rohini, DDA for horticulture	7.15
5.	From Vasant Kunj to Sanjay Van	3.40
6.	From Mehrauli STP to Garden of Seven Senses	3.40
7.	From Delhi Gate and Sen Nursing Home STP to PPCL	4.80
8.	From Nilothi STP to Flood Control & Irrigation Deptt. For Irrigation purposes	0.50
9.	From Papankalan STP for Irrigation purposes to DDA	1.83
10.	From Commonwealth Games Village STP to DDA horticulture	0.12
11.	From Yamuna Vihar to STP's Horticulture	0.50
12.	From Narela to Pvt. Agency for washing of vehicle	0.05
13.	From Najafgarh to WTP Dwarka for Horticulture	0.07
14.	From Chilla STP to Internal Horticulture of STP	0.20
15.	From Kondli STP to DDA, PPCL & Horticulture	3.0
	Total	89.04 MGD

Source: - Delhi Jal Board.

- 13.3 Estimates for many reuse projects are being framed. Besides, Sewerage Treatment Plants of Delhi Jal Board, treated waste water is available from Common Effluent Treatment Plants in industrial areas being maintained by DSIIDC and Mini Sewerage Treatment Plants of Delhi Urban Shelter Improvement Board (DUSIB).
- 13.4 For abatement of pollution in river Yamuna, DJB is executing the project of laying of interceptor sewer along three major drains (Najafgarh, supplementary & Shahdara). As on date, the ISP project stands completed to the tune of about 99.2%. Out of proposed 242 MGD, provision for trapping of 238 MGD (98.35%) has already been made. Out of this, 158.70 MGD wastewater is being trapped and treated at the various STPs in the command. The balance provision of trapping of approximately 04 MGD (1.65%) is likely to be completed by 31st March, 2022. However, the actual commissioning which includes the actual

trapping and treatment of balance flow of about 67.60 MGD shall be made only after construction of Coronation Pillar and Rithala STP under YAP-III.

- 13.5 Delhi Development Authority is responsible for 4,451 hectares of open spaces, all of which are irrigated via tube wells. There are also irrigation open spaces of Delhi Municipal Corporations, Central Government properties, private properties, road verges, sports stadiums etc. The information regarding the green areas being maintained by the various agencies is presented in Statement 13.10.

STATEMENT 13.10
GREEN AREAS MAINTAINED BY VARIOUS AGENCIES

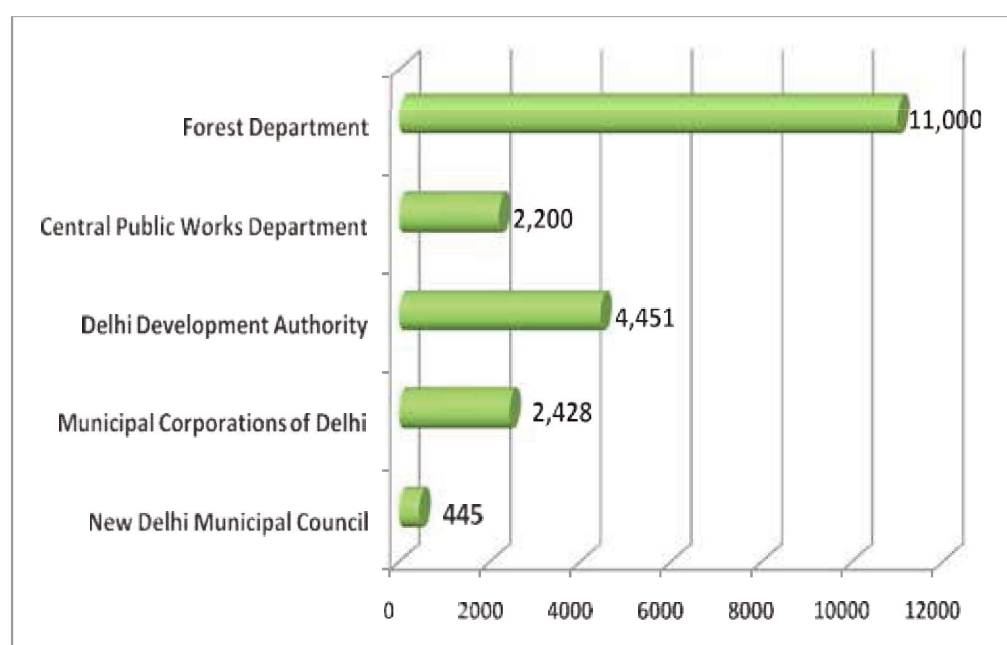
S. No	Agencies	Green Areas (in hectares)	% age
1.	New Delhi Municipal Council	445	2.17
2.	Municipal Corporations of Delhi	2,428	11.83
3.	Delhi Development Authority	4,451	21.69
4.	Central Public Works Department	2,200	10.71
5.	Forest Department	11,000	53.60
	Total	20,524	100.00

Source: - Delhi Jal Board

The green areas maintained by various agencies in Delhi are depicted in Chart 13.2.

CHART 13.2
GREEN AREAS MAINTAINED BY VARIOUS AGENCIES

(Hectares)



The colonies/ category wise progress of sewerage system is given in statement 13.11.

STATEMENT 13.11

COLONIES/CATEGORY WISE PROGRESS OF SEWAGE SYSTEM

S. No.	Colonies / categories	Total no. of colonies	Colonies with Sewerage System
1.	Un-authorized Regularized Colonies	567	557
2.	Urban Village	135	130
3.	Rural Village	219	55
4.	Un-authorized Colonies	1797	602
5.	Resettlement Colonies	44	44

14. Challenges for Water Supply & Sanitation

- 14.1 **Depletion of Ground Water** : The falling groundwater level due to excessive drawing of groundwater in Delhi is a concern. The water level has sunk to 20-30 metres below the ground level in many places. In a few zones the nitrate content has been observed to be more than 1,000 mg/litre in the groundwater. A high concentration of fluoride more than the recommended limits has also been found. Large areas have salinity in the groundwater. All of these are unhealthy for human consumption.
- 14.2 **Unsustainable approaches to Water use** : An official DJB estimate of 2016 showed that the total distribution losses were at about 40%. This is in contract to losses in the 4-20% range in some other countries. There are large water losses at different stages of water supply system, ranging from 30-50% in the treatment plants, conveyance systems and distribution systems, apart from leaks and pilferage.
- 14.3 **Wasteful Approaches**: People use Reverse Osmosis (RO) systems for water filtration since the tap water is not potable. RO causes water wastage of about 40-60% of the water used.
- 14.4 **Neglecting Natural Resources**: During the rainy season, Delhi experiences water-clogged roads and overflowing sewers. There is little rainwater harvesting, resulting in wastage of a precious resource.
- 14.5 **Public Awareness** : Public awareness and their role in water conservation and scientific use are presently unsatisfactory.