

**INFORMATION for NAGAR NIGAM WEB SITE
and
PUBLICATION OF BOOKLET
about
JODHPUR CITY SEWERAGE SYSTEM**

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(FOR THE PROJECTED POPULATION BY THE YEAR 2038)

1 BACK GROUND:

The purpose of the sanitary sewerage system is to collect the liquid wastes (sewage) from homes, institutional facilities and small scale industries located in these areas and deliver these to the proposed site for sewage treatment plant.

The components of a typical sanitary sewage collection system include the connecting pipes from houses and other buildings within the community (the small size laterals), medium size branch collecting sewage from many localities and large size main/trunk sewers collecting sewage from branch sewers and transport it to the Sewage treatment plant. After treatment the waste water is reused for irrigation, industrial process or disposed to a water body or river.

The collected sewage is transported to the sewage treatment plant(s) which provides required treatment before disposal to a natural source of water or reused for irrigation, recreational or any other purpose.

Sanitary sewer collection and treatment system is a fundamental component of the urban community's public health facilities, as untreated sewage contains disease causing organisms as well as a number of compounds which can harm the health of the community at large and pollute natural environment. There for it is essential to collect, treat and dispose sewage after treatment in a non offensive way. Hence, proper functioning of sewerage system round the clock is next in importance only to a safe and portable water supply in its relationship to the public health and welfare of urban population.

2 STATISTICS

A. Jodhpur city areas and populations

1 Area of the city (in sq km): **Municipal limits¹ 78.60 Sq.Kms** (Master Plan 2023)

2 Area of city: Total including outer city **297.7 Sq.Kms**
 Currently Habitated **259 Sq.Kms**
 Notified urban area 423 Sq.Kms (MasterPlan 1996)
 1212 Sq.Kms (Master Plan 2023)

3 Population of the City:

a) As per 2001 census **856034**
 b) As on 2005 -06 **959886**
 c) Projected population for 2011 **1063738** (PHED)
1300000 (Master Plan 2023)

B. Water supply status of the city

1 Estimated water demand (million liters per day, mld)

Year	Water Demand
2001	-206 mld,
2005	- 225 mld,
2011	-250 mld.

2 Rate of supply

Domestic through	
<i>House connections</i>	<i>150 lpcd (8 persons /connection)</i>
<i>Public Stand Posts</i>	<i>50 lpcd (90 persons/ PSP)</i>
<i>Unaccounted for water</i>	<i>15%</i>

3 **Source of water**

Harike Barrage (Constructed at the junction of rivers Beas and Sutlej) through Indira Gandhi canal up to village Madasar and than by 204 Kms long Jodhpur lift canal with 8 pumping station. (175 Kms open canal, 30Kms pipeline, 191m lift)

Raw water conveyance system has been strengthened to meet the water demand of the city by the year 2016 by PHED. Treatment, Pumping, main pipelines up to service reservoirs and the distribution system is strengthened to meet the city's water demand recently under Rajasthan Urban Infrastructure Development Project.

PHED is implementing a project costing Rs 16.00 Crores for rehabilitation of existing and extension of distribution system to the newly developed areas.

C. Sewerage System

- 1 Area covered 70% of currently habitated
- 2 Population served About 7,00,000. as per 2001 census
- 3 Sewerage net work 815 Kms, 100 to 1600 mm diameter sizes
- 4 Sewage generation 176 mld (80% of average Water supply 220mld)
- 5 Sewage Treatment Plant one 20mld capacity at Nandri
- 6 Type of treatment Tertiary,
Screening, grit removal, anaerobic and facultative
Ponds
- 7 Disposal of treated waste Used for irrigation
- 8 Investment made for providing sewerage facility in last 10 year;

.....Nagar Nigam

..... UIT

.....RHB

1994-99 Rs 5.07 Crores by PHED

2002-2006 Rs 100 Crores under RUIDP

9 Annual O & M Cost

10 Cost Recovery ratio

3.0 HISTORY

3.1 FIRST SEWERAGE SCHEME FOR JODHPUR CITY

The first sewerage scheme for Jodhpur city was framed in 1935 by Mr.S.G.Edgar,I.S.E. the than Superintending Engineer, PWD, Jodhpur. The scheme was prepared under the specialist guidance of Mr.F.D.Tunncliffe,M.S.Assoc. M.Inst. C.E., Superintending Engiener, Public Health Department, United Provinces. Mr.Tunncliffe visited Jodhpur in 1934 and submitted a note on Drainage proposal to the Government of Jodhpur on 05.04.1934

Some paragraphs from the report regarding necessity of introducing sewerage system in Jodhpur are reproduced below :-

With the increased water supply consequent of bringing into use the new Umed Sagar reservoir in the near future, the disposal of the sullage from the city area and its environs will become aggravated and the existing system of surface drainage, which is not sufficient to meet present demands, will become stressed to a degree and condition from a sanitary aspect will become intolerable.

With a piped water supply system unless the water consumption is kept down to a figure of about 5 gallons per head per day, any system of open drains sooner or later is bound to prove unsatisfactory... and there is no other alternative but to change the system and to introduce underground drains.

The intensity of rainfall is very great and the combined system of drainage so common in Europe is not possible in India. So what is known as the separate system of drainage that is underground drains for the foul water and separate open or covered surface drain for the storm water must be adopted.

The importance of excluding storm water from the foul water drains must be stressed and also exclusion of all sullage from the storm water drains.

Storm water drains should follow the natural drainage channels and there must be no departure from this rule.This, of course, does not apply to the underground foul water drains, although to make the best use of the fall available and to intercept sullage from low lying areas, these should in most cases follow the same alignment.

It is most important that storm water be excluded from the sewers.

Covered or underground drains are looked upon with dis favour in this country. It is said that they easily become choked and one has not go to far to find a reason for this. In the majority it is due to faulty maintenance. In the writer's own experience he has come across cases of manhole covers being removed to enable the contents of a refuse cart to be dumped into the sewer. And it is by no means uncommon for a gully grates to be removed there by dispensing with the efforts required on the part of the sweepers to keep the grating clear. The solution is obvious, strict supervision and maintenance must be insisted on from the start.

The disposal of the sullage should not present a difficult problem. Practically all land in the vicinity of Jodhpur is crying out for water .

Based on these recommendations, the first sewerage scheme for Jodhpur city costing Rs.3,45,000/- was sanctioned Administrative and Technically by State Council on 08.06.1935. The very object of the scheme was to remove the nuisance of the sullage stagnation in and around the city.

Execution of the scheme started in the year 1935-36 by laying 15'' trunk sewer from Ratanada (present Bhaskar Circle) to the Sewerage Farm near Bicharli village. The sewerage scheme started in 1935-36 continued and a number of additional sewers were laid.

These were:

- (1) 12'' Sardarpura sewer from Residency Road to Junction at Bheronbagh, taking in all the sullage from the open drain of the Sardarpura area;
- (2) A 12'' Western branch sewer from Bheronbagh to Railway Running-Shed via two churches and past Railway Club ground thereby connection 12'' Sardarpura sewer to the outfall sewer;
- (3) a 9'' sewer from Jalori Gate to Bheronbagh to meet 12'' Western branch sewer thereby diverting the sullage of the Windham Hospital premises flowing in the Jalori Bari Nuallah
- (4) 9'' Sojati Gate sewer starting from the back of the Municipal office in the city and receiving along and laid in the bed of the Sojati Nuallah course to meet the existing 9'' Ratananda Sewer near Railway Running shed;
- (5) a 9'' Main Bazar sewer from Hathiram – ka – odha to Juni Dhan Mandi receiving all along the main bazaar and picking up all cross drainage enroute.
- (6) A 12'' sewer from the Mehkma Khas, not a component of the main scheme, was laid starting from near the Willingdom garden embracing all the drainage for Willingdom garden, new Jubilee Courts and Old Mehkma Khas offices to connect up with the existing 12'' sewer near new Police Line Headquarters.
- (7) 9'' branch sewer from Shivanchi Gate to connect Sadarpura brach sewer to Junction at Bheronbagh to clect waste water from Umed Hospital and Sadarpura .

(8) 9” branch sewer from Moti Chowk to Sojati Gate and Ratanada , Windham Hospital to near Railway Guest House

(9) 9” branchsewer from Jalori Gate to Kotwali

(10) 9” branch sewer from Hathi Ram ka Oda to Naugari Gate

Thus, the first sewerage scheme comprising of 8.8 kms of 9”, 3.2 kms of 12” and 3.35 kms of 15” sewer together with construction of two settling tanks and development of some 100 acres of sewerage farm for utilization of sullage after settlement was completed and made functional by the year 1940-41.

3.2 EXPANSION OF SEWERAGE SYSTEM

Although a skeleton sewerage system was constructed between 1935 –1940 with the main object of disposal of sullage from houses through a system of open street side drains and catch pits /road gullies, which in turn connected to the sewers laid in main streets only. Conversion of dry pit latrines into flush latrines were not considered feasible at that time due to limited supply of water from surface as well as ground water sources*. Collection and disposal of refuse and night soil from dry latrines through conservancy tram- way remained in operation till 1955 since its inception in 1935. The conservancy tramway was used to run twice a day all along the city wall to Bhadwasia.

The sewerage system constructed in 1935-40 continued, without any major improvements, till about 1964-65 when expansion and improvement in the system was considered*** necessary and large size trunk sewers were constructed. Subsequently, with the object of extension of sewerage system JMC as well as UIT constructed lateral sewers in piecemeal depending on the availability of funds.

After second reorganization of Jodhpur WSS during 1972-76, Once again the capacity of the sewerage system was enhanced. The state government sanctioned Rs.148 lacs for laying, strengthening and expansion of sewerage system. New branch and main sewers for serving Walled city, Sardarpura , Ratanada and part of Mahamandir areas were laid. 600mm dia sewer from Fateh Pole to Sardarpura ‘D’ Road, 450 mm dia sewer from Hathi Ram ka oda to Darpan Cinema. The complete sewerage system of the city was connected to the out fall sewer of 800 mm dia to 1100 mm dia. starting from Ratanada and terminating near Jhalamand village. However, due to scarcity of funds some works planned in 1977-78 could not be completed.

*Average water supply during fifties was only 45 lpcd. The main source of water was Hemawas dam, which was connected to Jodhpur by 98 km. Long, (72 km gravity, and 16 km pumping sections with 8 lift pumping stations) Sumer Samand water supply canal. The conveyance system was constructed in the year 1938.

**First Reorganisation of Jodhpur WSS was done in the year 1958-60, when Hemawas was further connected to the Jawai construction of Baiji Ashram GSR and walled city distribution system were part of this scheme.

***After 2nd Reorganisation of Jodhpur WSS in the year 1971-76.

3.3 SEWERAGE CHARGES:

In order to meet out the expenditure done for operation & maintenance (O&M) of sewerage system ,state Government levied sewerage charge @ 20 percent of the water charges with effect from july,1984.since than PHED is regularly collecting sewerage charge and supposed to reimburse the O&m expenditure to the municipal corporation up to the limit of sewer charges collected.

3.4 WORLD BANK AIDED PROJECT (1981-1988)

There after a major extension of the city sewerage system was envisaged during the years 1982-86 under the World Bank aided project (Rs. 3.32 crore). A large number of dry pit latrines in the walled city area were converted into flush latrines as subsidized loans were granted to the house owners for conversion of the same under this Project (1981-1988).

Based on the topography of the city and covering areas of Master plan for the year 1996, the city was divided into 4 master drainage zones namely

Jhalamand,
Poonjala,
Pal, and
Industrial area)

The object of the project was to cover about 80% of the projected population (2010-11)of the city residing in the Walled city , Shastri Nagar,Sardarpura,Mahamandir and Ratanada areas. Incomplete works of the earlier sanctioned project were also included . 600 mm dia sewer from Ada Bazar to Ratanada and 450 mm dia sewer from Mahamandir to education office were constructed under the project Including laying of laterals in various parts of the city were done under the project.

The sewage treatment site at Bhichali was abandoned due to development of defense Air base in the adjacent area. The new site was selected near Jhalamand village and provision for preliminary treatment (screening & grit removal) was included in the project.

3.5 MAHAMANDIR SEWERAGE SCHEME 1993-99

Completion of work Bank project by year 1988, extension of sewerage system in most of the Jhalamand zone i.e. wall city to adjacent areas of Udai Mandir, Paota, Railway Station and Sojati Gate, Sardarpura, Shastri Nagar and some part of Ratanada was completed, Although land for construction of sewerage Treatment plant was acquired near Jhalamand village but due to non construction of STP the raw sewage was continued to be disposed off in open land.

Considering development in the Mahamandir area a part of Punjla zone a scheme was framed to provide sewerage system in Mahamandir, Shakti Nagar, Laxmi Nagar and BJS colonies together with provision for laying branch and main sewers upto the sewage Treatment plant site near village Nandri .

The scheme costing Rs 5.07 crores was sanctioned in the year 1995. 58 hectares of land was acquired for STP .A total length of 18.14 Kms of sewer lines size ranging from 150 to 900 mm dia were laid by the year 1999.

For construction of S.T.P. consultancy was obtained from National Environmental Engineering Research Institute, (NEERI) Nagpur. The estimated cost of the proposed STP was Rs 3.13Crores against the Rs 0.65 crores of initial provision to the scheme. Due to non-availability of funds the STP could not be constructed under the scheme. Scheme Map Titled Mahamandir zone is available under [MAPS](#).

Thus non availability of sufficient fund only 40% habitated areas of the city could be provided with sewerage facilities. Waste water generated from a large part of the city continued to be transported through open drains or discharged into soak pits system .

4.0 SEWERAGE WORKS UNDER [RUIDP](#) (2001-2006)

With a object of 90% population coverage by sewerage system and strengthening of the existing system to meet the requirement by the year 2034 an initial allocation of Rs 43.00 crores were made under Rajasthan Urban Infrastructure Development Project for Jodhpur(RUIDP).The allocations were subsequently increased first to Rs 72.00 crores and finally 12 work orders costing Rs 103.77 Crores were awarded for laying of 427 kms of sewer lines(150 to 1600mm dia.) and construction of one 20mld capacity Sewage Treatment Plant (STP) in the year 2002-03 .At present the project is nearing completion as laying of 413kms of sewer lines and construction of STP at Nandri are already completed .

4.1 SEWER LINES: The details of sewer lines included in the project are shown in the following table;

**Table 1 MASTER ZONE WISE SEWER LINES UNDER RUIDP
(2002-2006)**

MASTER ZONE	PACKAGE	SEWER LINES LAID IN Kms			Total Kms
		Laterals 150-250 mm dia	Branch 250-500 mm dia	Main 600-1600 mm dia	
Jhalamand	WW/07	27.00	3.50	14.00	44.50
	WW/13	04.75	6.00	05.25	16.00
	Sub Total	31.75	9.50	19.25	60.50
Punjla	WW/02	5.5	-----	-----	5.5
	WW/03	52.70	6.04	01.3	60.04
	WW/04	50.43	05.70	06.89	63.02
	SI/04	11.30	-----	-----	11.30
	SI0/5	03.00	-----	-----	03.00
	Sub Total	122.93	11.74	8.19	142.86
Pal	WW/09 L-1	45.00	03.00	04.00	52.00
	WW/09 L-2	29.00	04.00	-----	33.00
	WW/10 L-1	44.25	01.80	04.20	50.25
	WW/10 L-2	--	--	10.00	10.00
	WW/14 L-1*	32.00	02.00	03.00	37.00
	WW/14 L-2*	36.00	02.00	02.00	40.00
	SI0/5	05.00	-----	-----	05.00
Sub Total	191.25	12.80	23.20	227.25	
Grand Total		345.93	34.04	50.64	430.61

* laying of balance 12 kms of sewer lines are in progress

4.2 TREATMENT FACILITY. Treatment of raw sewage is carried out through **Waste Stabilization method**, at Nandri Sewage treatment plant. Currently about 10 MLD of sewage from Punjla Master Sewerage Zone is treated at this STP (design capacity – 20 MLD). The tertiary treatment plant is provided with Coarse Screen and Mechanical Cleaned Automatic Fine Bar Screens, Detritus Type Grit Chamber ,Anaerobic Ponds and Facultative Ponds.The treated water is used for irrigation .Nagar Nigam has awarded a contract for this.

Sewage collected from other two zones i.e. Jhalamand and Pal is disposed over land acquired for construction of STP.

5.0 AEARS AND POPULATION COVERED WITH SEWERAGE SYSTEM

After implementation of RUIDP, 47 wards are fully sewerred, 11 wards are partially sewerred while remaining 2 are unsewerred, of the total of 60 wards of the city . Based on the ward coverage of the system , it is estimated that approximately 7.00 lakh population is presently being covered with sewerage system.

Table 2 Sewerage System Coverage

Status	Ward Coverage (after Implementation of RUIDP)	Total wards
Fully Sewered	2,4,5,6,8,9,13-48,51;52,53,59	47
Partially Sewered	7,10,11,12,49,50,54,55,56,57,58,	11
Unsewerred Areas	1,60	02

The areas covered under the projects are shown in the [MAPS](#) available at the web site.

Total length of the existing sewer lines is about 430 km and the fair estimated value of these assets is about Rs 65 crores .Under ongoing RUIDP laying of 430 kms sewer lines together with construction of one sewage treatment plant are almost completed and being commissioned side by side to match with the progress of construction. Cost of these constructions is about Rs. 100 crores. As such the value of the sewerage system assets of the city shall be about Rs. 165 crores by the end of this financial year.

CURRENT ISSUES AND CHALLENGES

6.1 SEWER CONNECTIONS.

There exists a potential of about 50,000 new sewer connection with the network laid by RUIDP .So far about 15000 house owners have taken connections during camps jointly organised by RUIDP and Nagar Nigam or by directly applying to the Nagar Nigam office. The large gap indicates the possibility of illegal residential, institutional and commercial connection.

6.2 IMPROVING REVENUE COLLECTION

In absence of actual data regarding annual revenue and expenditures a preliminary statement of operating revenue and expenditures has been prepared for assessing the required budgetary provisions during next three years. The statement is enclosed at Annexure

A summary of the statement is shown in the table below;

Table 2 Summary of Operating revenue & Expenditures

Sn	Particulars	06-07	07-08	08-09	09-10
1	Sewer system assets (Rs Crores)	65	165	190	255
2	Operating Revenue (Rs Crores)	1.75	3.15	2.95	4.12
3	Operating Expenditures (Rs Crores)	2.99	6.80	8.21	11.11
4	Surplus/(deficit) (Rs Crores)	(1.24)	(3.65)	(5.26)	(6.99)

It is evident from the above table that estimated current deficit in operating revenue of Rs 1.24 crores shall increase to Rs 3.65 crores in next financial year and in the range of Rs 5.00 to 7.00 Crores in the next coming years even after collection and transfer of sewerage charges by PHED to the Nagar Nigam. Thus sustainable maintenance of the city sewer assets is a real challenge for Nagar Nigam at present and in the coming years .

6.3 IMPROVEMENT IN OPERATION & MAINTENANCE SYSTEM

Functioning of the city's sewerage system is problematic and needs immediate improvement in operation and maintenance aspects. Inability of Nagar Nigam in properly maintaining the system due to meager resources and poor organisational aspects has resulted into the following:-

- (a) There exists about 150 chronic sewer Man hole overflow points in various parts of the city. 'Raw Sewage' regularly overflows at these points and create hazard to the public health, environment and damages roads. .
- (b) Many blocked/damaged Sewers segments have been connected to the storm water drains due to inability in carrying out required corrective repairs or replacements timely.
- (c) Cleaning of main sewers have not been done for the last 20 to 25 years due to lack of funds. Absence of cleaning has resulted into reduction of carrying capacity of sewers. This condition causes overflow and surcharging of sewers. Problems at Shastri Nagar, Udai Mandir, Hathi Ram Ka Oda, Air Force and Shivanchi Gate areas are existing for the last many years.

(d) Maps, construction drawings showing plan and profiles of most of the city's existing sewerage system are not available. This is the first and the most important requirement for planning and executing O&M activities.

(e) Minimum required emergency equipment such as power rodders, bucket machines, dewatering pumps, sewer plugs and other equipments are not available with Nagar Nigam.

(f) Non-availability of properly trained skilled staff, services of engineers are the other major short coming with the maintenance teams currently working.

This is the most important issue as it is directly effecting health of general public , degrading environmen, and resulting into poor utilisation of the huge investment already done in providing sewerage facility to people of Jodhpur.

Hon'ble High Court has also took notice of the situation during hearing of various Public Interest Litigations .

Nagar Nigam has framed a separate sewer cell which working for condition assessment of sewer, repair and rehabilitation of maulfunctioing sewer segments,

Preparation of existing sewerage system maps and procurement of sewer cleaning equipments .Recently District Administration under the guidance of Collector Jodhpur and Traffic Management Commettee headed by the Divisional Commissioner are reviewing various aspects connected with the city sewerage system and has taken necessary actions to help Nagar Nigam at local Administration as well as GOR level..

6.4 STRENGTHENING AND REHABILITATION OF EXISTING SYSTEM

Strengthening and Rehabilitation of problematic sewerage system of walled city, Shastri Nagar, Ratanada and other localities are the next important work to be done for improving performance of the existing sewerage. Investigation and detailed analysis are

being done by the Consultant appointed by Nagar Nigam for including these works in UISSMD , the project under planing.

6.5 TREATMENT CAPACITY CONSTRAINT

Although 20mld STP at Nandri is functional since November 2005.It is receiving about 10 mld raw sewage from the connected Punjla Zone .But in absence of STP for the two master sewerage drainage zones i.e. Jhalamand and Pal, sever treatment capacity constraint ,as it has remained in the past several years, will be continued .

6.6 COVERAGE OF DEVELOPED AREA

Initial planning for deciding the scope and cost of the RUIDP was done in the years 1996-98. The project was cleared by ADB in 2001 and its implementation has taken five years.Considering availability of funds and non existance of protected piped water supply in the outskirts of the ,extension of water supply in these already developed areas was considered on priority .Thus newly developed areas along Jaipur ,Pal , Pali road and towards Mandore were covered with water distribution system. These localities have now been developed itto a thickly populated urban fringe and required to be provided with sewerage facilities for collection and disposal of waste water from these areas to improve sanitation and environment in these areas.
