CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development (Solid Waste Management)

Proposal	Municipal Solid Waste Management in Agra City
Name of District / State	Agra, Uttar Pradesh
Name of City	Agra
Objectives	To make an efficient solid waste management system in Agra in compliance with MSW Rules 2000
Whether CDP is prepared	Yes
Background	Nagar Nigam Agra (NNA) has appointed Regional Center for Urban and Environmental Studies (RCUES) to make a Detailed Project Report for formulating an integrated municipal solid waste management system for Agra meeting the requirements of MSW rules 2000.
Present Status of MSW	Agra has a present population of 14.26 lacs. It is spread over an area of 141 square kilometers. There are 90 election wards divided into 19 sanitary wards for solid waste management. As per NNA, the length of roads is about 1724 kilometers. There are 325 secondary collection points (200 open dumps, 9 dhalaos and 116 DP containers as per survey) for waste collection spread all over the city. NNA has about 2215 permanent Safai Karamcharis and a fleet of 96 vehicles of different type/age to carry out the MSWM activity. The waste in the city is being dumped at un-engineered dumpsite located at Shadhara on bypass road which is 4 to 5 kms away from main city. The present Municipal Solid Waste Management in Agra is not meeting the MSW Rules 2000. It lacks segregation of waste at source, door to door collection system, primary and secondary waste storage facility and waste transportation system. Moreover, waste is being dumped in unscientific manner. The present status is reflected by the dumping of garbage on road sides and open dumps, nallahs and storm water drains in Agra.
Need of the Project	The deteriorating situation of solid waste management reflects clearly in the streets/roads of Agra. This along with the requirement as per law, is to have a system in compliance with MSW rules 2000 into place, at the earliest, and has necessitated this activity.

Proposed Municipal Solid Waste Management Plan for Agra	➢ Source Segregation is proposed to be implemented through a two bin system – one for bio-degradable and the other for recyclables. It is also proposed to make it mandatory for citizens to segregate waste. ➢ Primary Collection is proposed to be implemented door-to-door through cycle rickshaws. The rickshaws will have separate bin system for bio-degradable and recyclable waste stream. There is a proposal to involve NGO/private operator for O&M in primary collection. ➢ It is proposed that existing ragpickers shall be made part of the MSW management and this sector shall be formalized through NGOs/ CBOs. Primary waste collectors (mostly ragpickers) will be allowed to sell the recyclables in the market. ➢ Waste collected by street sweepers is proposed to be collected in wheelbarrows. ➢ Secondary Storage will be through the use of Refuse Collector bins of 0.6 cum and 1.1 cum and dumper placer containers of 3.5 m3, 4.5 m3 and 8.0 m3 capacity. These bins/dumper containers are suitably placed at strategic locations in each sector/colony depending on available area for placement of these bins. ➢ Biodegradable waste collected from the households and non-biodegradable waste collected by street sweeping will be dumped in the respective bins/dumper placer containers placed at the secondary collection location. ➢ Twin Litter bins are also proposed to be installed at public places like parks, institutional areas and so on. ➢ Manual handling has been avoided at all stages of waste transportation. The refuse collector bins will be hydraulically lifted for emptying into the refuse collector trucks. Dumper placer containers will be transported by dumper placer vehicles and their waste will be emptied at the designated facility. Existing vehicles, which are in good condition have been used in the proposed plan after due renovation. ➢ Two transfer stations are proposed to economize on waste transportation costs and reduce vehicular traffic in the city area. Waste from the areas situated near the waste treatment and disposal facility site will be transported directly to the facility. For the remaining areas two transfer stations have been located at the strategic locations. Waste from these areas will be send to the two transfer stations and from there it will be transported in bigger compactor trucks to the waste treatment and disposal facility site. ➢ A Compost Plant is proposed to be established for treatment of biodegradable waste. Sanitary Landfill is also proposed to be established for inerts and rejects of compost plant. The

O&M of the compost plant and landfill facility will be given to Private Partner in a PPP mechanism.

Population — In the area under the purview of NNA

- as per 2001 census — 1275134
- base year (2006) — 1426617
- design year (2011) — 1590570

Solid Waste Generation (Total)

- base year — 709 TPD (As per Survey)

Waste Composition	Percentage Waste	Quantity (MT/day)
Bio-degradable	43.9%	311.3
Recyclable	21.2%	150.3
Non-biodegradable (Inert)	34.9%	247.4
Total Waste	100	709
Per-capita Waste (gm/capita/day)		497

- design year (2011) — 830 TPD

Project Components

The requirement of the total waste generation has been worked out in the DPR after a detailed survey of waste generating areas. The requirement of fund for purchase of the equipments for its collection, storage and transportation are under:

- Collection: Rs. 500.45 lacs
- Storage: Rs. 340.65 lacs
- Transportation: Rs. 571.88 lacs

Estimation of the cost of the waste to compost and development of an engineered landfill for waste disposal has been evaluated.

- Compost Plant (350 TPD): Rs. 772.46 lacs
- Landfill site (for use for 5 years): Rs. 808.73lacs

The land for the Integrated Sanitary Landfill facility for 25 years, is proposed at gram Kuberpur, Teshil Etmadpur by Agra Development Authority. Presently 22 acres of land is in the possession of the Nagar Nigam Agra at the same location. Additional land adjoining to the same is in the process of acquisition by Agra Development Authority in a short period of time. NNA has already initiated necessary action in the matter.

Provisions for IEC have been made in the DPR and provision is also made for areas that can be brought under PPP especially door-to-door collection, treatment and disposal of waste in the DPR.

Estimated Cost (Proposed)

	Particulars	Total Estimated Cost (Rs. in lacs)
A.	Collection/Storage/Transportation	
	Collection	500.45
	Storage	340.65
	Transportation to site/plant	571.88
	Sub Total	1412.98
B.	Compost Plant from Waste (350 TPD)	772.46
C.	Landfill Site (for use during the first 5 years):	808.73
D.	Contingencies @ 3% on A to C	89.82
E.	**Total Capital Cost (A+B+C+D)**	**3083.99**

Cost to be reimbursed

F	Preparation of Detailed Project Report @ 1.5 % of E above	46.26
G	Capacity Building, IEC @ 1.5 % of E above	46.26
H	Efficiency @ 1 % of E above	30.84
I	Innovative Approach @ 1 % of E above	30.84
J	**Incentives (F+G+H+I+J)**	**154.20**
K	**Third Party Project Monitoring and Evaluation @ 5 % of E above**	**154.20**

Period of Implementation: 13 months from date of sanction

Implementing Agency: Nagar Nigam Agra

Funding Pattern: The funds yet to be devolved from TFC is as follows:
2006-07: Rs. 109.84 lacs
2007-08: Rs. 219.68 lacs

Therefore, total capital cost required= Rs. 3083.99 lacs-(Rs. 109.84+Rs. 219.68 lacs) = Rs. 2754.47 lacs

Sharing Pattern (as per JNNURM guidelines)

	Share	Rs. in lacs
GOI	50%	1377.24
State Govt	20%	550.89
ULB	30%	826.34

Financial Phasing

- 10% of the GOI's share (Rs. 137.72 lacs) and 10% of State Govt's share (Rs. 55.09 lacs) of capital cost to be devolved in the Year 2006-2007.
- 90% of the GOI's share (Rs. 1239.52 lacs) and 10% of State

Govt's share (Rs. 495.80 lacs) of capital cost to be devolved in the Year 2007-2008.

Annual O&M Expenditure

- existing

The expenditure on SWM activity is financed from the funds it receives from the State Finance Commission. The details are as under:

Year	(Rs. in crores)
2004-05	25.5
2005-06	28.1

The detailed breakup of Rs. 28.1 crores incurred during 2005-06 is as follows:

	(Rs. in Crores) (2005-06)
Administration and establishment including salary/wages for Safai Karamcharis	24.8
Equipment / machinery	3.3
Total O&M	28.1

- proposed

	Year	2009	2010	2011	2012	2013
					Rs. in Lacs	
A	Surplus with NNA from H/H	358	363	369	375	381
	and Compost Plant					
B	20% share of Rates/Taxes	508	533	560	588	617
	& Municipal Revenue					
C	Conservancy Tax	609	622	636	975	1328
D=A+B+C	Total Surplus	1475	1519	1566	1938	2327
E	Expenditure on	2480	1984	1587	1270	1143
	Safai Karamchari					
F	Expenditure on Transportation	368	376	385	393	401
G=D+E	Total Expenditure	2848	2360	1972	1662	1544
H=G-D	Dependency on SFC Funds	1373	841	406	Nil	Nil

Agency Responsible for O&M — NNA under PPP for its sub components

Charge for Solid Waste Management

- existing — Nil
- proposed
  - The revenue from house tax was Rs. 7.6 crores and municipal revenues other than taxes was Rs. 17.6 crores in 2005-06. This is likely to part finance the SWM expenditure in future.
  - Conservancy charges can be levied by/from NNA to recover the O&M costs.
  - Surplus from house to house hold collection, compost plant would also fund the SWM expenditure in future.

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for MSW management for Agra city may be accorded sanction at an estimated cost of Rs. 2754.47 lacs and subject to following conditions:

PROJECT SPECIFIC COMMENTS.

1. Nagar Nigam Agra (NNA) is in the process of acquiring additional land of 42 acre for sanitary land fill near village Kuberpur, Tehsil Etmadpur, in addition to existing 22 acre land in the adjoining area. All efforts should be made by State Govt. to acquire land expeditiously which otherwise would hamper the progress of implementation. However, the funds under the project should be released to State Govt. only after getting land acquisition certificate from State Govt. by NURM Divn.

2. Before start of execution, State Govt. should satisfy itself that the proposed waste treatment / processing plant does not fall within 20 Km radius from the existing airport and if required necessary 'No Objection' certificate be obtained from AAI.

3. The funds already devolved under 12th Finance Commission grants needs to be fully utilized for purchasing the tools and equipments for SWM for which it is meant for and the same should be integrated in the proposed scheme. The remaining funds to be devolved in subsequent years as mentioned under funding pattern should also be integrated with the present scheme and NURM Directorate may take appropriate action in this regard to ensure integration of funds devolved under TFC while releasing the funds under the scheme.

4. The present bio-degradable waste generation in Agra is 311 MT. However, in the proposal the capacity of compost plant was originally adopted as 250MT only. But, based on discussion with CPHEEO, the compost plant capacity has been increased from 250 to 350MT for design year 2011, since the projected bio-degradable waste works out to 364 MT per day.

5. In the modified proposal provision of two transfer stations has been considered based on CPHEEO suggestions in place of one transfer station suggested in original proposal to bring efficiency and economy in collection of waste and its transportation to waste disposal site.

6. Based on the scrutiny of the project, the cost of collection, storage and transportation has been increased from Rs. 1086.41 to 1412.97, to bring efficiency in the collection of

waste due to inclusion of provision made for providing bins at households and transfer stations.

7. Sufficient land should be made available for setting up of two transfer stations in the project. Advance action may be initiated in this regard.

GENERAL COMMENTS

8. While implementing the project the MSW Rules (Management & Handling) Rules 2000 may be adhered to.

9. The quality of compost should meet the specification brought out under Fertilizer Control (Amendment) order 2006 by Ministry of Agriculture.

10. Before setting up the waste treatment and disposal facility necessary authorization may be obtained from the State Pollution Control Board (SPCB). The land area earmarked should have No Objection certificate of SPCB.

11. Wherever possible the involvement of community and private sector participation may be encouraged.

12. Wherever required advance necessary steps may be initiated to acquire the land to avoid the delay in implementation of project.

13. It should be ensured by the implementing agency that through enhancement of tariff and by other alternative means the project become viable as far as O & M of project is concerned.

14. Before implementation of project, the need for various components proposed in the DPR needs to be rechecked vis-à-vis the available facility along with the proposed cost estimate in the DPR, and the same may be got approved from the competent authority in the State.

15. In case of change, the same may be immediately referred to CPHEEO for further necessary action.

Abstract of Approved Cost
Solid Waste Management in Agra

	Particulars	Total Estimated Cost (Rs. in lacs)	Total Approved Cost (Rs. in Lacs)	Remarks
A.	Collection/Storage/Transportation			
	Collection	500.45		
	Storage	340.65		
	Transportation to site/plant	571.88		
	Sub Total	1412.98		
B.	Compost Plant from Waste (350 TPD)	772.46		
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To be reimbursed

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Recommended from Technical Angle

Appraisal Note for Central Sanctioning & Monitoring Committee,

Ministry of Urban Development,

for consideration of Projects under JNNURM

(Sewerage system for Agra city)

1	Proposal	:	**Branch & Lateral sewer lines in Northern & Western Zones of Agra city.**
2	Name of State	:	Uttar Pradesh
3	Name of City	:	**Agra**
4	Objectives	:	(a) To make effective the sewerage facility being provided in Northern & Western Zone Agra under YAP-II (b) To collect sewage from the houses through branch/lateral sewers and transport it to STPs through trunk sewers, being implemented under YAP-II for treating the sewage as per PCB norms.
5	Whether CDP is prepared	:	Yes
6	Background	:	Agra is a historical tourist destination of India with cultural importance. It is also developing industrially . It is thus facing rapid urbanization due to which the city needs environmental hygiene and prevention of pollution of river Yamuna.
7	Present Status	:	The existing sewerage system in Agra is available only in about 20% of the city. Kamla Nagar colony and the newly developed Sikandra colony have sewerage system without treatment facility. The present total waste water generation in the city is about 200 mld. The sewage treatment facility with interception and diversion of nalas executed in YAP-I is available for 90 mld of waste water. Another 54 mld STP with 70 km. of trunk sewers in part of Northern & Western Zones of Agra has been sanctioned by MoEF for YAP-II. The execution of work under YAP-II has been commenced in June, 2007 and is likely to be completed by June, 2009.
8	Need of the Project	:	In YAP-II, 2 nos. of STP's (total capacity 54 mld) along with 5 nos. of pumping station and 70 kms. of trunk sewer lines have been provided in the Project sanction by MoEF for Northern & Western Zones. The branch & lateral sewer lines were not included in

			the aforesaid YAP-II project without which the project will not be effective . In the meeting approving the YAP-II project by MoEF, it was agreed by SFC of MoEF to take up the works of branches and laterals through JNNURM programme to make the system effective. So, it is essential to take up the works of branches & laterals of these zones under the project.		
9	Area of the city	:	9126 Ha		
10	Details of area coverage	:			
	sewered area	:	1800 Ha (mainly central and part of western zone)		
	Area to be sewered under the project (JNNURM)	:	2000 Ha (part of northern and western zone)		
	Balance area to be sewered (under YAP-III - sometime in 2009)	:	5326 Ha		
11	Population	:			
	Census 2001(Total town)	:	1259979		
	Population(2001) covered in the project (JNNURM)	:	248010		
	Base Year 2007 (as per YAP II)	:	300234		
	Intermediate year 2017	:	422615		
	Design Year 2037	:	471728		
12	Existing rate of water supply	:	150 lpcd		
13	Sewage contribution	:	120 lpcd		
14	Sewage Generation (MLD)	:			
			Under Project area (MLD)	Under Total city area(MLD)	Total STP capacity available in 2010 (MLD)
	Base Year 2007	:	33.78	192	144 (STPs for balance capacity shall be provided under YAP-III around 2010)
	Inter Year 2017	:	48.46	300	
	Design Year 2037	:	54.44	480	
15	Existing Sewerage System in Northern & Western zone	:	The sewage is discharged into open drains.		
16	STPs (MLD)	:			
	2007 (Existing)	:	90 mld(in other zones)		
	2010	:	54 mld (under implementation in YAP II)		
17	Project components (proposed)	:	(i) Branch & lateral sewer lines - 69.262 kms.		
			(ii) Manholes- 2558 Nos.		

18	Estimated Cost (proposed)	:	Rs. 2162 Lakhs			
19	Period of implementation	:	22 months			
20	Funding pattern GOI: GOUP: ULB					
		:	GOI	GOUP	Agra Nagar Nigam	Total
		:	50%	20%	30%	100%
	As proposed	:	1081 Lakh	432.4 Lakh	648.6Lakh	2162 Lakh

21	Financial Phasing	:	2007-08, 2008-09

(Rs in lakh)

Year	GoI	GoUP	AGRA Nagar Nigam	Total
2007-08	500	200	300	1000
2008-09	581	232.4	348.6	1162
Total	1081	432.4	648.6	2162

22	Ownership of Project	:	Agra Nagar Nigam
23	Implementing Agency	:	U.P. Jal Nigam
24	Annual O & M Expenditure (Rs. lakh)	:	
	Existing works	:	Rs. 824.53 lakh for all O&M of existing STP's (3 nos. 90 mld and 11 nos. of SPS)
	Proposed	:	Rs. 183.38 lakh for proposed component in YAP-II
25	Agency Responsible for O&M	:	Agra Nagar Nigam
26	O&M Recovery plan	:	

While submitting the YAP-II project for approval of MoEF, the annual anticipated income of the project area is shown as below.

Income from sewer Tax @ 4%	Rs. 20,75,006
Income from sewer service charges @ Rs. 635 per house connection per annum	Rs. 1,64,63,322
Total	1,85,38,328

Whereas the O&M expenditure of assets being created in project area (YAP-II) has been anticipated as Rs. 183.38 lakhs.

On the above proposed tariff, the scheme will be self sustainable as per the project approved by MoEF for YAP II.

27	Estimated Cost for Consideration & approval	:	**Rs. 2162 lakh**

PROJECT COST (Component-wise)

Rs in LAKH

Sl. No.	Components	As per the proposed DPR	As recommended by CPHEEO
1.	(a) Cost of branch, lateral, manholes etc. in Northern zone	1470.00	1429.00
	(b) Cost of branch, lateral, manholes etc. in Western zone	719.34	669.82
	SUB TOTAL	2189.34	2098.82
	3% contingencies	65.68	62.96
	Total	**2255.02**	**2161.78**
	Say	**2255.00**	**2162.00**

The charges for IEC, DPR preparation etc may be claimed separately as per JNNURM guidelines.

COMMENTS OF CPHEEO:

The project may be accorded technical clearance at an estimated cost of Rs. 2162 lakhs against the proposed cost of Rs. 2255 lakhs. During project implementation State Government should ensure the following:

- Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured to as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

- Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

- While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

- Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers to as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by ANN for record.

- Flushing tanks, ventilating shafts and inspection chambers may be provided and suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection of O&M, if necessary.

- While laying sewers and during construction of manholes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed.

- All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

- The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

- ANN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board / competent authority depending upon the mode of final disposal.

- Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

- A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

- The implementation schedule / PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by ANN to this Ministry regularly for perusal and record.

- A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory be amending the existing bye-laws if necessary.

- Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

- All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO / CBO also may be explored.

- An Action plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

- The project has been approved with price level of 2006-07, without price contingencies during the implementation period. Cost Escalation, if any, shall be met by ANN / Govt. of Uttar Pradesh.

- The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

- The project implementation schedule should match with the main sewerage system project sanctioned under YAP II, so as to ensure that components of project constructed under YAP-II may not be kept idle.

- No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Project under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development

<table>
<tr><td>1</td><td>Proposal</td><td>:</td><td>Sewerage works for city of Agra- Agra sewerage scheme phase-1 (part-1).</td></tr>
<tr><td>2</td><td>Name of State</td><td>:</td><td>Uttar Pradesh</td></tr>
<tr><td>3</td><td>Name of City</td><td>:</td><td>Agra</td></tr>
<tr><td>4</td><td>Objectives</td><td>:</td><td>A- To provide sewerage facilities in Central & Tajganj zones in comprehensive manner, out of eight sewerage zones of Agra city.

B- To collect, convey & treat the sewage and disposal as per PCB standard.</td></tr>
<tr><td>5</td><td>Whether CDP is prepared</td><td>:</td><td>Yes</td></tr>
<tr><td>6</td><td>Background</td><td>:</td><td>Agra is historical city of India. The tourists from all over the world visit the city due to TAJ Mahal. Leather & Petha industries are very famous for the city. It is also educational center in the region.

With the rapid urbanization, there is an urgent need to provide sewerage facilities to the entire population of Agra, for promoting environmental hygiene and to prevent pollution of river Yamuna.</td></tr>
<tr><td>7</td><td>Present Status</td><td>:</td><td>In Agra Nagar Nigam area the existing sewerage system is available only in about 25% of the core city area. About 15% area of part of Northern & Western Sewerage zones areas shall be covered by ongoing projects under YAP-II/JNNURM programme and part (Bhim Nagri) of Southern zone-II under state sector programme. Thus total available sewered area is likely to be around 30% of total city.

The ongoing projects include the following works.

<table>
<tr><th>S. No.</th><th>Sewerage Zones</th><th>Sewer network</th><th>S.P.S.</th><th>S.T.P.</th></tr>
<tr><td>A</td><td colspan="4">Under YAP-II</td></tr>
<tr><td>1.</td><td>Part of Northern zone</td><td>35 Km.</td><td>2 Nos.</td><td>1 No. 14 mld capacity UASB based</td></tr>
<tr><td>2.</td><td>Part of Western zone</td><td>35 Km.</td><td>3 Nos.</td><td>1 No. 40 mld capacity UASB based</td></tr>
<tr><td>B</td><td colspan="4">JNNURM</td></tr>
<tr><td>1.</td><td>Part of Northern zone</td><td>44 Km.</td><td>-</td><td>-</td></tr>
<tr><td>2.</td><td>Part of Western zone</td><td>25 Km.</td><td>-</td><td>-</td></tr>
<tr><td>C</td><td colspan="4">Under State Sector Programme</td></tr>
<tr><td>1.</td><td>Part (Bhim Nagri) Southern zone-II.</td><td>63 Km.</td><td>1 No.</td><td>1 No. 12 mld</td></tr>
</table>

Further, under Yamuna Action Plan Phase-I of NRCD, M/o Environment & Forests 3 nos. Sewage Treatment Plants oftotal capacity of 90.25 mld (78 mld capacity UASB based at</td></tr>
</table>

			Dhandupura, 10 mld capacity WSP at Peelakhar and 2.25 mld capacity WSP at Bhuri Ka Nagla) were setup in 2002 on the concept of intercepting nalas sludge and diverting them to STP for treatment.
8	Need of the Project	:	U.P. Jal Nigam has prepared a sewerage master plan under YAP-II programme for 2040. The project area under sewerage master plan has been taken as per 2021 year master plan of Agra Development Authority. As per sewerage master plan, the city has been divided into eight sewerage zones. Under present DPR, the two main important zones viz- Central & Tajganj zones have been included. The Central zone is the core area of the Agra city and Tajganj zone is area surrounding the famous 'TAJ MAHAL'. Accordingly, these two zones need sewerage facilities on priority basis. These two zones covered under present DPR are falling within Agra Municipal limit. In major part of Central zone, 30-50 years old sewerage network exists but most of the trunk mains & lateral sewers are chocked/ defunct and are insufficient to cater the present waste water discharge. The old Mantola trunk sewer can not be replaced due to site condition constraints. Accordingly, the a new main trunk sewer starting from RBS College crossing via Khandari crossing, Civil Court, Nehru Nagar, Vijay Nagar, Jeoni Mandi Road, Jamuna Kinara Road up to outfall chamber near Agra fort has been proposed in this DPR. The rehabilitations/replacement of non-functional and under capacity sewers in different areas have also been proposed along with new sewer lines in the un-sewered areas. A sewerage scheme for some part of the Tajganj zone amounting Rs. 43.572 Cr. was sanctioned under Taj Trapezium Zone (TTZ) programme in year 2000. The works proposed under scheme could not be completed due to limited release of funds viz. Rs. 23.00 Cr only. The remaining works of above scheme along with works of reaming area of Tajganj sewerage zone have been proposed in this DPR for funding under JNNURM programme.
9	Project Area of the city as per Master Plan	:	21962 Hectare.
10	Zone Wise Break up of the Project Area (in hectare)		

S. No.	Name of zone	Total Area	Area Covered in on going Projects	Area to be covered under project	Remaining area to be covered
1	**Central zone**	**2072.50**	**-**	**2072.50**	**-**
2	South Zone - III	386.21	-	-	386.21
3	South Zone-II	3005.37	1093.97-	-	1911.40
4	South Zone - I	1713.60	-	-	1713.68
5	**Tajganj Zone**	**1979.50**	**-**	**1979.50**	**-**
6	East Zone	4391.04	-	-	4391.04
7	West Zone	5256.04	1910.00	-	3346.04
8	North Zone	3157.74	1170.85	-	1986.89

	Total Area in Hact.		**21962.08**	**4174.82**	**4052.00**	**13735.26**

11 Details of area coverage :

Central Sewerage District consists of mainly Mantola, Bijli Ghar, Kamla Nagar, Balkeshwar, Nehru Nagar, Rajamandi, Sanjay Palace, Belan Ganj, Khandari etc. areas covering 40 nos. municipal wards.

The Tajganj Sewerage District consists of mainly Gobar Chowki, Nagla Mewati, Shaheed Nagar etc. areas covering 8 nos. municipal wards.

12 Population

Population details for Agra city and project area is as under:

A- Census population year 2001 - 1275134

B - Projected population within Agra Nagar Nigam limit.

2010	2025	2040
1484712	1857632	2217299

C- Projected population of the zones under DPR

Name of zone	2010	2025	2040
Central zone	545932	616153	674729
Tajganj zone	135444	192196	254041
Total	**681376**	**708349**	**928770**

ZONE- WISE POPULATION COVERAGE AS PER SEWERAGE MASTER PLAN IN YEAR 2010

S. No.	Name of zone	Population Covered under on going Projects	Population to be Covered under present DPR	Remaining Population To be covered	Total Population
1	Central zon	-	545932	-	545932
2	South Zone - III	-	-	63384	63384
3	South Zone II	82179	-	143584	225763
4	South Zone - I	-	-	73885	73885
5	Tajganj Zone	-	135444	-	135444
6	East Zone	-	-	166554	166554
7	West Zone	152285	-	267016	419301
8	North Zone	71218	-	120854-	192072
	Total	**305683**	**681376**	**835277**	**1822335**

13 Water Supply

The rate of water supply will be available @ 150 lpcd through out the project design period. The works of strengthening the water supply system are sanctioned in Ganga Jal Project under JBIC assisted programme which is under implementation and likely to be completed by 2012.

Sewage Contribution

It has been assumed that 80% of water supply will reach the sewer system.

<table>
<tr><td>14</td><td>Sewage Generation (MLD)</td><td></td><td>Sewage generation within Nagar Nigam area is as under

<table><tr><td>2010</td><td>2025</td><td>2040</td></tr><tr><td>160</td><td>223</td><td>266</td></tr></table>
Sewage generation in the zones included in this DPR.

<table><tr><th>Name of zone</th><th>2010</th><th>2025</th><th>2040</th></tr><tr><td>Central zone</td><td>66</td><td>74</td><td>81</td></tr><tr><td>Tajganj zone</td><td>16</td><td>23</td><td>30</td></tr></table></td></tr>
<tr><td>15</td><td>STPs (MLD)</td><td></td><td>Status of STP for the zones under project

<table><tr><td>Requirement in the year 2025 (MLD)</td><td>Existing Capacity(MLD)</td><td>Proposed for the year 2025(MLD)</td></tr><tr><td>97</td><td>78</td><td>24</td></tr></table>
Zone wise STP status as per Sewerage Master Plan
(In MLD)
<table><tr><td rowspan="2">S. No.</td><td rowspan="2">Name of Zone</td><td rowspan="2">Requirement in the year 2025</td><td colspan="2">Available</td><td rowspan="2">Balance requirement in the year 2025</td></tr><tr><td>Existing</td><td>Under on going project</td></tr><tr><td>1.</td><td>Central zone</td><td>74</td><td>78</td><td>-</td><td>-</td></tr><tr><td>2.</td><td>South zone-III</td><td>14</td><td>-</td><td>-</td><td>14</td></tr><tr><td>3.</td><td>South zone-II</td><td>36</td><td>-</td><td>12</td><td>24</td></tr><tr><td>4.</td><td>South zone-I</td><td>16</td><td>-</td><td>-</td><td>16</td></tr><tr><td>5.</td><td>Tajganj zone</td><td>23</td><td>-</td><td>-</td><td>23</td></tr><tr><td>6.</td><td>East zone</td><td>29</td><td>10</td><td>-</td><td>19</td></tr><tr><td>7.</td><td>West zone</td><td>75</td><td>-</td><td>40</td><td>35</td></tr><tr><td>8.</td><td>North zone</td><td>33</td><td>2.25</td><td>14</td><td>19</td></tr><tr><td></td><td>Total</td><td>300</td><td>90.25</td><td>66</td><td>150</td></tr></table></td></tr>
<tr><td>16</td><td>Project components</td><td></td><td>Central zone-
1. Sewerage network of 150 to 1600 mm dia of 93.90 km.
2. Pumping stations 4 nos. (2 Nos. new and 2 Nos. renovation of existing pumping stations).
3. Rising main – 300 to 600 mm dia 1550 m.
4. STP – Existing.
Tajganj zone-
1. Sewerage network of 150 to 400 mm dia of 39.87 km.
2. Pumping stations 4 nos.
3. Rising main – 200 to 800 mm dia 2025 m.
4. STP – 24 mld capacity (UASB)</td></tr>
<tr><td>17</td><td>Period of implementation</td><td></td><td>33 months (July 2009 to March 2012).</td></tr>
<tr><td>18</td><td>1) Estimated</td><td></td><td>Rs. 283.86 Crore.</td></tr>
</table>

	Cost (Appraised by State Govt. including 12.5% centage)					
19	2) Cost Recommended by CPHEEO		Rs. 195.92 crores			
20	Funding pattern GOI: GoUP : ULB	:	GOI	GOUP	Agra Nagar Nigam	Total
		:	50%	20%	30%	100%
		:	90.00*	51.92	54.00	195.92

* GOI share restricted to available fund of Rs.90 crore

21	Financial Phasing	:	

(Rs in crore)

Year	GoI	GoUP	ANN	Total
2009-10 (25%)	22.50	12.98	13.50	48.98
2010-11 (50%)	45.00	25.96	27.00	97.96
2011-12 (25%)	22.50	12.98	13.50	48.98
Total	**90.00**	**51.92**	**54.00**	**195.92**

22	Ownership of Project	:	Agra Nagar Nigam
23	Implementing Agency	:	U.P. Jal Nigam
24	Agency responsible for O&M		Agra Nagar Nigam

The approach of State Government towards Standardized Service Level Benchmarking and Total Sanitation is placed at Annexure-I. Agra Nagar Nigam undertakes that during course of execution of project, the implementation agency envisages achieving the proposed benchmarks.

O & M Revenue Generation

25	Annual O & M Expenditure & Revenue Generation (Rs. lakh)	:	S.No.	Particulars	2010	2025	2040
			1	Annual O&M Expenditure	845.69	1039.69	1292.26
			2	Annual Income	1040.72	1081.95	1418.50
			3	Nett. Surplus/Los	195.03 (+)	42.26 (+)	126.24 (+)

			s

26	Sewage Cess Proposed	:	Sewage Cess 50% of prevailing water tariff.

Details of Revenue Generation:

The sewage cess is proposed as 50% of following water tariff proposed in JBIC assisted Ganga Jal water supply project for Agra.

0.0 - 10 KL @ Rs. 6/KL/per month
upto – 15 KL @ Rs. 8/KL/per month
upto – 25 KL @ Rs. 9/KL/per month
upto – 50 KL @ Rs. 10/KL/per month
upto – 75KL @ Rs. 12/KL/per month

Total population of Central & Tajganj zones			75% population on which tariff proposed			No of households assuming 6 person per house		
2010	2025	2040	2010	2025	2040	2010	2025	2040
681376	708349	928770	511032	531262	696578	85172	88546	116097

(Rs. In Lacs)

Consumption rate	Sewage cess Tariff proposed in Rs./KL	YEAR					
		Consumer	Amount	Consumer	Amount	Consumer	Amount
0.0 – 10 KL	3.00/KL	11072	39.86	11511	41.44	15093	54.33
Upto 15 KL	4.00/KL	36624	263.69	38075	274.14	49922	359.44
Upto 25 KL	4.50/KL	24700	333.45	25678	346.65	33668	454.52
Upto 50 KL	5.00/KL	11924	357.72	12396	371.88	16254	487.62
Upto 75 KL	6.00/KL	852	46.00	886	47.84	1161	62.69
	Total	**85172**	**1040.72**	**88546**	**1081.95**	**116097**	**1418.60**

27	Existing		Not identified separately as sewage cess in merged with property tax.
28	Income & Expenditure of Municipal corporation of Agra	:	(Rs. In Crores)

S.No.	Year	Income	Expenditure	Surplus/Deficit
1	2005-06	74.13	56.47	(+) 17.66
2	2006-07	70.44	68.81	(+) 1.63
3	2007-08	147.04	91.33	(+) 55.71

As the DPR for providing sewerage system in Agra in Central and Taj Ganj Zones is design as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 195.92 crores as detailed below in the table. The State Government and Agra Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.

(Rs in lacs)

Sl.No.	Components wise Project Cost	Cost appraised by State Govt. (for Central and Tajgang Zones)	As recommended by CPHEEO
A.	**Civil Works**		
1.	Supply and laying of NP – 2/ NP-3 RCC pipes for Trunk, Lateral & Branch Sewers (excluding road reinstatement.)	13436.98	12612.42
2.	Construction of Pumping Stations	690.86	690.86
3.	Supply and laying of 150 mm to 800mm dia D.I K-7 Rising Mains	391.87	358.36
4.	Sewer Cleaning Equipments	122.80	122.80
5.	Sewage Treatment Plant	2426.71	1296.48
	Sub Total (A)	**17069.22**	**15080.92**
B.	**E&M Works**		
1.	Supply and installation of Pumping plants, generators, construction of sub stations and other accessories for MPS & SPS	1616.93	1616.93
2.	E&M works for STPs	710.38	284.58
	Sub Total (B)	**2327.31**	**1901.51**
	Total (A+B)	**19396.53**	**16982.43**
C.	**Contingencies @ 3% on (A+B)**	**(5%) 1185.73**	**509.47**
D.	**Administrative Expenses (0.5% on A+B)**	**-**	**84.91**
	Total (A+B+C+D)	**20582.26**	**17576.81**
E.	1. Reinstatements of Roads	2182.17	1877.01
	2. Transmission Line and power connections	138.00	138.00
	Sub Total (E)	**2320.17**	**2015.01**

	Total (A+B+C+D+E)	**22902.43**	**19591.82**
F.	**Inflation as per D.P.R.**	1997.94	-
	Total (A+B+C+D+F)	**24900.37**	**19591.82**
G.	**Training, Capacity building, IEC (1.5%)**	**373.50**	**-**
	Total (A to G)	**25273.87**	**19591.82**
H.	**Centage charges 12.5% on Total (A to F)**	**3112.55**	-
	Grand Total	**28386.42**	**19591.82**
	Say	**283.86 Crores**	**195.92 Crores**

CPHEEO's Comments on DPR :

1. No objection certificate for including the project area covered under TTZ programme may be obtained by State Government from MoEF and forwarded to the Ministry before release of Ist installment.

2. The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution

3. All efforts should be made to connect sewerage system with individual houses so as to collect sewage right from its generation point and any connection with drain / nallah to tap waste water / sullage water need to be discontinued after commissioning of the project.

4. The efforts have also been made to provide linkage to urban poor/slums in the proposed sewerage network at the identified sewer stretches/manholes enclosed at Annexure-II.

5. The Population projection method adopted for JBIC assisted Ganga Jal project for agra has been followed for the forecast of population for planning Sewerage system for Agra city. Accordingly population in the base year 2010, mid year 2025and design year 2040 by various methods is given in technical statement of the DPR. The projected population has been distributed in the proposed project area in the wards/ zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

6. The water supply availability in the project area will be 150 lpcd as stated by UP Jal Nigam (**project sanctioned under JICA assistance is under execution**), which is the required for efficient functioning of sewage facility as per Manual.

7. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

8. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

9. Agra Nagar Nigam will ensure recycling/ reuse of at least 20% of treated waste water so as to recover part of O&M of scheme.

10. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

11. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

12. MNN should ensure that industrial waste water is not allowed to mix in municipal sewage. Wherever possible industrial waste water should be collected and brought to common effluent treatment plant for treatment before its disposal.

13. Treatment efficiency of UASB is sensitive to the characteristics of raw sewage. As such, before start of execution, detail analysis of raw sewage need to be undertaken to ensure proper design of UASB. In the present DPR, BOD of raw sewage has been adopted as 205 mg/l for design of STP.

14. The cost estimate has been finalized as per the UASB. However, the ULB shall explore the possibility of various cost effective technologies considering capital investment and O&M cost and the most economical one shall be adopted. Suitable clause may be incorporated in the tender document while calling for tender.

15. To reduce the dependence on power, provision has been made for power generation out of gas generated in the Sewage treatment Plant.

16. Sewer cleaning machines should be used to clean sewers rather than engaging manual labourers.

17. The linkage between the sewer network & the urban poor population with manhole ID & length has been indicated in the annexure.

18. Provision of recycle and reuse of treated waste water effluent has been made in the DPR for agricultural farming.

19. The sewer system for Agra has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

20. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 8.00 meters in open

areas in small stretches of alignment. The average depth of cutting of Trunk sewer is kept as 5 to 6 m.

21. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 pipes as per BIS Standards have been proposed.

22. It has also been mentioned that MNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

23. The BAR Chart and implementation Schedule have also been enclosed.

24. The cost estimate has been prepared based on SOR of 2008-09 prevailing in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by MNN / Govt. of Uttar Pradesh.

General Comments for Project Implementation:

I. Before commencing the project, minimum per-capita rate of water supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked along with design of sewer network, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network to the extent possible.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by ANN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. ANN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by ANN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring committee of M/o UD
(Water Supply)

1.	Proposal	:	Agra Water Supply
2.	Name of District, State	:	Agra, Uttar Pradesh
3.	Name of City	:	Agra
4.	Objectives	:	To provide continuous, qualitative water supply to Agra city in equitable manner as per CPHEEO/JNNURM Norms
5.	Whether CDP is prepared	:	Yes
6.	Background	:	Agra one the important KAVAL Town of state of Uttar Pradesh, with 2001 census population of 1259979 is growing at a faster pace. The city is of historical importance as it was once the capital city of Mughal Empire, and is having many historical buildings, including the Taj Mahal, one of the seven wonders of the world. Agra is situated at latitude of 2 degree 10' N and longitude of 78 degree 02' E.

The city has important defence establishments apart from a few cottage industries such as shoe making, stone carving and darri weaving etc.

7.	Present status	:	As per the master plan of Water supply done by NEERI, Nagpur under TTZ Programme on the instructions of Hon'ble Supreme Court of India, the city has been divided into 25 water supply zones. The source of water supply to the city has been Yamuna river. Several extension and rehabilitation schemes were Implemented till 1997 but due to inadequate water supply system, on the direction of Hon'ble Supreme Court of India, U.P. Jal Nigam requested the National Environmental Engineering Research Institute (NEERI) to prepare the project for Augmentation of water supply system of Agra. NEERI initially prepared PFR of Rs. 107.24 crores for phase - I and Rs. 84.94 crores for phase II. After checking by EFC, state and central govt. sanctioned the project for Rs. 72.80 crores only this project is mainly for providing equitable distribution of water and extension of water supply systems to the newly developed areas according to master plan of water supply prepared by NEERI, the city has been divided into 25 water supply zones, out of which 15 zones are existing and 10 zones are new or developing areas on out skirts of the city.

Existing Zones Hariparwat, Lohamandi, Maithan, Chatta, Kotwali, Rakabganj, Tajganj-I, Khandari, Sikandra –I south of NH2, Shahganj – I, Bundukatra, Trans Yamuna – I, Ghatwasan – I, Bodla – I, and Shahganj – II,

New Zones Trans Yamuna – II, Ghatwasan – II, Dayal Bagh Swami Bagh, Sikandra –I north of NH2, Sinkandra –II, Bodla – III, Bodla – II, Shahganj – III, Tajganj – II & III.

Existing Water supply system have two water treatment plants (WTP) of 225 & 144 MLD at Jeonimandi (W.W. –I) and Sikandra (W.W.-II) respectively. This capacity is sufficient for present requirement but the problem at present is not of treatment capacity, but is of poor and polluted raw water. The source of Raw water is River Yamuna. Status of Agra water supply before Taj trapezium zone programme was as below.

Sl. No.	Item	No.	Capacity
1	Treatment Plants	2	369 MLD
2	Distribution System	418 Km	
3	Overhead Tank	9	9499K.L.
4	Under Ground Reservoir	12	42475 K.L.
5	Zonal Pumping Station	11	

The Mission Management Board (MMB) has approved a cost of Rs. 72.80 crores under Taj Trapezium zone programme. This estimate includes following works which are under execution. Detailed status is annexed with this DPR.

Sl. No.	Name of work	Proposed works	Completed works
1	Distribution System	784 Km	418 Km
2	Rising Main	42 Km	195 Km
3	Overhead Tank	15 Nos.	6 Nos.
4	Under Ground Reservoir	13 Nos.	12 Nos.
5	Pumping Station	77 Nos.	53 Nos.

Against an approved project of Rs. 72.80 crores, Rs. 61.50 crores were released till year 2004 and balance Rs. 11.30 crores were released in March 2005. Due to delay in release of funds all the works could not be completed within scheduled time and cost. Now the cost of the project has been revised to Rs. 93.51 crores and an additional Rs. 14.11 crores for road reinstatement. State Govt. has approved the revised cost and sent to Govt. of India for approval, which is yet to be accorded.

Some of the works executed under TTZ programme are yet to be completed and commissioned due to non-release of funds (Rs. 34.82 crores).

Another project for augmentation of water supply (source) conveying 140 cusecs water from Palra Fall at a distance of app. 130 Km from Agra, on upper Ganga Canal in district Bulandshehar, through conduit is under preparation by U.P. Jal Nigam. The project is proposed to be funded by JBIC.

After completion of all proposed works, Agra city will have complete zonal distribution network and storage capacity according to norms.

8. Proposal : In the present proposal, reorganization and improving upon the equitable distribution of water for all the 25 zones has been considered.

In addition, all the remaining works, previously proposed under TTZ programme, are included in this DPR.

The necessary repair of 5 no. old over head tanks, 2 no. old clear water reservoirs, replacement of old rising main, new intake well at WW-I, recycling arrangement for back wash water at both the water treatment plants, leak detection equipments and SCADA system, for operating raw water /clear water and zonal pumping station etc. are included in this DPR.

The details of main works/ components proposed can be seen in the abstract of cost.

9.	Water Availability	:	(Existing water supply details)
	Source		River Yamuna
	Water Treatment Plants	:	2 Nos. WW. –I (at Jeevani Mandi) – 225 MLD. WW.II (at Sikandra) – 144 MLD.
	Total Production	:	262 MLD.
	Water Supply at consumers point	:	170 MLD.
	Per Capita	:	119.72 LPCD.
	UFW	:	40 %

10.	Population		
	As per 2001 census	:	1259979
	Base year 2010	:	1564200
	Intermediate year 2025	:	2239000
	Design year 2040	:	3135600

11.	Water Demand (MLD)	:	Clear/Raw
	Base year 2010	:	351 / 386
	Intermediate year 2025	:	490/ 539
	Design year 2040	:	667/ 734

12. Need of the project : Existing works commissioned before Taj Trapezium zone programme (TTZ) are too old and need rehabilitation. The works proposed and executed under T.T.Z. are to enhance the existing zonal capacity & distribution network and providing water supply systems in new zones. Some works for rehabilitation were also proposed to make the existing system functional. Present system can run smoothly only when all works are functional, so it became necessary to replace or repair those items which were required for proper functioning of the systems. The flow of fund under TTZ is not coming from last

many years and subsequently most of the works proposed under TTZ are incomplete and yet to be commissioned.

Agra Water Supply (Ganga Jal) Project mainly covers conveyance of Ganga water from Palra fall to Trans Kailash side of Agra in a distance of approximate 130Km. with a ground level difference of +34 m. Hence 150 Cusc water including 10 cusec for Mathura /Vrindavan will flow in gravity from Palra to Agra. From Trans Kailash water will be conveyed to water works I & II through 2 no. rising mains from pumping station in a length 22 Km. and 3 Km. respectively with appurtenanant works. This project also have the provision for installing water meters for domestic/ Non-domestic connections. This project covers social development work with awareness campaign etc. Some rehabilitations works have also been proposed in this estimate.

All the necessary works to be executed for improvement of the water supply systems in Agra town, have been proposed under this estimate which include balance remaining works of rehabilitation, and augmentation, other than those proposed under Agra water Supply (Ganga Jal) Project and all the incomplete or Balance works, which were earlier proposed under TTZ Programme, are now being proposed under this project, namely Agra Water Supply project (Under JNNURM). The proposals included in this DPR have been finalized after detailed consultation with Agra Jal Sansthan Authorities.

Following are the main objectives:

Need for extensive reorganization of the distribution network and its extension to the newly developed localities.

Need for isolation of the feeder mains/ rising mains from the distribution lines.

Need for renovation of zonal pumping station and segregation of zones to ensure equitable distribution of water and to ensure operation of the zonal pumping stations at desired efficiency.

Need for loss and leakage prevention to reduce the quantum of un-accounted for water and replacement of old and out lived pipe lines which, at certain places, are even responsible for contaminated water Supply.

Need for augmentation of storage capacity in different Zones.

After completion and commissioning of the project components, operation and maintenance shall be done by Agra Jal Sansthan by providing house connections and realization of water charges.

13. Proposed Scheme : The project component include new zonal pumping station of Ghatwasan –II zone, new zonal pumping station at Subhash

Park (Nai Ki mandi), reorganization of distribution network (457 kms), repairing of 5 no. overhead Tanks, repairing of 2 no,. clear water reservoirs, atomization of complete water supply system (SCADA System),replacing old rising mains, provision of leak detection equipment, all the incomplete /balance works proposed under TTZ programme, Roof top rain water harvesting & ground water recharging, new intake well at WW-I and Recycling arrangement for back wash water at WW-I & WW –II.

14. Source of Water : The source of water for existing water supply system is River Yamuna. Tube wells are not successful in the area.

Augmentation of source is proposed in another DPR, named Agra water supply scheme (Ganga Jal), which is separately under preparation and is proposed to be funded by JBIC.

The process of short listing of consultants is going on and is expected to be completed shortly. This project is mainly for augmentation of the source for Agra Water Supply Scheme. The source has been taken as Ganga Water from upper Ganga canal at Palra fall in district Bulandshahar, approximately 130 km from Agra.

Thus provision for source augmentation has not been done in this DPR., proposed under JNNURM.

15. Cost for Consideration & Approval :

Sl.No.	Description of Work	Financial outlay proposed (Rs. Lacs)
	Civil Work	
1	New zonal pumping station at Ghatwasan Zone –II	285.54
2	New sub-zonal pumping station for Nail ki mandi at Shubash park	166.64
3	Distribution system & appurtenant works	2538.60
4	Repairing of old Over head Tanks	103.33
5	Repairing of old clear water reservoirs	80.88
6	Replacement of old Rising Main	726.90
7	New Intake well at WW- I in place of old intake Well	76.05
8	Re-cycling arrangement for back wash water at WW-I & WW-II	10.85
9	Balance cost of works proposed under TTZ.	3154.00
10	Ground Water recharging & rain water harvesting	23.50
11	Staff Quarter & other buildings	30.00
	TOTAL	**7196.29**
12	Work contingencies @3% of Rs. 7196.29 lacs	215.89
	Total Cost of Civil Works (Rs. In Lacs)	7412.18
B	Electrical & Mechanical Works	
1-(a)	Cost of pumping plants & other allied works.	
	(a) Brij Vihar Pumping Station under Ghatwasan zone – II 3735 LPM 37M Head 50 HP HP 3 Nos.	47.13
	(b) New Agra Pumping station under Ghatwasan Zone – II 24902 PM37 m Head 34 HP – 3 Nos.	40.94
	(C) Subhash Park Pumping Station under Nai ki Mandi zone. 1970 LPM 31mt. Head 20 HP – 3 Nos.	36.61
	(d) Shahganj pumping plants & Other allied works for Jeevani Mandi Water works. 32550 LPM 15.5 m Head 175 HP -3 Nos.	36.47
(B)	Cost of Raw Water pumping plants & other allied works for Jeevani Mandi water works . 200 LPM 15.5 Mt. Head 175 HP 3 nos.	151.37
(C)	Cost of circulating Water pumping Plant & other allied works	
	(a) At Siknadra Water Works. 6000 LPM 10 mt Head -30 HP-3 Nos.	47.91
	(b) At Jeevani Mandi Water Works 9450 LPM 10 m Head -30 HP-3 Nos	65.75
2-(A)	Cost of power connection to be taken from UPPCL and internal electrification of Pump House Water works campus etc.	
	(a) Brij Vihar Pumping Station.	10.25
	(b) New Agra Pumping Station	9.26
	(c) Subhash park Pumping Station.	11.28
	(d) Shahganj Pumping Station.	8.24

(B)	Cost of power connection to be taken from sub-station of water works and internal electrification of Pump House, water works campus etc. for circulation waste water pumping station.	
	(a) Sikandra Water Works	10.25
	(b) Jeevani Mandi Water Works	11.35
3-	Cost of installation, Commissioning of automatic Bacteriological treatment plant with microprocessor based – Programmable logic controller, water flow sensing system of proportional design controller with Sodium hypochlorite solution Gr. 1 Conforming to is 11701992 for running & maintenance on trial and run for 2 Nos. Zonal Pumping Station.	
4-	Leak detector System. 4 Sets complete	144.00
5-	SCADA System for operating Raw Water, Clear Water and all Zonal Pumping Station	995.00
	Cost of E&M Works (Rs. In Lacs)	1634.69
6-	Work contingencies @3%of Rs. 1634.69 Lacs	49.04
	Total cost of E&M works (Rs. In Lacs)	**1683.73**
	Grand Total (Rs. In Lacs)	**9095.91**

16. Per Capita Cost (Rs.) : Year 2010 Year 2025 Year 2040
662.90 463.12 330.70

17. Sharing Pattern :

	Share	Rs. In Lacs
GOI	50%	4547.96
Sate Govt.	20%	1819.18
ULB (ANN)	30%	2728.77

18. Financial Phasing :

GOI Share Rs. 4547.96 Lacs

Year	2007-08	15%	682.19
	2008-09	45%	2046.58
	2009-10	40%	1819.19

State share Rs. 1819.18 Lacs

Year	2007-08	15%	272.88
	2008-09	45%	818.63
	2009-10	40%	727.67

ANN Share Rs. 2728.77 lacs

Year	2007-08	15%	409.32
	2008-09	45%	1227.95
	2009-10	40%	1091.50

19. Period of Completion : 26 months

20. Implementing Agency : U.P. Jal Nigam

21. Annual O&M Expenditure :
- Existing (year 2006) : 2037.50 lacs
- Proposed (Year 2010) : 2995.07 lacs
- Energy and Power charges : 156.87 lacs
- Chemical like Alum Bleching Powder etc. : 590.38 lacs

- Maintenance & Repair : 860.81 lacs
- Wages of operating staff : 1387.01 lacs

22. Agency responsible for O&M : Agra Jal Sansthan

23. Proposed Tariff :

Sl.No	Description	Poroposed Tariff	
1	No. of anticipated private connections	14000	
1.1	Domestic connections (nos)	No.	Rate (Rs./Yr
A	Consumers using water up to 10 Kl/month	18000	720
B	Consumers using water up to 15 Kl/month	60000	1440
C	Consumers using water up to 25 Kl/month	40000	2700
D	Consumers using water up to 50 Kl/month	20000	6000
E	Consumers using water more than 50 Kl/month	2000	10800
	Total (1.1)	**140000**	
1.2	Non- domestic /commercial connections (No.s)	No.	Rate Rs. /Yr
A	Nursing homes	35	2024
b	Cinema halls	35	694
C	Hotels (starred)	4	72405
D	Restaurant & lodges	100	675
E	Ice factory, cold storage & bottling plant	17	20596
F	Service stations & garages	33	3972
G	Petha industry	50	1388
H	Dairy, sweet shop, tea shop, small hotels, clinic, gardens etc.	495	643
	Total (1.2)	**769**	
1.3	Bulk consumers		
A	S.N. Hospital	Consumption (M.L)	Rate Rs. Per K.L.)
B	M.E.S.	360	17
C	Kheria	3250	17
D	Railways	1600	17

E	Cantonment Board	1000	17
F	Multi storey buildings	1200	13
F (i)	One connection for 20 flats up 5 lac it. Water consumption P.M.	912	17
F(ii)	More than 20 flat up to 8 lac it. Water consumption P.M.	547	18
F(iii)	More than 8 lac it. Water consumption P.M	366	20
	Total (1.3)	**9235**	

24. Proposed Tariff & Revenue Generation : Rs. 4992.05 lacs

25. Existing Tariff & Revenue (2006-07) : Rs. 3895.50 lacs

DPR has been perused and CPHEEO'S comments are as under:

The proposed DPR for water supply for Agra city may be accorded technical clearance at an estimated cost of Rs. 10369.34 lacs as per following break-up.

S. No.	Component	Cost as per proposed DPR	As recommended by CPHEEO
	Civil Work		
1	New zonal pumping station at Ghatwasan Zone –II	285.54	
2	New sub-zonal pumping station for Nai ki mandi at Shubash park	166.64	
3	Distribution system & appurtenant works	2538.60	
4	Repairing of old Over head Tanks	103.33	
5	Repairing of old clear water reservoirs	80.88	
6	Replacement of old Rising Main	726.90	
7	New Intake well at WW- I in place of old intake Well	76.05	
8	Re-cycling arrangement for back wash water at WW-I & WW-II	10.85	
9	Balance cost of works proposed under TTZ.	3154.00	
10	Ground Water recharging & rain water harvesting	23.50	
11	Staff Quarter & other buildings	30.00	
	TOTAL	**7196.29**	
B	Electrical & Mechanical Works		

1-(a)	Cost of pumping plants & other allied works.		
	(a) Brij Vihar Pumping Station under Ghatwasan zone – II 3735 LPM 37M Head 50 HP HP 3 Nos.	47.13	
	(b) New Agra Pumping station under Ghatwasan Zone – II 24902 PM37 m Head 34 HP – 3 Nos.	40.94	
	(C) Subhash Park Pumping Station under Nai ki Mandi zone. 1970 LPM 31mt. Head 20 HP – 3 Nos.	36.61	
	(d) Shahganj pumping plants & Other allied works for Jeevani Mandi Water works. 32550 LPM 15.5 m Head 175 HP - 3 Nos.	36.47	
(B)	Cost of Raw Water pumping plants & other allied works for Jeevani mandi water works . 200 LPM 15.5 Mt. Head 175 HP 3 nos.	151.37	
(C)	Cost of circulating wate Water pumping Plant & other allied works		
	(a) At Sikandra Water Works. 6000 LPM 10 m Head -30 HP-3 Nos.	47.91	
	(b) At Jeeani Madi Water Works 9450 LPM 10 m Head -30 HP-3 Nos	65.75	
2-(A)	Cost of power connection to be taken from UPPCL and internal electrification of Pump House Water works campus etc.		
	(a) Brij Vihar Pumping Station.	10.25	
	(b) New Agra Pumping Station	9.26	
	(c) Subhash park Pumping Station.	11.28	
	(d) Shahganj Pumping Station.	8.24	
(B)	Cost of power connection to be taken from sub-station of water works and internal electrification of Pump House, water works campus etc. for circulation waste water pumping station.		
	(a) Sikandra Water Works	10.25	
	(b) Jeevani Mandi Water Works	11.35	
3.	Cost of installation, Commissioning of automatic Bacteriological treatment plant with microprocessor based – Programmable logic controller, water flow sensing system of proportional design controller with Sodium hypochlorite		

	solution Gr. 1 Conforming to is 11701992 for running & maintenance on trial and run for 2 Nos. Zonal Pumping Station.		
4-	Leak detector System. 4 Sets complete	144.00	
5-	SCADA System for operating Raw Water, Clear Water and all Zonal Pumping Station	995.00	
	Cost of E&M Works (Rs. In Lacs)	**1634.69**	
	Grand Total (Rs. In Lacs)	**8830.98**	
	Work contingencies @3%	**264.93**	
	Total work cost	**9095.91**	
	Training Capacity and Building, IEC@ 5%	454.80	
	Administrative expenses @ 5%	454.80	
	Supervision@12.5%	1136.99	
	Grand Total	**11142.50**	

Distribution System

Proposed under TTZ				
As per original sanction by EFC	**As per revised approval by EFC**	**Size**	**Executed**	**Balance**
428.46 Km	818 Km	500 to 80 mm	457 Km	361 Km
Proposed under Present DPR (JNNURM				
		700 to 100 mm	457.03 Km	

CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development (Municipal Solid Waste Management)

➢ Proposal	Municipal Solid Waste Management in Allahabad City
➢ Name of District / State	Allahabad, Uttar Pradesh
➢ Name of City	Allahabad
➢ Objectives	To make an efficient Solid Waste Management System in Allahabad in compliance with MSW Rules, 2000
➢ Whether CDP is prepared	Yes
➢ Background	Allahabad Nagar Nigam (ANN) has formulated an Integrated Management System for Municipal Solid Waste Disposal in Allahabad as per the requirements of MSW Rules, 2000.
➢ Present Status (Year 2006)	➢ Total waste generated (MC) = 541.31 MT/ day ➢ Total waste collected & transported by ANN (MC) = 390 MT/ day ➢ Total uncollected waste = 150.31MT/ day is dumped in the low lying areas other than the existing dumping ground ➢ Physical characteristics of MSW (sampling and analysis done by SGS India Limited) Organic waste: 235.3 MT/ day (43.46%) Recyclable waste: 235.3 MT/ day (17.26%) Construction debris: 94.1 MT/ day (17.38%) Drain Silt, Mixed waste & Street sweeping: 118.5 MT/ day (21.9%) ➢ People dump Solid Waste on the Road Side in heaps (Primary Collection System). ➢ Primary Solid Waste Storage System includes 160 bins/ containers. ➢ 47 Open Dump Sites exist in the City from where ANN vehicles collect MSW. ➢ ANN has 1872 permanent and 470 contractual staff for street sweeping ➢ The organizational set up: Municipal Commissioner Mukhya Nagar Swasthya Adhikari

Nagar Swasthya Adhikari
Asst. Engg. Zonal sanitary officer
Foreman & O/M staff Chief Sanitary Inspector
SI/ Safai Nayak/ Sweepers

- The Secondary Collection Fleet/Transport Equipments consists of :
  - Loaders/ excavators – 2 Nos
  - Trucks/ Dumpers – 28 Nos
  - Tractor Trolleys – 8 Nos
  - Hydraulic Three wheelers – 32 Nos
  - JCB – 9 Nos
  - Refuse Collector - 6 Nos
- Processing System does not exist.

- Dump Sites

  Two dump sites exist. They are :
  - Near Kareli, at a distance of 7-8 km from the city centre (S-W)
  - Bauxi Bandh at a distance of 7-8 km from the city centre (N-E)

- Need of the Project — The need of the project is to introduce Scientific Approach for managing Solid Waste in compliance with MSW Rules, 2000 and to protect the Environs from Pollution.

- Population (Nos)

As per 2001 Census	1018092 Nos (including MC + Outer Growth)
As on Base Year (2006)	1339051 Nos (including 15% floating population)
As on Design Year (2011)	1543539 Nos (including 15% floating population)

- Solid Waste Generation

Base Year (2006)	577.58 TPD (MC + OG)
Design Year (2011)	606.95 TPD (MC + OG)

Proposed system

In view of existing waste generation and inadequate handling scenario and future growth potential of Allahabad city, it is imperative that a robust integrated MSW Management system is put in place. The proposed system would consist of segregation, collection, treating, transportation, disposal of waste in a scientific manner as detailed below:

- Source Segregation proposed will be implemented through a two bin system – one for bio-degradable and the other for recyclables which will be made mandatory for citizens to adopt.
- Primary Collection proposed is from door-to-door through cycle rickshaws & handcarts. Handcarts are proposed for collection from congested areas and rickshaws will be used in other areas. The rickshaws/ handcarts will have separate bin system for bio-degradable and recyclable waste stream. There is a proposal to involve NGO/private operator for O&M in primary collection.
- It is proposed that existing ragpickers shall be made part of the MSW management and this will be formalized through NGOs / CBOs. Primary waste collectors (mostly ragpickers) will be allowed to sell the recyclables in the market.
- Waste collected by street sweepers is proposed to be collected in wheelbarrows.
- Secondary Storage will be through the use of Refuse Collector bins of 0.6 cum and 1.1 cum and dumper placer containers of 3.0 cum capacity. These bins/dumper containers are suitably placed at strategic locations in each street//colony depending on available area for placement of these bins.
- Biodegradable waste collected from the households and non-biodegradable waste collected by street sweeping will be dumped in the respective bins/dumper placer containers placed at the secondary collection location.
- Twin Litter bins are also proposed to be installed at public places like parks, institutional areas and so on.
- Manual handling has been avoided at all stages of waste transportation. The refuse collector bins will be hydraulically lifted for emptying into the refuse collector trucks. 8.0 m^3 capacity RC trucks are proposed for collection from congested areas, whereas, in other areas 14.0 m^3 RC trucks will be used.
- Dumper placer containers will be transported by twin container dumper placer vehicles and their waste will be emptied at the designated facility. Few of the existing vehicles, which are in good condition must also be used after due renovation.
- Two transfer stations are proposed to economize on waste transportation costs and reduce vehicular traffic in the city area. Waste from the areas situated near the waste treatment and disposal facility site will be transported directly to the facility. Biodegradable waste from smaller trucks/ DP will be sent to the two transfer stations and from there it will be transported in bigger compactor trucks to the waste treatment and disposal facility site.

- A Compost Plant is proposed to be established for treatment of biodegradable waste.
- Sanitary Landfill is proposed to dispose of inerts and rejects of compost plant.
- The PPP mechanism will be explored for O&M of the compost plant and sanitary landfill facility.

Proposed Integrated Processing & Disposal Facility

The entire waste of the city would reach at the proposed Integrated MSW Processing facility and finally to the Disposal Facility. In the treatment plant organic waste would be processed and converted into compost and the rejects would be sent to the landfill. 300 TPD of Compost Plant (which is around 43.46 % of biodegradable waste generated in 2013- 2014) has been proposed for the treatment of organic waste. The waste treatment facility would be in line with MSW Rules, 2000.

Furthermore, 27.04 ha of land for the purpose of Integrated system of waste has been identified by the ANN at *Gram Basawar*, *Paragana Arail, Teshil Karchhana which is* connected through well approach road to the NH-27 and is in process of acquiring. This land is sufficient for 25 years for landfilling.

Summary of the Costs

The proposed MSWM facility for Allahabad has been estimated as follows:

	Particulars	**Total Estimated cost (Rs. in lakh)**
	- Collection - Storage - Transfer station - Transportation to site/plant	562.11 322.10 220.00 444.71
A.	Sub total	1548.92
B.	Compost plant	770.50
C.	Landfill site (for use during the first 5 years):	633.48
D.	Contingencies @ 3% on A to C	88.59
E.	**Capital Cost (A+B+C+D)**	**3041.49**

Cost to be reimbursed		**(Rs. in lakhs)**
F.	Preparing of Detailed Project Report @1.5% of E	45.62
G.	Capacity Building , IEC @ 1.5% of E above	45.62

H.	Efficiency @ 1% of E above	30.41
I.	Innovative Approach @ 1 % of E above	30.41
J.	**Incentives (F+G+H+I+J)**	**152.06**
K.	**Third Party Project Monitoring and Evaluation @ 5% of E above**	**152.06**
	Total	**304.12**

- Period of Implementation: 18 months (March 2008 to August 2009)
- Implementing Agency: Allahabad Nagar Nigam

Financing Pattern (as per JNNURM guidelines)

	Share	Rs. in lacs
GOI	50%	1520.75
State Govt	20%	608.30
ULB	30%	912.44

- Financial Phasing

	2007-08	2008-09	2009-10
% release	10%	70%	20%
GOI	152.08	1064.52	304.14
State Govt	60.83	425.81	121.67
ULB	91.24	638.71	182.49
TOTAL	304.15	2129.04	608.30

- Annual O&M Expenditure
  - existing

The annual expenditure on SWM activity during 2005-06 was Rs 22.5 crore which was financed from the funds of the State Finance Commission and income of the Nagar Nigam with the following break-up:

	Rs. in Crores (2005-06)
Administration and establishment including salary/wages for Safai Karamcharis	18.7
Equipment	3.8
Total O&M	22.5

Revenue Generation

- Existing — Total Revenue (2005-06) = Rs 26.0 Crore

  Break-up of revenue is as under:
  Taxes: 14.9 Cr
  Municipal revenue other than taxes: 11.1 Cr

- Proposed (year 2008-09)

		2009	2010	2011	2012	2013
		Rs. In lacs				
A	Surplus with ANN from H/H & Compost Plant	529	616	632	648	664
B	30% share of Rates/ Taxes & Municipal Revenue	447	536	644	772	927
	Total Surplus	976	1152	1276	1420	1591
C	Expenditure on Safaikaramcharis	1870	1683	1515	1364	1228
D	Expenditure on Transportation	212	223	234	246	258
	Total Expenditure	2082	1906	1749	1610	1486
	Dependency on SFC Funds	-1106	-754	-473	-190	105

- Tariff Structure

  Existing — Nil

  Proposed — Rs 15 to Rs 50 per household per month for collection of waste

  The Compost Plant is likely to generate a Revenue of Rs 1500/ton

Though in initial years the scheme may not be self-sufficient due to high establishment expenditure of department. However, the dependence on SFC grants would be drastically reduced. the scheme becomes self-sustainable after 2013.

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for MSW management for Allahabad city may be accorded sanction at an estimated cost of Rs. 3041.49 lacs and subject to following conditions:

PROJECT SPECIFIC COMMENTS

1. The detailed design of sanitary landfill, compost plant and transfer station may be carried out by ANN before start of work and the same may be forwarded to CPHEEO for approval and records. However, any increase in cost of the project due to above shall be borne by State Government/ANN.

2. The physical and chemical characterization of waste may be done again through NEERI, Sriram test house or any other Government laboratory and certified copy of report may be forwarded to CPHEEO for record and necessary action. This would help to firm up the characterisation of waste which has been fluctuating remarkably in past test reports submitted by ANN.

3. Allahabad Nagar Nigam (ANN) is in the process of acquiring 29.824 ha for sanitary land fill at *Gram Basawar*, *Paragana Arail, Tehsil Karchhana.* All efforts should be made by ANN to acquire land expeditiously which otherwise would hamper the progress of implementation. However, the funds under the project should be released to State Govt. only after getting land acquisition certificate from State Govt. by NURM Divn.

4. The funds already devolved under 12th Finance Commission grants needs to be fully utilized for purchasing the tools and equipments for SWM for which it is meant for and the same should be integrated in the proposed scheme. The remaining funds to be devolved in subsequent years as mentioned under funding pattern should also be integrated with the present scheme.

5. The compostable waste generation in Allahabad in 2006 is 226 MT. In the proposal the capacity of compost plant was originally adopted as 200MT only. But, based on discussion with CPHEEO, the compost plant capacity has been increased from 200 to 300MT for design year 2013, since the projected compostable waste for 2013 works out to be 296 MT per day.

6. In the modified proposal provision of two transfer stations has been considered based on CPHEEO suggestions to bring efficiency and economy in collection of waste and its transportation to waste disposal site.

7. Based on the scrutiny of the project, the cost of collection, storage and transportation has been increased from Rs. 973.73 lacs to Rs 1548.92 lacs. To bring efficiency in the collection of waste provision has been made for

providing two bins for each household. Further, to bring efficiency in collection, the provision of two transfer stations has also been included. This has lead to increase in the cost of scheme from originally Rs 23.93 crore to Rs. 30.41 crore. Further, due to increase in population projection, which was very much on lower side in original proposal, and also because of adoption of latest schedule of rates, the cost of scheme has gone up.

8. Sufficient land should be made available for setting up of two transfer stations in the project. Advance action may be initiated in this regard.

GENERAL COMMENTS

9. While implementing the project the MSW Rules (Management & Handling) Rules 2000 may be adhered to.

10. The quality of compost should meet the specification brought out under Fertilizer Control (Amendment) order 2006 by Ministry of Agriculture.

11. Before setting up the waste treatment and disposal facility necessary authorization may be obtained from the State Pollution Control Board (SPCB). The land area earmarked should have No Objection certificate of SPCB.

12. Wherever possible the involvement of community and private sector participation may be encouraged.

13. Wherever required advance necessary steps may be initiated to acquire the land to avoid the delay in implementation of project.

14. It should be ensured by the implementing agency that through enhancement of tariff and by other alternative means the project become viable as far as O & M of project is concerned.

15. Before implementation of project, the need for various components proposed in the DPR needs to be rechecked vis-à-vis the available facility along with the proposed cost estimate in the DPR, and the same may be got approved from the competent authority in the State.

16. In case of change, the same may be immediately referred to CPHEEO for further necessary action.

17. All procured material for SWM project needs to be as per BIS specification.

CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development

1.	Proposal	:	**DPR for sewerage system of Allahabad city (Zone D)-Phase-I**
2.	Name of State	:	Uttar Pradesh
3.	Name of City	:	**Allahabad**
4.	Objectives	:	• To provide Sewerage facility in Sewerage District-'D' in a comprehensive manner, out of seven sewerage districts of Allahabad city. • To collect, convey & treat the sewage and disposal as per PCB standards.
5.	Whether CDP is prepared	:	Yes
6.	Background	:	The holy city of Allahabad is surrounded by rivers in three directions i. e. River Ganga in North& East and by river Yamuna in South. Situated in the North west of confluence of two of India's holiest rivers, the Ganga and the Yamuna on the 25°28' North latitude and 81°52' East longitude. World famous Mahakumbh occurs at Sangam (confluence of river Ganga & Yamuna) at an interval of 12 years. An important pilgrim and tourist centre. Population of Allahabad as per 2001-1018092. Present population of the town is around 13.70 lakh. Plain terrain with ground level varies between 84.0m and 92.0m above MSL. HFL of the river Ganga at Allahabad city is 88.35m.
7.	Present Status	:	Presently, Allahabad is covered with sewer network only in few parts of Zone-A and Zone-D and that too with trunk / main sewers laid with State Plan Funds / under Ganga Action Plan. The brief details are as under: • **Sewer Net Work :** The length of existing sewers / trunk sewers of Allahabad town is around 452 km. • **Sewage Pumping Stations :** 9 Nos sewage pumping stations have been constructed earlier in

			different areas of the city.
			
			• **Sewage treatment plants :**Two sewage treatment plants at Naini and Salori have been constructed under Ganga action plan.
			  • 60 MLD capacity at Naini (based on Activated sludge process).
			  • 29 MLD capacity at Salori (Based on FAB Process)

8.	Need of the Project	:	• To provide sewerage facilities for improvement of the living standard of the residents of the city by ensuring better hygienic conditions. • Present sewage treatment capacity is 89 mld only against requirement of 176 mld in year 2010 and 250 mld in the year 2025.
9.	Area of the city		95.10 Sq. Km.

10. Details of sewer coverage in Allahabad City

Details of area coverage	Allahabad city	Sewerage Dist- 'D' (under presentation)	Sewerage Dist- 'A,B,C,E,F,G' (under preparation)
1	2	5	7
Total area (Sq.km)	95.10	17.09	78.01
Sewered area before start of JnNURM (Sq.km)	18.00	8.76	9.23
Balanced area to be sewered under JNNURM (Sq.km)	77.01	8.33	68.68

11. Sewerage District wise Population of Allahabad City

Sewerage District	Population			
	2001	2010	2025	2040
A	304643	330234	509650	573025
B	147121	164825	279169	476309
C	139099	156916	230029	311027
D	239465	333480	482500	668305
E	164672	177845	208952	362694
F	85000	105500	142000	209000
G	180000	199600	232280	418000
Total	1260000	1468400	2084580	3018360

12. Water supply — Rate of water supply will be available at 150 lpcd in 2010 as DPR for Allahabad water supply has already been sanctioned under JNNURM and is under execution.

13. Sewerage District wise Sewage Flow of Allahabad City @ 120 lpcd sewage

Sewerage District	Sewage generation		
	2010	2025	2040
A	39.63	61.16	68.76
B	19.78	33.50	57.16
C	18.83	27.60	37.32
D	40.02	57.90	80.20
E	21.34	25.07	43.52
F	12.66	17.04	25.08
G	23.95	27.87	50.16
Total	176.20	250.14	362.20

14	Sewerage District	Required as of year 2025	Existing	Proposed under JNNURM
	A	61 mld	60 mld	NIL
	B	33 mld	-	35*
	C	28 mld	29 mld	Nil
	D	58 mld	-	60 mld**
	E	25 mld	-	25 mld*
	F	17 mld	-	17 mld*
	G	28 mld	-	28 mld*
	Total	250 mld	89 mld	161 mld
	** Proposed under this DPR * DPRs are under preparation			

15	Project Components of proposed DPR District-'D'	:	**Description**	
			Sewer Laying	
			1. New Main Trunk Sewer	7.203 km
			2. Laterals & Branch Sewer	225.00 km
			3. Replacement of old Trunk Sewer	3.800 km
			4. Desilting & rehabilitation of old Trunk sewer	5.474 km
			Construction of new Sewage Pumping Station	
			• Mumfordganj MPS	55 mld
			• Rajapur MPS	20 mld
			Renovation / Rehabilitation of Existing SPS	4 Nos
			Construction of STP at Rajapur	60 MLD
16	Period of implementation	:	36 months (Mar. 2009 to Feb. 2012)	

Estimated cost of DPR submitted by State Government	Rs. 499.97 crore			
Recommended cost by CPHEEO	Rs. 355.98 crore			
Funding pattern GoI: GoUP: ULB	GoI	GoUP	Allahabad Nagar Nigam	Total
	50%	20%	30%	100%
As proposed	177.99	71.20	106.79	355.98

Financial Phasing				
Year	GoI	GoUP	ANN	Total
2008-09 (25%)	44.50	17.80	26.70	89.00
2009-10 (40%)	71.29	28.48	42.72	142.49
2010-11 (25%)	35.60	14.24	21.36	71.20
2011-12 (10%)	26.70	10.68	16.01	53.39
G.Total	**177.99**	**71.20**	**106.79**	**355.98**

Ownership of Project :	Nagar Nigam, Allahabad
Implementing Agency	Uttar Pradesh Jal Nigam
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 1881.244 lakhs (for city)(Rs.594.368 lakhs for works proposed in present proposal)
Agency Responsible for O&M	Allahabad Nagar Nigam

Existing Sewage Tariff

Existing sewage tariff is based on water tariff as per Government of UP Gazette Notification No. 541/9-2-2000/25-7-2000 dated 1.4.2000. The existing water tariff is on flat rate basis based on area of the property and sewage tax is charged @ 25% of water tariff.

Domestic

Annual Rental Value	**Size of Connection**		
	15 mm	**20 mm**	**25 mm**
Rs. 0-360	480	720	1080
Rs 361-2000	900	1080	1200
Rs 2001-3500	1080	1200	1680
Rs 3501-5000	1200	1680	2040
Above Rs 5000	1680	1800	2400

Not Domestic	Size of Connection			
	15 mm	20 mm	25 mm	40mm
Industrial	400	600	1000	2000
Restaurant	300	450	750	1500
Govt/Semi Govt. Institutions	200	300	500	1000

- **Proposed Tariff & Revenue Generation**

The proposed sewage tax is based on 50% of water tariff. The begin with 85% of Total Population would be made to pay charges. For remaining 15 % taxes would be imposed in phased manner.

Year 2010 1195950(85% population)

Percentage consumption in Slab	Slab	MLD	Applicable Rate (Rs/kl)	Revenue Generated per Annum (Rs. in Lacs)	Sewage tax @ 50% of water tariff
Year 2010					
40	0-2KL	71.75	2.00	523.78	261.89
30	2-5 KL	53.82	4.00	485.77	242.88
20	5-10 KL	35.88	6.50	851.25	425.62
10	> 10 KL	17.94	10.50	687.55	343.77
			Total	**2848.35**	**1424.16**

It is proposed to increase this tariff 2% per annum

Year 2040					
30	0-2 KL	136.26	3.60	1790.45	8955.23
30	2-5 KL	136.26	7.20	3580.91	1790.45
20	5-10 KL	90.84	11.75	3895.90	1947.95
20	>10 KL	90.84	19.00	6299.75	3149.87
			Total	**15567.01**	**7783.50**

Profit / Loss			
			Rs. in crore
Year	**Expenditure on maintenance**	**Income**	**Profit/ loss**
2010	14.82	14.24	- 0.58
2040	54.41	77.84	+ 23.43

On the above proposed tariff, the scheme will be self sustainable

Revenue Generation (Rs. In Lakh)	
Existing (Year 2007-08)	Sewer Tax : Rs. 92.680 Lakh Sewer Charges : Rs. 432.032 Lakh Total : Rs. 524.715 Lakh
Proposed	Upon implementation of user charges as proposed:

	Year 2010	:	**Rs. 1424.16 Lakh**
	Year 2040	**:**	**Rs. 7783.50 Lakh**

CPHEEO's Comments on DPR :

As the DPR for providing sewerage system in sewerage District D of Allahabad has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 355.98 crore as detailed below in the table. The State Government and Allahabad Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

Sl. No.	Proposed Component of DPR	As per the proposed DPR (cost recommended by State Government)	As recommended by CPHEEO
A	Providing and laying of Sewerage network	23924.05	23924.05
B	Rehabilitation/ renovation of 4 Nos existing Sewage Pumping Stations	2698.60	2698.60
C	Construction 2 Nos. new Sewage Pumping Stations	2482.94	2482.94
D	Construction cost of 60 mld Rajapur STP	7448.47	7448.47
	Sub-Total	**36554.06**	**36554.06**
	Contingencies (2%)	1827.70	731.08
	Sub-Total	**38381.76**	**37285.14**
	5% reduction for proficiency (as per appraisal done by State Government)	1919.09	1864.26
	Sub-Total	**36462.67**	35420.88
	Supervision charges @ 12.5%	4557.83	**Nil**
	Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.	**0.000**	177.10
	Grand Total	**41020.51**	**35597.98**
	Say	**Rs. 355.98 Crore**	

1. **The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. Based on actual site condition the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution.**

2. All efforts should be made to connect the houses through sewerage system / and any existing connection with drain / nallah to tap waste water / sullage water need to be discontinued while commissioning the project.

3. The population projection for the design year 2040 has been made considering the decadal growth during 1921-2001 using methods indicated in the Manual on Water Supply & Treatment. The projected population has been distributed in the proposed project area in the wards / zones and accordingly,

the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

4. The water supply availability in the project area will be 150 LPCD as stated by ANN / UP Jal Nigam **(project sanctioned under JNNURM is under execution)**, which is the required for efficient functioning of sewage facility as per Manual.

5. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

6. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

7. ANN will ensure recycling/reuse of atleast 20% of treated waste water so as to recover part of O&M of scheme.

8. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

9. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

10. The sewer system for Allahabad has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

11. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment in very small stretches due to prevailing ground condition. The maximum depth of cutting has been considered upto 9.00 meters. The average depth of cutting of Trunk sewer is kept as 3 to 5 m.

12. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 & NP-4 pipes as per BIS Standards have been proposed. NP-4 pipes have been proposed wherever depths are more than 6.0 m, as per proper design. In the original proposal only NP-3 & NP-4 pipes have been proposed. During project appraisal, it has been suggested to adopt 50-60% of lower diameter sewer pipes upto 200mm to be used to NP-2. Accordingly proposal has been got revised.

13. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system and those being implemented under Gomti Action Plan with NRCD funding.

14. It has also been mentioned that ANN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

15. The BAR Chart and implementation Schedule have also been enclosed.

16. The cost estimate has been prepared based on SOR of 2007-08 preveling in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by ANN / Govt of Uttar Pradesh.

General Comments for Project Implementation:

I. Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by ANN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. ANN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by ANN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Project under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD

➢ Proposal	Detailed Project Report for Water Supply Component of Allahabad City (Part-II)
➢ Name of District State	Allahabad, Uttar Pradesh
➢ Name of City	Allahabad
➢ Objectives	To Provide Continuous, Potable water supply to Allahabad city in equitable manner as per CPHEEO/JNNURM Norms.
➢ Whether CDP is prepared	Yes

➢ **Background**

Allahabad is a major urban agglomeration located in the South Eastern region of the State of U.P. Mighty River Ganga meanders long its North - West, North and Eastern Limits. River Yamuna, a major tributary to river Ganga, Confluence with it at the South Eastern tip of the city - boundary. This point of confluence of the two rivers and a third mythological invisible river Saraswati is famous as Sangam, a very famous religious place of high sanctity. Every 12th year, there is the largest congregation of people in the world at Allahabad on occasion of Kumb Mela. It is very famous educational place of North India with a lot of school/ colleges and universities located here. The High Court of U.P. is also located here which is the biggest High Court is Asia.

The total population of Allahabad city as per census 2001 is 1018092. The present Population of the city is 13.70 Lac. Due to rapid urbanization of Allahabad city and growing needs of the city in respect of water supply, the water supply system needs to be augmented and reorganized to cater the water demand of population for next 30 years. The proposal has been submitted for consideration under JNNURM for sanction to meet the above objectives and consider the urgent need of city.

Allahabad Water Supply Part-I costing Rs. 89.69 crores had already been sanctioned on 06-08-2007 and the proposals for remaining works has been submitted for consideration under JNNURM for sanction to comprehensively address the water supply problem in the city.

➢ **Existing Water Supply System**

The existing water supply system of Allahabad city is based on ground water and river water both. River Yamuna is utilized as a source of supply to meet the part demand of the city mainly the southern part of Railway line upto Yamuna River.

Intake raw water pumping station is located at the bank of river Yamuna at Karelabagh, where there are eight pumps being used to pump water to Khushroobagh water works through pumping mains along Nurullah Road. In addition, there are 148 deep Tubewells in the city for supply of water to the people.

Allahabad city is divided into 12 water supply zones. Lukerganj, Khusgroobagh, Atala are covered by surface water source. Civil lines and Kydganj zones are partially covered by surface water supply. Remaining part of these two zones are covered with ground water source. The remaining six zones namely Colonelganj, Daraganj, Rasoolabad, Sulem sarai, Naini, Phaphamau and Jhunsi are covered by tube wells.

- **Water Availability**

Total (MLD)	360
Sources	Tube Wells 225 mld
	River water source 135 MLD
Total Supply	252 mld (excluding losses)
Per Capita (lpcd)	184 (as of 2008)
UFW	30 %

- **Need of the Project**

- Allahabad is growing city where average decadal rate is 30.82% for the past 3 decades.

- **Though per capita available water at present is more than 150 lpcd, the same for design year 2040 works out to 83 lpcd only. But the main problem is of inadequate pressure, inequitable distribution in many pockets of the city.**
- Storage capacity of reservoirs is inadequate. The system has no separate Sump/pumps for each water supply zone and direct pumping from Khushroobagh water works is being resorted to through common pumps and common feeder mains to all surface water supply zones. This results in low pressure and inequitable distribution in water supply in far flung areas of the city.

- Presently supply is intermittent for approx 10 hours in a day. This needs to be improved to 24 X 7 supply.

- The distribution system was first laid in year 1892, latter it was strengthened in some part between 1970 to 1975. So the distribution network is very old and out lived its useful life. Further, the major part of distribution system are of 80 mm or smaller size pipe. They do not cater the present need satisfactorily as minimum required size recommended for water supply in urban areas is 100mm as per Manual on Water Supply and Treatment.

- 68 Tube Wells out of 148 Tube Wells have completed its life. Based on their condition and to meet the balance demand upto 2025, 18 tubewells were sanctioned for reboring and 33 new tubewells in part-I of scheme. In the present DPR, another 46 tubewells have been proposed to cater the need for remaining zones upto 2025.

- Ground water depletion in the city is reported to be approx 0.5 m to 1.50 m in the last five years including Civil Lines zone and Katra area where ground water depletion is more. It is proposed to supply water in these areas through surface source.

- **Population**

As per 2001 Census 10,10,892

Year	Total Population
Base year 2010	14,07,000
Intermediate year 2025	20,56,000
Design year 2040	30,28,000

- **Water Demand (MLD)**

Year	Entire city
Base year 2010	260
Intermediate year 2025	372
Design year 2040	548

- **Sanctioned Scheme**

The works proposed in the reorganization of four water supply zones namely Khushroobagh, Civil Lines, Colonelganj and Rosoolabad zone and the other works urgently needed to mitigate the problem as per request made by Allahabad Jal Sansthan were taken in first part at an estimated cost of Rs.89.69 crore in the meeting of C.S.M.C. dated 06-08-2007.

The components of works sanctioned are as under:

1. Intake structures and Pump Houses
2. Distribution system

3. Rising Mains
4. T./C.W.R. OHT / CWR
5. Water Treatment plants
6. Staff quarters, Boundary wall & Other misc, works
7. Construction of new T.W. and rejuvenation works.
8. Pumping machinery
9. Power connection
10. Installation of Automatic control panel
11. Introduction of Meter system for consumers (existing river zones only)

- **Proposed scheme**

The proposed scheme comprises of reorganization of distribution network of 8 water supply zones namely Sulem Sarai, Kydganj, Daraganj, Atala, Lukerganj, Naini, Phaphamau and Jhunsi. The major project components are strengthening of distribution network, rising mains, provision of tubewells and storage reservoirs.

<table>
<tr><td>Period of implementation</td><td>30 months (January 2009 to June 2011)</td></tr>
<tr><td>Implementing Agency</td><td>UP Jal Nigam</td></tr>
<tr><td>Agency Responsible for O&M</td><td>Allahabad Nagar Nigam</td></tr>
<tr><td>Project cost recommended by State Appraisal Agency</td><td>Rs.183.95 crore</td></tr>
<tr><td>Project cost recommended by CPHEEO</td><td>Rs. 162.34 crore</td></tr>
<tr><td>Funding Pattern</td><td>Cost Sharing Pattern (as per JNNURM guide lines) (Rs. In lacs)<table><tr><td>GOI</td><td>50%</td><td>81.17</td></tr><tr><td>State Govt.</td><td>20%</td><td>32.47</td></tr><tr><td>ULB</td><td>30%</td><td>48.70</td></tr></table></td></tr>
<tr><td>Financial Phasing</td><td><table><tr><th>Year</th><th>GoI</th><th>GoUP</th><th>ANN</th><th>Total</th></tr><tr><td>2008-09 (20%)</td><td>16.23</td><td>6.49</td><td>9.74</td><td>32.46</td></tr><tr><td>2009-10 (40%)</td><td>32.47</td><td>12.99</td><td>19.48</td><td>64.94</td></tr></table></td></tr>
</table>

		2010-11 (25%)	20.29	8.12	12.17	40.58
		2011-12 (15)	12.18	4.87	7.31	24.36
		G.Total	**81.17**	**32.47**	**48.70**	**162.34**

Proposed annual O&M Expenditure

O&M and Revenue Generation

Sl. No.	Particulars	Year 2010	Year 2030
1	Annual O&M Expenditure (Rs. lacs)	2925.83	7197.78
2.	Annual Income (Rs. lacs)	2848.35	9491.88
3.	Net Profit (Rs. lacs)	(-)76.48	2294.10

Existing Water Tariff

Existing water tariff is based on Government of UP Gazette Notification No. 541/9-2-2000/25-7-2000 dated 1.4.2000. The existing water tariff is on flat rate basis based on area of the property.

Domestic

Annual Rental Value	**Size of Connection**		
	15 mm	**20 mm**	**25 mm**
Rs. 0-360	480	720	1080
Rs 361-2000	900	1080	1200
Rs 2001-3500	1080	1200	1680
Rs 3501-5000	1200	1680	2040
Above Rs 5000	1680	1800	2400

Not Domestic	**Size of Connection**			
	15 mm	**20 mm**	**25 mm**	**40mm**
Industrial	400	600	1000	2000

Restaurant	300	450	750	1500
Govt/Semi Govt. Institutions	200	300	500	1000

- **Existing Revenue Generation (Year 2005-2006)** Rs.2110.27 Lakh
- **Existing O & M (Year 2005-2006)**

  Rs.2008 Lakh
- **Proposed Tariff & Revenue Generation**

  The begin with 85% of Total Population would be made to pay charges. For remaining 15 % taxes would be imposed in phased manner.

  Year 2010 1195950(85% population)

Percentage consumption in Slab	Slab	MLD	Applicable Rate (Rs/kl)	Revenue Generated per Annum (Rs. in Lacs)
Year 2010				
40	0-2KL	71.75	2.00	523.78
30	2-5 KL	53.82	4.00	485.77
20	5-10 KL	35.88	6.50	851.25
10	> 10 KL	17.94	10.50	687.55
			Total	**2848.35**

It is proposed to increase this tariff 2% per annum

Year 2040				
30	0-2 KL	136.26	3.60	1790.45
30	2-5 KL	136.26	7.20	3580.91
20	5-10 KL	90.84	11.75	3895.90
20	>10 KL	90.84	19.00	6299.75
			Total	**15567.01**

Hence, the scheme would be self sustainable, as far as O&M of the scheme is concerned

CPHEEO's comments are as under

The proposed DPR for Water Supply for Allahabad city Part-II may be accorded technical clearance at an estimated cost of Rs. 162.34 crore as per following cost break-up.

Component	Cost Appraised by SLNA	Cost recommended by CPHEEO

Distribution system	5352.82	5352.82
O.H.T./C.W.R.	2931.39	2190.56
Rising Mains	3152.07	4117.80*
Pump House, Boundary wall and miscellaneous	280.20	142.39
Intake	500.00	-
WTP	2700.00	85.78
E/M Works		
(a) Pumping machinery	1976.34	1286.95
(b) Construction of New TW		1041.21
(c)Power sub station		367.22
SCADA	-	469.00
Meter System	-	1400.00**
Leak detection system	-	300.00**
Total	16874.90	**16753.73**
Add 2% contingency	337.50	335.07
Total	17212.40	**17088.80**
Less 5% Nigam Proficiency (-)	860.62	854.44
Total	**16351.78**	**16234.36**

* Due to inclusion of rising main component and revision of metallic pipe rates as per latest one.

** Inclusion of water meters and leak detection equipments.

State Government/Allahabad Nagar Nigam should ensure compliance of comments during project implementation.

i. The water supply project for Allahabad city under JNNURM is to be implemented in two parts. Part-I of the proposal has already been approved and is under execution. Under the project 4 out of 12 zones were considered for reorganization basically covered with surface water source. Under part-II of the water supply scheme remaining 8 zones are proposed to be reorganized. The project is designed to cover the newly developed areas and other areas where water supply distribution network is inadequate / in dilapidated condition.

ii. As per suggestion of CPHEEO, efforts has been made to augment the system based on gravity supply rather direct pumping based water supply.

iii. During the project implementation, land for all the units may be acquired so that during the course of implementation the possibility of delay because of non-availability of land may be avoided.

iv. During the project implementation, the detailed design of each and every component in the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the

component authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the ANN/State Govt. from their own resources.

v. Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance any to avoid water scarcity to the people.

vi. The estimate has been prepared based on current schedule of rates of 2008. Market rates. However, any increase in project cost above the sanctioned cost for any reason has to be borne by State Govt./ULB from its own resources.

vii. A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue fro future augmentation of the scheme.

viii. All efforts should be made to ensure that the scheme runs in self – sustainable manner in respect of O&M of the project and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Govt. shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

ix. It is suggested that ANN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcoming found during monitoring the same will be mitigated with suitable action/Action plan then and there.

x. The Implementing Agency shall provide Bulk Meters at WTP, all reservoirs including metering all HSCs as to facilitate water conservation and water audit as envisaged in the DPR.

xi. The ANN, while selecting the size and type of pipe materials for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

xii. Air valves and scour valves may be provided at strategic in the transmission mains.

xiii. After carrying out detail engineering a set of final drawing including the distribution network may be forwarded to CPHEEO for reference and records.

xiv. During the implementation of project, the project in- charge/State Govt. should ensure that requisite budgetary allocation is made by state Govt. as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

xv. The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end as prescribed in the CPHEEO's revised Manual on Water Supply and treatment published in may 1999.

xvi. Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

xvii. The material and equipment to be procured should conform to BIS specifications.

xviii. Uninterrupted electric power supply must be ensured by ANN for trouble free operation and maintenance of the scheme.

xix. ANN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation &maintenance after commissioning of the scheme.

xx. The extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

xxi. Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

xxii. No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD

- Proposal : Detailed Project Report for Water Supply of Allahabad City.
- Name of District State : Allahabad, Uttar Pradesh.
- Name of City : Allahabad.
- Objectives : To Provide Continuous, potable water supply to Allahabad City in Equitable manner as per CPHEEO/JNNURM Norms.
- Weather CDP is Prepared : Yes

- **Background** : Allahabad is a major Urban agglomeration located in the South Eastern region of the State of UP. Mighty river Ganga meanders along its North –West, North and Eastern Limits. River Yamuna, a major tributary to river Ganga, Confluence with it at the South Eastern tip of the city- boundary. This point of confluence of the two rivers and a third mythological invisible river Saraswati is famous as Sangam, a very famous religious place of high sanctity. Every 12th Year, there is the largest congregation of people in the world at Allahabad on occasion of Kumbh Mela. It is very famous educational place of North India with a lot of school/colleges and universities located here. The High Court of U.P is also located here.

The total population of Allahabad city as per census 2001 is 1018092. The present population of the city is 13.13 lakhs.

Due to rapid urbanization of Allahabad city and growing needs of the city in respect of water supply, the water supply system needs to be augmented and reorganized to cater the water demand of population for next 30 years. The proposal has been submitted for consideration under JNNURM for sanction to meet the above objectives.

- **Present Status** : The existing water supply system of Allahabad city is based on ground water and river water both. River Yamuna is utilized as a source of supply to meet the part demand of the city mainly the southern part of Railway line upto Yamuna river.

- Intake raw water pumping station is located at the bank of river Yamuna at Karelabagh, where there are eight pumps being used to carry water to Khushroobagh water works through pumping mains along Nurullah Road.

- In addition, there are 148 deep Tubewells in the city for supply of water to the people.

  - Allahabad city is divided into 11 water supply zones.

- Lukerganj, Khushroobagh, Atala are covered by Surface water source.

- Civil lines and Kydganj zones are partially covered by surface water supply.

- Remaining part of these two zones are covered with ground water source. The remaining six zones namely Colonelganj, Daraganj, Rasoolabad, Sulem Sarai, Naini and Phaphamau are covered by tubewells.

- The main problem in surface water supply zones is inadequate pressure in the water mains. Inadequate storage reservoirs and direct pumping from WTP to far flung areas is also a reason for inequitable water supply to many areas with very less pressure.

- Further, it is because of the fact that the system has no separate sump/ pumps for each water supply zone and direct pumping from Khushroobagh water works is being resorted to through common pumps and common feeder mains to all surface water supply zones.

Following are the salient features of existing water supply system.

- 135 mld water is supplied from river source covering three zones completely and two more partial zones.
- Water is supplied to another six zones through deep tube wells.
- 148 Nos of deep T.W. are located in the whole city.
- Ground water depletion is reported to be approx 1M per year.
- Water supply is intermittent (Approx 10 hours daily in 3 shifts).
- Present services storage is inadequate.
- Distribution system are more than 30 years old and outlived its useful life in most of the areas.
- Because of old and worn out system, the leakages are very high in the system and are of the order of approx 30%.
- In surface water supply zones, water is pumped through common pump and feeder main causing inadequate pressure in feeder main.

- **Water Availability**

Total (MLD)	: 260
Sources	: Through Tube Wells –225 MLD Through surface water source -135 Mld
Total supply	: 252 mld (excluding losses)
Per Capita (lpcd)	: 188 (as of 2006)
UFW	: 30%

- **Need of the Project** :
  - Though per capita available water at present is more than 150 lpcd but the same for design year (2040) works out to 83 lpcd only. But, the main problem of

inadequate pressure and inequitable distribution in many pockets of the city is the main reason behind reorganization of water supply zones.

- Inadequate storage reservoirs and direct pumping from WTP to far flung areas is main reason for inequitable water supply to many areas with very less pressure.
- Presently supply is intermittent for approx 10 hours in a day.
- Ground water is reported to be depleting each successive year.
- In some areas distribution network are very old and do not cater the present need and are of very small size.
- Allahabad is growing city where average decadal growth rate is 30.82% for the past 3 decades.

➢ **Population**

- As per 2001 Census : 10,18092
- Population as per 2006 : 12,60000

Year	Total population	Project area population
Base year 2010	14,07,000	370350
Intermediate year – 2025	20,56,000	486300
Design year – 2040	30,28,000	615360

➢ **Water Demand (MLD)**	**Entire city**	**Project area**
- Base year- 2010	: 260	70
- Intermediate year – 2025	: 372	92
- Design year – 2040	: 548	116

➢ **Proposed Scheme** : The proposed Scheme comprises of Reorganization of four water supply zones namely Khushroobagh, Civil lines, Colonelganj and Rasoolabad.

In Khushroobagh zone, to improve pressure in various localities, it is proposed to divide it into three subzones namely Shahganj, Rani Madni and Swaroop Rani zone. The proposed Shahganj subzone will be supplied water from Khushroobagh water works. The remaining two subzones will have independent zonal pumping station at Rani Mandi and Swaroop Rani park. The distribution network is redesigned for the future population of year 2040.

In Civil lines, Colonelganj and Rasoolabad zones water supply system has been reorganized.

Construction of 33 new deep tubewells in different pockets of problematic areas of Rasoolabad, Daraganj, Colonelganj, civil lines, part of Kydganj, Attala, Sulem Sarai Phaphamau and Naini.

Reboring of 18 old deep tubewells, near the existing ones is also proposed to serve till 2025 in Rasoolabad and Colonelganj, Attala and Daraganj.

Construction of Over Head Tanks (17nos) and under ground reservoirs (4 nos.)with boosting station have been proposed to enhance storage capacity where water supply through OHT is not feasible because of space constraint.

- **Source** : The river Yamuna is a perennial source of water which flows from West to East in the South of the city and the same has been used as a source of water supply for existing water supply system. Ground water is also source of water supply in the zones away from river Yamuna so as to reduce the cost of conveyance of surface water.

Based on the appraisal of DPR, a number of components namely miscellaneous works, lump sum and departmental charges etc. has not been allowed. Moreover, the drastic reduction in the project cost is because of disallowing Part-II and Part-III of the project costing Rs. 39.98 crore and 212.10 crore respectively as the need for switching over from existing ground water based system to surface water based system is not duly justified especially on following points:

- The details about quality of ground water and deterioration,if any.
- Details about the existing system and its year of commissioning including the condition of water supply system.
- The part -II &III of project is not based on detailed investigation including the detail design of all components.

As such,the part -II &III of project may be put up separately for consideration under JNNURM in a separate DPR prepared as per CPHEEO guidelines

The details of proposed as well as recommended cost is as under:

- **Estimated Cost**

(Rs. Lakh)

Components	Original cost of project	Cost recommended by CPHEEO
Intake Structures/Pump Houses	1978.00	109.08
Distribution system	4877.88	2221.215
Rising Mains	4829.88	1000.96
O.H.T/ CWR	5131.52	2430.27
WTP	6480.00	-
Staff quarters, Boundary wall & Other misc. works	449.11	387.655
Construction of new T.W and rejuvenation of T.W.	1120.90	417.18
Pumping machinery	2642.11	943.67

Power connection (zonal pumping station and new tubewells)	461.90	454.77
Installation of automatic control panel	150.00	148.00
Introduction of metering system (Existing River zones only)	1000.00	595.00
Optimization of tubewells	444.00	-
Sub Total	**29565.30**	**8707.80**
Contingencies @ 3%	886.96	261.23
Total	**30452.26**	**8969.03**
Training , capacity building and departmental fees	**4263.33**	**-**

- Provision for training and capacity building may be claimed as per JNNURM guidelines

- 12.5% Departmental fee may be separately claimed from State Govt)

- Per Capita Project Cost
  2010 - Rs. 2421.76
  2025 - Rs. 1844.33
  2040 - Rs. 1457.54

- Financing Pattern

GOI	50%	4484.52 lakhs
State Govt	20%	1793.80 Lakhs
ANN	30%	2690.71 Lakhs

- Financial Phasing

GOI Share	**Rs. 4484.52 Lakhs**	
Year 2007-2008	30%	1345.35 Lakhs
Years 2008-2009	50%	2242.26 Lakhs
Year 2009-2010	20%	896.91 Lakhs
State Share	**Rs. 1793.80 Lakhs**	
Year 2007-2008	30%	538.14 Lakhs
Years 2008-2009	50%	896.90 Lakhs
Year 2009-2010	20%	358.76 Lakhs
ANN Share	**Rs. 2690.71 Lakhs**	
Year 2007-2008	30%	807.21 Lakhs
Years 2008-2009	50%	1345.35 Lakhs
Year 2009-2010	20%	538.15 Lakhs

- Period of Implementation : Three Years
- Funding Pattern : GOI: State: ULB :: 50:20:30

- Implementing Agency : Allahabad Nagar Nigam
- Annual O&M Expenditure : (Rs. Lakh)

- Existing (Year 2006) : 2008.00
- Proposed (Year 2010) : 2869.40
- Proposed (year 2040) : 7704.72

- Agency Responsible for O&M : Allahabad Nagar Nigam
- Existing Tariff

Domestic

Annual Rental Value	Size of Connection		
	15mm	20mm	25mm
	(Minimum water tax in Rs. per annum)		
Rs. 0-360	480	720	1080
Rs 361- 2000	900	1080	1200
Rs 2001-3500	1080	1200	1680
Rs 3501- 5000	1200	1680	2040
Above Rs 5000	1680	1800	2400

Non Domestic

	Size of Connection			
	15mm	20mm	25mm	40mm
Industrial	400	600	1000	2000
Restaurant	300	450	750	1500
Govt/Semi Govt. Institutions	200	300	500	1000

- Existing Revenue Generation (Year 2005-200) : Rs. 2110.27 Lakhs

Proposed Tariff & Revenue Generation

To begin with 85% of total population would be made to pay charges. For remaining 15%, taxes would be imposed in phased manner.

Year 2010 - 1195950 (85% population)

Year 2010

% consumption in slab	slab	MLD	Applicable Rate (Rs./KL)	Revenue generated per annum (Rs. in lakhs)
40	0-2 KL	71.75	2.00	523.78
30	2-5 KL	53.82	4.00	785.77
20	5-10 KL	35.88	6.50	851.25
10	>10 KL	17.94	10.50	687.55
			Total	**2848.35**

It is proposed to increase this tariff 2% per annum.

Year 2040

% consumption in slab	slab	MLD	Applicable Rate (Rs./KL)	Revenue generated per annum (Rs. in lakhs)
30	0-2 KL	136.26	3.60	1790.45
30	2-5 KL	136.26	7.20	3580.91
20	5-10 KL	90.84	11.75	3895.90
20	>10 KL	90.84	19.00	6299.75
			Total	**15567.01**

Hence, the scheme would be self sustainable, as far as O&M of the scheme is concerned.

CPHEEO's comments are as under:

The proposed DPR for Water Supply for Allahabad city may be accorded technical clearance at an estimated cost of Rs. 89.69 crore against the proposed cost of Rs. 347.15 Crore.

The drastic reduction in the project cost is because of disallowing Part-II and Part-III of the project costing Rs. 39.98 crore and 212.10 crore respectively as the need for switching over from existing ground water based system to surface water based system is not duly justified and the same may be put up separately for consideration under JNNURM in the form of a separate DPR prepared as per CPHEEO guidelines.

1) The DPR has been prepared as per Manual on water Supply & Treatment.

2) As per suggestion of CPHEEO, efforts has been made to augment the system based on gravity supply rather than direct pumping based water supply.

3) During the project implementation, land for all the units may be acquired well in advance so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

4) During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the ANN / State Government from their own resources.

5) Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

6) The estimate has been prepared based on current schedule of rates / market rates. However, any increase in project cost above the sanctioned cost for any reason has to be borne by State Government / ULB from its own resources.

7) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

8) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

9) It is suggested that ANN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

10) The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR.

11) The ANN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

12) Air valves and scour valves may be provided at strategic locations in the transmission mains.

13) After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

14) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

15) The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

16) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

17) The material and equipment to be procured should conform to BIS specifications.

18) Uninterrupted electric power supply must be ensured by ANN for trouble free operation and maintenance of the scheme.

19) ANN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

20) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

21) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

22) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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DETAILS OF EXISTING / PROPOSED T.W

S.No.	Name of West Zone	Existing TW	Proposed TW (New)	Proposed TW (Rebore)	Spare pumps
1	Lukerganj	4	-		
2	Atala	10	04	04	-
3	Khushroobagh	08	-	03	-
4	Kydganj	10	03	-	6 sets
5	Civil lines	09	03	-	-
6	Colonelganj	27	02	05	10 sets
7	Rasoolabad	14	02	02	-
8	Daraganj	20	02	03	-
9	Sulemsarai	20	06	-	-
10	Phaphamau	04	01	-	-
11	Naini	19	10	01	10 sets + 2 gen sets
		148	33	18	

CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development (Solid Waste Management)

Proposal	Municipal Solid Waste Management in Kanpur City
Name of District / State	Kanpur, Uttar Pradesh
Name of City	Kanpur
Objectives	To make an efficient solid waste management system in Kanpur in compliance with MSW Rules 2000
Whether CDP is prepared	Yes
Background	Nagar Nigam Kanpur (NNK) has appointed Regional Center for Urban and Environmental Studies (RCUES) to make a Detailed Project Report for formulating an integrated municipal solid waste management system for Kanpur meeting the requirements of MSW rules 2000.
Present Status of MSW	Kanpur has a present population of 3116263. It is spread over an area of 261 square kilometers. There are 110 sanitary wards for solid waste management. As per NNK, the length of roads is about 2601 kilometers. There are 468 secondary collection points and 153 open dumps for waste collection spread all over the city. NNK has about 2950 permanent Safai Karamcharis and a fleet of 132 vehicles of different type/age to carry out the MSWM activity. The waste in the city is being dumped at un-engineered dumpsite located at Panki which is 10 km away from the city. The present Municipal Solid Waste Management in Kanpur is not meeting the MSW Rules 2000. It lacks segregation of waste at source, door to door collection system, primary and secondary waste storage facility and waste transportation system. Moreover, waste is being dumped in unscientific manner. The present status is reflected by the dumping of garbage on road sides and open dumps, nallahs and storm water drains in Kanpur.
Need of the Project	The deteriorating situation of solid waste management reflects clearly in the streets/roads of Kanpur. This along with the requirement as per law, is to have a system in compliance with

MSW rules 2000 into place, at the earliest, and has necessitated this activity.

Proposed Municipal Solid Waste Management Plan for Kanpur

- Source Segregation is proposed to be implemented through a two bin system – one for bio-degradable and the other for recyclables. It is also proposed to make it mandatory for citizens to segregate waste.
- Primary Collection is proposed to be implemented door-to-door through cycle rickshaws. The rickshaws will have separate bin system for bio-degradable and recyclable waste stream. There is a proposal to involve NGO/private operator for O&M in primary collection.
- It is proposed that existing ragpickers shall be made part of the MSW management and this sector shall be formalized through NGOs/ CBOs. Primary waste collectors (mostly ragpickers) will be allowed to sell the recyclables in the market.
- Waste collected by street sweepers is proposed to be collected in wheelbarrows.
- Secondary Storage will be through the use of Refuse Collector bins of 0.6 cum and 1.1 cum and dumper placer containers of 3.5 m3, 4.5 m3 and 8.0 m3 capacity. These bins/dumper containers are suitably placed at strategic locations in each sector/colony depending on available area for placement of these bins.
- Biodegradable waste collected from the households and non-biodegradable waste collected by street sweeping will be dumped in the respective bins/dumper placer containers placed at the secondary collection location.
- Twin Litter bins are also proposed to be installed at public places like parks, institutional areas and so on.
- Manual handling has been avoided at all stages of waste transportation. The refuse collector bins will be hydraulically lifted for emptying into the refuse collector trucks. Dumper placer containers will be transported by dumper placer vehicles and their waste will be emptied at the designated facility. Existing vehicles, which are in good condition have been used in the proposed plan after due renovation.
- Three transfer stations are proposed to economize on waste transportation costs and reduce vehicular traffic in the city area. Waste from the areas situated near the waste treatment and disposal facility site will be transported directly to the facility. For the remaining areas three transfer stations have been located at the strategic locations. Waste from these areas will be send to the three transfer stations and from there it will be transported in bigger compactor trucks to the

waste treatment and disposal facility site.

- A Compost Plant is proposed to be established for treatment of biodegradable waste. Sanitary Landfill is also proposed to be established for inerts and rejects of compost plant. The O&M of the compost plant and landfill facility will be given to Private Partner in a PPP mechanism.

Population — In the area under the purview of NNK

- as per 2001 census: 2772212
- base year (2006): 3116263
- design year (2011): 3491534
- population in 2031: 5198993

Solid Waste Generation (Total)

- base year: 1447 TPD (As per Survey)

Waste Composition	Percentage Waste	Quantity (MT/day)
Bio-degradable	46%	665.62
Recyclable	19%	274.93
Non-biodegradable (Inert)	35%	506.45
Total Waste	100	1447
Per-capita Waste (gm/capita/day)		464

- design year (2011): 1704 TPD

Project Components

The requirement of the total waste generation has been worked out in the DPR after a detailed survey of waste generating areas. The requirement of fund for purchase of the equipments for its collection, storage and transportation are under:

- Collection: Rs. 1292.89 lacs
- Storage: Rs. 767.68 lacs
- Transportation: Rs. 914.98 lacs

Estimation of the cost of the waste to compost and development of an engineered landfill for waste disposal has been evaluated.

- Compost Plant (700 TPD): Rs. 1121.07 lacs
- Landfill site (for use for 5 years): Rs. 1363.37 lacs

The land for the Integrated Sanitary Landfill facility for 25 years, is proposed at Panki. NNK is in the process of acquiring 114 acres of land at the proposed location.

Provisions for IEC have been made in the DPR and provision is also made for areas that can be brought under PPP especially door-to-door collection, treatment and disposal of waste in the DPR.

Estimated Cost (Proposed)

	Particulars	Total Outlay Rs. in lacs
A.	Collection/Storage/Transportation	
	- Collection	1292.89
	- Storage	767.68
	- Transportation to site/plant	914.98
A.	Sub total of above	2975.55
B.	Compost plant	1121.07
C.	Landfill site (for use during the first 5 years):	1363.37
D.	Contingencies @ 3% on A to C	163.80
E.	**Capital Cost (A+B+C+D)**	**5623.79**

COST TO BE RE-IMBURSED

F.	Preparing of Detailed Project Report @1.5% of Central grant (50% of E)	42.18
G.	Capacity Building , IEC @ 1.5% of E above	42.18
H.	Efficiency @ 1% of Central grant above	28.12
I.	Innovative Approach @ 1 % of Central grant above	28.12
J.	**Incentives (F+G+H+I+J)**	**140.60**
K.	**Administrative and other expenses @ 5% of Central grant**	**140.60**

Period of Implementation: 13 months from date of sanction

Implementing Agency: Nagar Nigam Kanpur

Funding Pattern: The funds yet to be devolved from TFC is as follows:
2007-08: 417.58 lakhs
2008-09: 417.58 lakhs

Therefore, total capital cost required= Rs. 5623.79 lacs-(Rs. 417.58+Rs. 417.58 lacs) = Rs. 4788.63 lacs

Sharing Pattern (as per JNNURM guidelines)

	Share	Rs. in lacs
GOI	50%	2394.315
State Govt	20%	957.726
ULB	30%	1436.589

Financial Phasing

- 10% of the GOI's share (Rs. 239.43 lacs) and 10% of State Govt's share (Rs. 95.73 lacs) of capital cost to be devolved in the Year 2006-2007.
- 90% of the GOI's share (Rs. 2154.88 lacs) and 90% of State Govt's share (Rs. 861.53 lacs) of capital cost to be devolved in the Year 2007-2008.

Annual O&M Expenditure

- existing

The expenditure on SWM activity is financed from the funds it receives from the State Finance Commission. The details are as under:

Year	(Rs. in crores)
2004-05	42.6
2005-06 (10 months)	32

The detailed breakup of Rs. 32 crores incurred during 2005-06 (10 months period) is as follows:

Rs. in Crores	(2005-06) 10 months actual	Annualised
Cleanliness – Salaries	24.9	29.9
Instrumentation & Contingencies	1.4	1.7
Workshop	1.0	1.2
Diesel	4.4	5.3
Others	0.3	0.4
Total	32	38.4

- proposed

	Year	2009	2010	2011	2012	2013
					Rs in Lacs	
A	Surplus with NNK from H/H and Compost Plant	736	783	796	809	822
B	20% share of Rates/Taxes & Municipal Revenue	820	861	904	949	997
C	Conservancy Tax	1336	1366	1397	2141	2917

D= A+B+C	Total Surplus	2892	3010	3096	3899	4736
E	Expenditure on Safai Karamchari	2988	2689	2420	2178	1960
F	Expenditure on Transportation	777	795	812	830	849
G= D+E	Total Expenditure	3765	3484	3233	3009	2809
H=G-D	Dependency on SFC Funds	873	474	136	Nil	Nil

Agency Responsible for O&M — NNK under PPP for its sub components

Charge for Solid Waste Management

- existing — Nil
- proposed
  - The revenue from taxes and municipal revenues other than taxes was Rs. 23.8 crores in 2005-06 (10 months). This is likely to part finance the SWM expenditure in future.
  - Conservancy charges can be levied by/from NNA to recover the O&M costs.
  - Surplus from house to house hold collection, compost plant would also fund the SWM expenditure in future.

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Solid Waste Management for Kanpur city may be considered at and estimated cost of Rs. 4788.63 lakhs and subject to following conditions:

PROJECT SPECIFIC COMMENTS.

1. Nagar Nigam Kanpur is in the process of acquiring land for sanitary land fill adjoining to the existing dump site. All efforts should be made by State Govt. to acquire land expeditiously which otherwise would hamper the progress of implementation. However, the funds under the project should be released to State Govt. only after getting land acquisition certificate from State Govt. by NURM Divn.

2. Before start of execution, State Govt. should satisfy itself that the proposed waste treatment / processing plant does not fall within 20 Km radius from the existing airport and if required necessary 'No Objection' certificate be obtained from AAI.

3. The funds already devolved under 12th Finance Commission grants needs to be fully utilized for purchasing the tools and equipments for SWM for which it is meant for and the same should be integrated in the proposed

scheme. The remaining funds to be devolved in subsequent years as mentioned under funding pattern should also be integrated with the present scheme and NURM Directorate may take appropriate action in this regard to ensure integration of funds devolved under TFC while releasing the funds under the scheme.

4. In the modified proposal a provision of three transfer stations has been considered based on CPHEEO suggestions to bring efficiency and economy in collection of waste and its transportation to waste disposal site.

5. Based on the scrutiny of the project, the cost of collection, storage and transportation has been increased to Rs. 2975.55 lakhs from Rs. 2049.02 lakhs, to bring efficiency in the collection of waste due to inclusion of provision made for providing bins at households and transfer stations. Taking 2011 as the design year, compost plant capacity has been increased from 500 TPD to 700 TPD hence, cost of compost plant has been increased to Rs. 1121.07 lakhs from Rs. 867.69 lakhs.

6. State Government has to ensure that sufficient land is made available for setting up of three transfer stations in the project. Advance action may be initiated in this regard.

GENERAL COMMENTS

7. While implementing the project the MSW Rules (Management & Handling) Rules 2000 may be adhered to.

8. The quality of compost should meet the specification brought out under Fertilizer Control (Amendment) order 2006 by Ministry of Agriculture.

9. Before setting up the waste treatment and disposal facility necessary authorization may be obtained from the State Pollution Control Board (SPCB). The land area earmarked should have No Objection certificate of SPCB.

10. Wherever possible the involvement of community and private sector participation may be encouraged.

11. Wherever required advance necessary steps may be initiated to acquire the land to avoid the delay in implementation of project.

12. It should be ensured by the implementing agency that through enhancement of tariff and by other alternative means the project become viable as far as O & M of project is concerned.

13. Before implementation of project, the need for various components proposed in the DPR needs to be rechecked vis-à-vis the available facility along with the proposed cost estimate in the DPR, and the same may be got approved from the competent authority in the State.

14. In case of change, the same may be immediately referred to CPHEEO for further necessary action.

15. All procured material for SWM project needs to be as per BIS specification.

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Appraisal note for Consideration of Central Sanctioning & Monitoring Committee, Ministry of Urban Development (under JNNURM)

(Sewerage)

Proposal	Sewerage Treatment for Kanpur city
Name of State	Uttar Pradesh
Name of City	Kanpur
Objective	1. To provide sewerage facility in Kanpur city in a comprehensive manner. 2. To collect, convey and treat the sewage as per PCB standard.
Whether CDP is proposed	Yes

Background	• **KANPUR CITY** – Kanpur city is the largest industrial and commercial centre of Uttar Pradesh. Population wise also it is the largest city in Uttar Pradesh with present population around 32.0 lacs. The town is surrounded by river Ganga on one side (North) and river Pandu on the other side (South) & situated on the right bank of river Ganga at 125.6 m. above MSL. It is located at 80^0 21' E longitude and 26^0 28' N latitude. – Main industrial activities of concern are textile, leather, fertilizer and arms. Small scale industries cover rerolling, casting, painting and varnishing. – Kanpur is an important pilgrimage centre and centre of higher technical education. – Plain terrain with ground level varying between 118.0 m and 125.0 m above MSL. – It is well connected with rail, road and air net work. – HFL of the river Ganga at Kanpur city is 118.5 m**.**
Present Status	• **Sewer Net Work :** The length of existing sewers / trunk sewers of Kanpur town is around 1100 km. out of which around 800 Km. long sewers exist in core area, which is project area of present DPR.

	• **Sewage Pumping Stations :** 11 Nos sewage pumping stations have been constructed earlier in different areas of the city. • **Sewage treatment plants :** Three sewage treatment plants at Jajmau have been constructed under Ganga action plan. • 5 MLD (based on up flow anaerobic sludge blanket process). • 130 MLD ASP (Based on Activated Sludge Process) • 36 MLD UASB (Common Effluent Treatment Plant, to treat industrial waste with domestic waste) Projects sanctioned under JNNURM for sewerage district-I with following components is under implementation Gravity sewer Net work – 69 km. Rising main – 6 km. Renovation of existing sewage pumping station – 11 No Construction of new sewage pumping stations- 1 no. Renovation of existing sewage treatment plant – 3 No. Construction of new sewage treatment plants, 15 mld (Sewerage district-III)and 43 mld (sewerage district-I) At present except rainy season, treated waste water is used for irrigation purposes.
Need of the Project	▪ Under Ganga Action Plan Phase-II the work on following 6 schemes is in progress : ➢ Relieving sewers for Bakarmandi to Rakhimandi: 4.33 Km.: 85% work completed. ➢ Intermediate Pumping Station at Munshipurwa : 74 mld : 96% work completed. ➢ Intermediate Pumping Station at Rakhimandi : 96 mld. : 81% work completed. ➢ Tapping of Ganda Nala & Halwa Khanda Nala : 30 mld. : 87% work completed. ➢ Main Pumping Station & relevant works : 200 mld. : 10% work completed. ▪ Trunk Sewer Along COD Nala : 8.76 km. : 60% work completed.

	▪ Intermediate Pumping Station at Rakhimandi, Munshipurwa and Ganda Nala shall pump the combined sewage to Main Pumping Station at Bingawan through Trunk Sewer Along COD Nala. ✓ To Utilize the works being constructed under above schemes the immediate commencement of construction work of the proposed 210 mld Sewage Treatment Plant is essential. ✓ All the works shall be fruitless and remain idle until the construction of Sewage Treatment Plant of 210 mld is completed and would lead to enhanced pollution of holy river Ganges. ✓ Existing old sewerage network shall be relieved, ponding in depressed areas due to overflowing of manholes shall stop leading to better hygienic conditions. ✓ As per the U.P. Jal Nigam's statement that though NRCD, MoEF earlier agreed for funding of 200 mld STP but later due to change in policy of NRCD this project was deferred and it was suggested that 200 mld STP may be posed to JNNURM for funding. Hence the need has been highlighted by the U.P. Jal Nigam.		
Area of City	25,810 hectare (Divided into four sewerage district)		
District	Area (ha)	Sewered area (ha)	Unsewered area (ha)
District I -City Central	1,961	1569	392
District I -City East	3,664	1099	2,565
District II - City Central	2,706	2165	541
District II –South	4,254	1276	2,978
District III-West	7,243	1449	5,794
District IV-East	5,982	0	5,982
Total Area of City	25,810	7,558	18,252
PROJECTED POPULATION of Kanpur City			
District	Population 2010	Population 2025	Population 2040
District I -City Central	874,357	1,034,788	1,333,889
District I -City East	390,712	595,486	897,335
Sub-total	**1265069**	**1630274**	**2231224**
District II - City Central	1,061,879	1,383,586	1,798,232
District II –South	689,612	1,205,023	1,798,312

Sub-total	**1751491**	**2588609**	**3596544**
District III-West	422,740	1,033,890	1,968,178
District IV-East	110,700	347,226	836,054
Total	**3,550,000**	**5,600,000**	**8,632,000**

Water Supply Status : A water supply scheme for part of the project area has been recently sanctioned under JNNURM raising water supply level to 150 lpcd till design year 2040. As reported by U.P. Jal Nigam another DPR for remaining areas has already been prepared and submitted to state Government for onward transmission to Ministry for sanction. Thus, by the time the sewerage system would be implemented, the desired level of water supply would be in place for efficient functioning of sewerage system. Thus, water supply availability is ensured till design year for efficient functioning of sewerage system.

Sewage Contribution Rate	120 lpcd

District wise Sewage Generation

District	**Sewage Generation (MLD) 2010**	**Sewage Generation (MLD) 2025**	**Sewage Generation (MLD) 2040**
District I -City Central	104.92	124.17	160.07
District I -City East)	46.89	71.46	107.68
Sub-total	151.81	**195.63**	**267.75**
District II - City Central	127.43	166.03	215.79
District II –South	82.75	144.60	215.80
Sub-total	**210.18**	**310.63**	**431.59**
District III-West	50.73	124.07	236.18
District IV-East	13.28	41.67	100.33
Total	**426.00**	**672.00**	**1035.85**

STATUS OF STPs

	2010		**2025**		**2040**	
	Required	**Existing**	**Required**	**Proposed / Sanctioned**	**Required**	**To be constructed in 2040**
District I	**152**	**162**	**196**	**43 ****	**268**	**63**
District II	**210**	**0.00**	**311**	**210 ***	**432**	**121**

				(JNNURM)		
				111 (JNNURM)		
District III-	**51**	**0.00**	**124**	**15 ** (JNNURM)**	**236**	**11**
				109 (JNNURM)		
District IV	**13**	**0.00**	**42**	**42 (JNNURM)**	**100**	**59**
Total	**426**	**162**	**673**	**520**	**1036**	**254**
**** Sanctioned Under JNNURM *Proposed at present.**						

Present Proposal: In the present DPR, the design and estimate for 200 mld has been submitted. However, considering the total requirement for treatment of sewage for intermediate year (2025) of 310 mld and ultimate stage (2040) for 430 mld, two modular units of 105 mld each totaling 210 mld has been recommended in place of 200 mld proposed by State Government. Thus, in the II part of DPR along with sewer network, another unit of 105 mld would be required to have treatment capacity of 315 mld sufficient upto intermediate stage 2025 for which a separate proposal is being formulated by U.P. Jal Nigam and would be posed to the Ministry through SLSC for possible funding under JNNURM in the current financial year.

Estimated cost (Proposed) for 200 MLD STP by State Government	Rs. 133.75 crore			
Recommended cost for 210 mld STP by CPHEEO	Rs. 101.45 crore			
Period of implementation	30 months (December 2008 to February 2011)			
	(Rs. in Crores)			
Funding pattern GoI: GoUP: ULB	GoI	GoUP	Kanpur Nagar Nigam	Total
	50%	20%	30%	100%
As proposed	50.73	20.29	30.43	101.45

Financial Phasing	

Year	GoI	GoUP	KNN	Total
2008-09 (20%)	10.15	4.06	6.08	20.29
2009-10 (50%)	25.36	10.14	15.22	50.72
2010-11 (30%)	15.22	6.09	9.13	30.44
G.Total	50.73	20.29	30.43	**101.45**

Ownership of Project :	Nagar Nigam, Kanpur
Implementing Agency	Uttar Pradesh Jal Nigam
O&M Expenditure for 2007-08	Rs. 14.10 crore.
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 1674.00 lakhs (Rs.400 lakhs for STP proposed in present proposal)
Agency Responsible for O&M	Kanpur Nagar Nigam

Sewage Cess

Percentage of population to consume Prescribed slab of consumption of water	Slab of proposed consumption of water per month				Consumption of water per month (In KL)	Proposed Tariff (Rs/ KL)	Proposed Revenue Generation per annum (Rs in lacs)	
							Water tax	Sewerage cess @ 35% of water supply
Year 2010								
80.00%			10	KL	3960000	2	950.40	332.64
60.00%	10	to	20	KL	2970000	4	1425.60	498.96
40.00%	20	to	30	KL	1980000	6	1425.60	498.96
Total Revenue Generated							**3801.60**	**1330.56**
Year 2025								
90.00%			10	KL	8145000	3	2932.20	1026.27
60.00%	10	to	20	KL	5430000	6	3909.60	1368.36
40.00%	20	to	30	KL	3620000	9	3909.60	1368.36
Total Revenue Generated							**10751.40**	**3762.99**
Year 2040								
100.00%			10	KL	15114000	4	7254.72	2539.15
60.00%	10	to	20	KL	9068400	8	8705.66	3046.98
40.00%	20	to	30	KL	6045600	12	8705.66	3046.98
Total Revenue Generated						**Say**	**24666.04**	**8633.11**

Profit / Loss			
			Rs. in crore
Year	**Expenditure on maintenance**	**Income**	**Profit/ loss**
2010	16.74	13.30	-3.44
2025	34.80	37.62	2.82
2040	72.34	86.33	13.99

On the above proposed tariff, the scheme will be self sustainable

Revenue Generation (Rs. In Lakh)	
Existing (Year 2006-07)	Sewer Tax : Rs. 355.11 Lakh Sewer Charges : Rs. 106.11 Lakh Total : Rs. 461.22 Lakh
Proposed	Upon implementation of user charges as proposed: Year 2010 : Rs. **1330.56 Lakh** Year 2025 : Rs. **3762.99 Lakh** Year 2040 : Rs. **8633.11 Lakh**

As the DPR for providing sewage treatment plant in Kanpur has been framed as per the Manual on Sewerage & Sewage Treatment taking into account the technical comments of CPHEEO, we may accord technical approval to the same at an estimated cost of Rs.101.45 crore as detailed below in the table. The State Government and Kanpur Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned below:-

Project components of proposed DPR (200 mld)	**As per the proposed DPR (cost recommended by State Government)**	**As recommended by CPHEEO**
Civil Works	9481.35	9299.25
E/M Works	633.16	621.79
Sub-total	**10114.51**	**9921.04**
Laying of sewer along Ganda Nala	473.86	Advised to propose along with Part-II of the project which is

		for sewer network.
2% contingencies	207.90	198.42
Training, Capacity building, IEC (5%)	159.04	NIL
Administrative expenses (5%)	159.04	NIL
Sub Total	**10920.88**	**10317.88**
5% reduction for proficiency (as per appraisal done by State Government)	546.04	505.97
Sub Total	**10374.84**	**9613.49**
Supervision charges (12.5%)	1296.85	NIL
- *Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.*	-	48.06
Grand Total	**11671.69**	**9661.55**
Proportionate cost for 210 mld STP	**9661.55 X 210 / 200 = 10144.63 lakhs**	
Say	**Rs.101.45 crore**	

CPHEEO's Comments on DPR :

1. Hon'ble High Court of Allahabad is regularly monitoring the status of pollution of River Ganges for the cities situated on the bank of river Ganges particularly for Kanpur, Allahabad and Varanasi. In this matter Ministry of UD has also been impleaded as respondent by Hon'ble High Court on 17.9.2008.

2. As per Kanpur Sewerage Master Plan, prepared by JICA, the city has been divided into four sewerage districts. The integrated proposal for sewerage district – I has already been approved under JNNURM and is under implementation.

3. Sewerage District-II has been divided into two parts viz. part-I for sewage treatment and part – II for sewer network for ease of implementation and to maximize the utilization of existing infrastructure. Accordingly, to utilize the existing sewer network as well as those being executed under NRCD which are likely to be completed by 2009, there is urgent need for providing sewage treatment facility, otherwise, the untreated sewage would keep on polluting river Ganges inspite of investing for sewer network. Keeping in view, State Government has submitted sewage treatment project for consideration under JNNURM. The DPR preparation for sewer network for remaining areas of sewerage District-II is underway and is likely to be submitted within this financial year. Thus, integrated sewerage system (Network as well as STP) would be ready at the same time by 2011.

4. Keeping in view the population covered with sewer network, and its sewage generation a STP of 210 MLD (two modular units of 105 mld) has been allowed against 200 mld proposed by State Government and based on coverage of area other modular units may be added at the time of need.

5. Necessary land has already been acquired for STP.

6. The water supply availability in the project area will be 150 LPCD as water supply project for the same area has been recently approved under JNNURM to raise water supply level upto 150 lpcd and another water supply project for remaining area has already been prepared and submitted to Government of Uttar Pradesh for posing the same for sanction under JNNURM. Thus, by the time sewerage system would be implemented, required level of water supply would be available in the project area for efficient functioning of sewerage system.

7. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system created under NRCD so that there is no replication of work/components.

8. It has also been mentioned that KNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

9. The BAR Chart and implementation Schedule have also been enclosed.

10. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current SOR of 2007. For non-SOR items, market rates have been considered.

11. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by KNN / Govt of Uttar Pradesh.

12. During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the KNN / State Government from their own resources.

General Comments for Project Implementation:

- Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing

velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

- All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

- The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

- KNN may explore the possibility of various treatment options including the proposed one and cost effective treatment option may be adopted based on the cost economics. KNN may float tenders accordingly. KNN / State Govt. may explore the possibility of providing cost effective, less power intensive treatment facilities with less recurring cost and also recover revenue from the by-product for sustainable O&M and suitable to local condition.

- KNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

- Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

- A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

- The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by KNN to this Ministry regularly for perusal and record.

- The project has been approved with price level of 2007-08, without price contingencies during the implementation period. Cost escalation, if any, shall be met by KNN / Govt of Uttar Pradesh.

- The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

- A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

- Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

- All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

- An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

- All possible efforts may be made to involve Public-Private-Partnership in O&M of STPs and other components of project.

- No change in the scope of project shall be effected without prior approval of CPHEEO.

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Appraisal note for Consideration of Central Sanctioning & Monitoring Committee, Ministry of Urban Development (under JNNURM)

(Sewerage)

1	Proposal	Sewerage work for Kanpur city (Inner Core Area)
2	Name of State	Uttar Pradesh
3	Name of City	Kanpur
4	Objective	1. To provide sewerage facility in Kanpur city (Core area + part of District –III) in a comprehensive manner. 2. To collect, convey and treat the sewage as per PCB standard.
5	Whether CDP is proposed	Yes
6	Background	• **KANPUR CITY** – Kanpur city is the largest industrial and commercial centre of Uttar Pradesh. Population wise also it is the largest city in Uttar Pradesh with present population around 32.0 lacs. The town is surrounded by river Ganga on one side (North) and river Pandu on the other side (South) & situated on the right bank of river Ganga at 125.6 m. above MSL. It is located at 80^0 21' E longitude and 26^0 28' N latitude. – Main industrial activities of concern are textile, leather, fertilizer and arms. Small scale industries cover rerolling, casting, painting and varnishing. – Kanpur is an important pilgrimage centre and centre of higher technical education. – Plain terrain with ground level varying between 118.0m and 125.0m above MSL. – It is well connected with rail, road and air net work. – HFL of the river Ganga at Kanpur city is 118.5m**.**
7	Present Status	• **Sewer Net Work :** The length of existing sewers / trunk sewers of Kanpur town is around 1100 km. out of which around 800 Km. long sewers exist in core area, which is project area of present DPR. • **Sewage Pumping Stations :** • 11 Nos sewage pumping stations have been constructed earlier in different areas of the city. • **Sewage treatment plants** Three sewage treatment plants at Jajmau have been constructed under Ganga action plan • 5 MLD (based on up flow anaerobic sludge blanket

		process) • 130 MLD ASP (Based on Activated Sludge Process) • 36 MLD UASB (Common Effluent Treatment Plant, to treat industrial waste with domestic waste) At present, except rainy season, treated waste water is used for irrigation purposes.		
8	Need of the Project	Presently, sewer network exists mainly in core area of city and in some part of southern and western area of the city and was laid in piece meal manner right from 1904 till date depending upon need and availability of funds. Many of laid trunk sewers were constructed in brick masonry and are in dilapidated condition. Further, due to improper cleaning and silting, sewers often get chocked and are giving frequent trouble. Some of the pipes are damaged beyond repair and need replacement. Due to above factors unhygienic conditions prevail in the city and needs immediate attention. CCTV survey has been carried out for the trunk sewer network which also shows that trunk sewers in brick masonry are in dilapidated conditions with joints opening and tree roots penetrating to sewer line and obstructing the sewage flow. Because of above, some patches of sewer line had collapsed and is beyond repair. Further, many of the areas are still uncovered and sewerage network needs to be extended to uncovered areas including making proper facility for sewage disposal. Though some STPs have been set up/ proposed under Ganga Action Plan of NRCD, they will not be effectively utilized unless sewerage network is developed all over the city area and entire sewage is captured and conveyed to the said STPs. Accordingly, UP Jal Nigam has prepared a Sewerage Master Plan for Kanpur Nagar Nigam. Under this Master Plan, sewerage network will be development / augmented under JNNURM in all the areas of the city and the sewage will be conveyed to various STPs (existing / proposed) ensuring proper integration with the facilities already developed under Ganga Action Plan of NRCD.		
9	Area of City	25,810 hectare		
10	District	Area (ha)	Sewered area (ha)	Unsewered area (ha)
	District I -City Central	1,961	1569	392
	District I -City East	3,664	1099	2,565
	District II - City Central	2,706	2165	541
	District II –South	4,254	1276	2,978
	District III-West	7,243	1449	5,794
	District IV-East	5,982	0	5,982
	Total Area of City	25,810	7,558	18,252

11	PROJECTED POPULATION			
	District	Population 2010	Population 2025	Population 2040
	District I -City Central	874,357	1,034,788	1,333,889
	District I -City East	390,712	595,486	897,335
	Sub-total	**1265069**	**1630274**	**2231224**
	District II - City Central	1,061,879	1,383,586	1,798,232
	District II –South	689,612	1,205,023	1,798,312
	Sub-total	**1751491**	**2588609**	**3596544**
	District III-West	422,740	1,033,890	1,968,178
	District IV-East	110,700	347,226	836,054
	Total	**3,550,000**	**5,600,000**	**8,632,000**

12	PROJECTED POPULATION OF PROJECT AREA				
	Population for year	Kanpur City	Projected population under present DPR		Remaining population (To be covered in next DPR)
	2010	3,550,000	District I -C C	874,357	
			District I -C E)	390,712	
			District II -C C	1,061,879	
			District II -S	206,884	
			District III-W	42,274	
			Sub-total	**2,576,105**	973,895
	2025	**5,600,000**	District I -C C	1,034,788	
			District I -C E)	595,486	
			District II -C C	1,383,586	
			District II -S	361,507	
			District III-W	103,389	
			Sub-total	**3,478,757**	2,121,243
	2040	**8,632,000**	District I -C C	1,333,889	
			District I -C E)	897,335	
			District II -C C	1,798,232	
			District II -S	539,493	
			District III-W	196,818	
			Sub-total	**4,765,767**	3,866,233

13	**<u>Water supply</u> <u>status</u>**: A water supply scheme for the same project area has been recently sanctioned under JNNURM raising water supply level to 150 lpcd till design year 2040. Thus, water supply availability is ensured till design year for efficient functioning of sewerage system.
14	Sewage Contribution (Rate) — 120 lpcd

District wise Sewage Generation

District	Sewage Generation (MLD) 2010	Sewage Generation (MLD) 2025	Sewage Generation (MLD) 2040
District I -City Central	104.92	124.17	160.07
District I -City East)	46.89	71.46	107.68
Sub-total	**151.81**	**195.63**	**267.75**
District II - City Central	127.43	166.03	215.79
District II –South	82.75	144.60	215.80
Sub-total	**210.18**	**310.63**	**431.59**
District III-West	50.73	124.07	236.18
District IV-East	13.28	41.67	100.33
Total	**426.00**	**672.00**	**1035.85**

STP's (Capacity in MLD)

	2010		2025		2040	
	Required	**Existing**	**Required**	**Proposed**	**Required**	**Addl. requ-ired**
District I	152	162	196	43*	268	63
TANNERY	9	9			13	4
District II	210	0.00	311	200	432	121
				(NRCD) +		
				111 (JNNURM)		
District III-	51	0.00	124	15*	236	112
				JNNURM +		
				109 JNNURM		
District IV	13	0.00	42	42	100	59
				JNNURM		

* *Proposed at present.*

Cost Estimate	
Project components of proposed DPR	**Estimated cost (Rs. lacs)**
Gravity sewer Net work – 69 km.	12691.30
Rising main – 6 km.	888.25
Renovation of existing sewage pumping station – 11 No.	769.47
Construction of new sewage pumping stations- 1 no.	410.70
Renovation of existing sewage treatment plant – 3 No.	799.92
Construction of new sewage treatment plants, 15 mld (Sewerage district-III)and 43 mld (sewerage district-I)	2883.09
Sub-total	**18442.73**
3% contingencies	553.28
- *Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.*	92.21
Grand Total	**19088.22**
Say	**Rs. 190.88 crore**

Period of implementation	36 months (January 2008-December 2010)

				(Rs. in Crores)
Funding pattern GoI: GoUP: ULB	GoI	GoUP	Kanpur Nagar Nigam	Total
	50%	20%	30%	100%
As proposed	95.44	38.18	57.26	190.88

Financial Phasing

Year	GoI	GoUP	KNN	Total
2007-08 (10%)	9.54	3.82	5.73	19.09
2008-09 (40%)	38.18	15.27	22.90	76.35
2009-10 (30%)	28.63	11.45	17.18	57.26
2010-11 (20%)	19.09	7.64	11.45	38.18
			G.Total	**190.88**

Ownership of Project :	Nagar Nigam, Kanpur
Implementing Agency	Uttar Pradesh Jal Nigam
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 1673.79 lakhs
Agency Responsible for O&M	Kanpur Nagar Nigam

Sewage Cess								
Percentage of population to consume water in prescribed slabs (for assessment of sewage cess)	**Slab of proposed consumption of water per month Per connection**				**Consumption of water per month (In KL)**	**Proposed Tariff (Rs/ KL)**	**Proposed Revenue Generation per annum (Rs in lacs)**	
							Water tax	**Sewerage cess@ 35% of W/s**
Year 2010								
80.00%			10 KL		5680000	2.0	1363.20	477.12
60.00%	10	to	20 KL		3550000	4.0	1704.00	596.40
40.00%	20	to	30 KL & above		6840000	6.0	1635.84	572.54
Total Revenue Generated							**4703.04**	**1646.06**
Year 2025								
90.0%			10 KL		10080000	3	3628.8	1270.08
60.00%	10	to	20 KL		5736000	6	4129.92	1445.47
40.00%	20	to	30 KL		3584000	9	3870.72	1354.75
Total Revenue Generated							**11629.44**	**4070.30**
Year 2040								
100.0%			10 KL		17264000	4	8286.72	2900.35
60.00%	10	to	20 KL		8286720	8	7955.25	2784.34
40.00%	20	to	30 KL		5524480	12	7955.25	2784.33
Total Revenue Generated							**24197.22**	**8469.02**

Comparison of O & M and Revenue generation

Year	Expenditure on maintenance	Income	Profit/ loss
2010	16.74	16.46	-0.28
2025	34.80	40.70	5.90
2040	72.34	84.69	12.35

On the above proposed tariff the scheme will be self sustainable

Revenue Generation (Rs. In Lakh)	

Existing (Year 2006-07)	Sewer cess : Rs. 355.11 Lakh Sewer Charges : Rs. 106.11 Lakh Total : Rs. 461.22 Lakh
Proposed	Upon implementation of user charges as proposed: Year 2010 : Rs.**16.46 crore** Year 2025 : Rs.**40.70 crore** Year 2040 : Rs. **84.69 crore**

CPHEEO's Comments on DPR :

1. Existing sewage treatment units are not performing to desired effluent standard because of poor O&M and lack of adequate funds for operating STP. KNN should take immediate steps to ensure proper O&M of STP.

2. Kanpur Nagar Nigam/UP Jal Nigam should do the needful to separately treat tannery waste and avoid mixing with municipal sewage during treatment which is adversely affecting the performance of UASB. An action plan for properly treating tannery waste may be separately proposed after carefully studying the same along with part-II of the proposal which is likely to be submitted by December end.

3. The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line, which is often not easy to carry out in the field.

4. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

5. The water supply availability in the project area will be 150 LPCD as stated by KNN (water supply project for the same area has been recently approved under JNNURM to raise water supply level upto 150 lpcd) which is the required rate of water supply for providing sewerage facilities as per the Manual on Sewerage and sewage treatment.

6. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry.

7. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

8. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been allowed upto 8.0 meters in a small stretch near STP.

9. Considering the capital cost, the durability and availability of the pipes, RCC NP-3 pipes as per BIS Standards have been proposed.

10. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system created under NRCD so that there is no replication of work/components.

11. It has also been mentioned that KNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

12. The BAR Chart and implementation Schedule have also been enclosed.

13. KNN has informed that all the capital investment will be grant-in-aid from Govt. of India, Govt. of Uttar Pradesh and loans availed by KNN / Kanpur Jal Sansthan.

14. KNN has prepared the DPR in detail with proper input data. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current SOR of 2007. For non-SOR items, market rates have been considered.

15. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by KNN / Govt of Uttar Pradesh.

16. **As the DPR for providing sewerage system in Kanpur has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs.190.88 crore as detailed below in the table. The State Government and Kanpur Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-**

COST ESTIMATE

(Rs in lacs)

Project components of proposed DPR	As per the proposed DPR	As recommended by CPHEEO
Gravity sewer Net work – 69 km.	12691.30	12691.30
Rising main – 6 km.	888.25	888.25
Renovation of existing sewage pumping station – 11 No.	769.47	769.47
Construction of new sewage pumping stations- 1 no.	410.70	410.70
Renovation of existing sewage treatment plant – 3 No.	799.92	799.92
Construction of new sewage treatment plants – 2 no., 15 mld (Sewerage district-III)and 43 mld (sewerage district-I)	2883.09	2883.09
Sub-total	**18442.73**	**18442.73**
3% contingencies	553.28	553.28
Training, Capacity building, IEC (5%)	949.75	NIL
Administrative expenses (5%)	949.75	NIL
Supervision charges (12.5%)	2374.37	NIL
- *Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.*	-	92.21
Grand Total	**23269.88**	**19088.22**
Say	**232.70 crore**	**190.88 crore**

General Comments for Project Implementation:

- Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

- Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

- While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

- Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by KNN for record.

- Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

- While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

- All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

- The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

- KNN may explore the possibility of various treatment options including the proposed one and cost effective treatment option may be adopted based on the cost economics. KNN may float tenders accordingly. KNN / State Govt. may explore the possibility of providing cost effective, less power intensive treatment facilities with less recurring cost and also recover revenue from the bye product for sustainable O&M and suitable to local condition.

- KNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

- Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

- A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

- The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and

resultant cost over-runs. The Monitoring report may be furnished by KNN to this Ministry regularly for perusal and record.

- The project has been approved with price level of 2006-07, without price contingencies during the implementation period. Cost Escalation, if any, shall be met by KNN / Govt of Uttar Pradesh.

- The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

- A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

- Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

- All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

- An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

- All possible efforts may be made to involve Public-Private-Partnership in O&M of STPs and other components of project.

- No change in the scope of project shall be effected without prior approval of CPHEEO.

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Appraisal note for Consideration of Central Sanctioning & Monitoring Committee, Ministry of Urban Development (under JNNURM)

(Sewerage)

Proposal	Sewerage works in sewerage District IV of Kanpur city
Name of State	Uttar Pradesh
Name of City	Kanpur
Objective	1. To provide sewerage facility in Kanpur city in a comprehensive manner. 2. To collect, convey, treat and dispose the sewage as per PCB standard.
Whether CDP is proposed	Yes

Background	• **KANPUR CITY** – Kanpur city is the largest industrial and commercial centre of Uttar Pradesh. Population wise also it is the largest city in Uttar Pradesh with present population around 32.0 lacs. The town is surrounded by river Ganga on one side (North) and river Pandu on the other side (South) & situated on the right bank of river Ganga at 125.6 m. above MSL. It is located at 80^0 21' E longitude and 26^0 28' N latitude. – Main industrial activities of concern are textile, leather, fertilizer and arms. Small scale industries cover rerolling, casting, painting and varnishing. – Kanpur is an important pilgrimage centre and centre of higher technical education. – Plain terrain with ground level varying between 118.0 m and 125.0 m above MSL. – It is well connected with rail, road and air net work. – HFL of the river Ganga at Kanpur city is 118.5 m**.**
Present Status	• **Sewer Net Work :** The length of existing sewers / trunk sewers of Kanpur town is around 1100 km. out of which around 800 Km. long sewers exist in core area of sewerage District I, II &III. • **Sewage Pumping Stations :** 11 Nos sewage pumping stations have been constructed earlier in different areas of the city.

<table>
<tr><td></td><td colspan="3">

Sewage treatment plants :Three sewage treatment plants at Jajmau have been constructed under Ganga action plan.

5 MLD (based on up flow anaerobic sludge blanket process).
130 MLD ASP (Based on Activated Sludge Process)
36 MLD UASB (Common Effluent Treatment Plant, to treat 9 MLD tannery waste with domestic waste (Under Indo-Dutch bilateral assistance)

Projects sanctioned under JNNURM for sewerage district-I, II & III with following components is under implementation

Gravity sewer Net work – 69 km.
Rising main – 6 km.
Renovation of existing sewage pumping station – 11 No.
Construction of new sewage pumping stations- 1 no.
Renovation of existing sewage treatment plant – 3 No.
Construction of new sewage treatment plants, 15 mld (Sewerage district-III)and 43 mld (sewerage district-I)

Further, a 210 mld capacity STP at Bingawan has been Sanctioned recently to treat sewage discharge from sewerage district II

At present, except rainy season, treated waste water is used for irrigation purposes.
</td></tr>
<tr><td>Need of the Project</td><td colspan="3">

There is no sewerage system in this area (Sewerage District IV). Considering the rapid growth in population and sewage generation this sewerage district shall require 42 mld STP to take care of sewage load of the year 2025 along with requisite sewer network and pumping stations. .
This is essential to reduce the pollution load of holy river Ganges

</td></tr>
<tr><td>Area of City</td><td colspan="3">25,810 hectare (Divided into four sewerage district)</td></tr>
<tr><td>District</td><td>Area (ha)</td><td>Sewered area (ha)</td><td>Unsewered area (ha)</td></tr>
<tr><td>District I -City Central</td><td>1,961</td><td>1569</td><td>392</td></tr>
<tr><td>District I -City East</td><td>3,664</td><td>1099</td><td>2,565</td></tr>
<tr><td>District II - City Central</td><td>2,706</td><td>2165</td><td>541</td></tr>
<tr><td>District II –South</td><td>4,254</td><td>1276</td><td>2,978</td></tr>
<tr><td>District III-West</td><td>7,243</td><td>1449</td><td>5,794</td></tr>
<tr><td>District IV-East</td><td>5,982</td><td>0</td><td>5,982</td></tr>
<tr><td>Total Area of City</td><td>25,810</td><td>7,558</td><td>18,252</td></tr>
</table>

PROJECTED POPULATION of Kanpur City			
District	Population 2010	Population 2025	Population 2040
District I -City Central	874,357	1,034,788	1,333,889
District I -City East	390,712	595,486	897,335
Sub-total	**1265069**	**1630274**	**2231224**
District II - City Central	1,061,879	1,383,586	1,798,232
District II –South	689,612	1,205,023	1,798,312
Sub-total	**1751491**	**2588609**	**3596544**
District III-West	422,740	1,033,890	1,968,178
District IV-East	110,700	347,226	836,054
Total	**3,550,000**	**5,600,000**	**8,632,000**

Water Supply Status : Two water supply schemes for Kanpur city have been recently sanctioned under JNNURM raising water supply level to 150 lpcd till design year 2040. Thus, by the time the sewerage system would be implemented, the desired level of water supply would be in place for efficient functioning of sewerage system. Thus, water supply availability is ensured till design year for efficient functioning of sewerage system.

Sewage Contribution Rate	120 lpcd

District wise Sewage Generation

District	**Sewage Generation (MLD) 2010**	**Sewage Generation (MLD) 2025**	**Sewage Generation (MLD) 2040**
District I -City Central	104.92	124.17	160.07
District I -City East)	46.89	71.46	107.68
Sub-total	151.81	**195.63**	**267.75**
District II - City Central	127.43	166.03	215.79
District II –South	82.75	144.60	215.80
Sub-total	**210.18**	**310.63**	**431.59**
District III-West	50.73	124.07	236.18
District IV-East	13.28	41.67	100.33
Total	**426.00**	**672.00**	**1035.85**

STATUS OF STPs (Capacity in mld)

	2010		2025		2040	
	Required	Existing	Required	Existing / Sanctioned	Required	Additional capacity needed
District I	**152**	**162**	**195**	**162/ 43 ****	**268**	**63**
District II	**210**	**0.00**	**311**	**0.00/ 210** (JNNURM)**	**432**	**121**
				111 (Yet to be approved)		
District III-	**51**	**0.00**	**124**	**0.00/ 15 ** (JNNURM)**	**236**	**112**
				109 (Yet to be approved)		
District IV	**13**	**0.00**	**42**	**42* (JNNURM)**	**100**	**58**
Total	**426**	**162**	**672**	**162/ 268**	**1036**	**291**
				242 (Yet to be approved)		
**** Sanctioned Under JNNURM *Proposed at present.**						

Present Proposal: In the present DPR, the design and estimate for 130.90 km sewerage network, 14 mld & 40 mld Capacity Intermediate sewage pumping station, 42 mld capacity Main sewage pumping station and 42 mld capacity sewage treatment plant has been submitted.

Estimated cost of DPR submitted by State Government	Rs. 238.95 crore			
Recommended cost by CPHEEO	Rs. 207.36 crore			
Funding pattern GoI: GoUP: ULB	GoI	GoUP	KNN	Total
	50%	20%	30%	100%
As proposed	103.68	41.47	62.21	207.36

Financial Phasing	

Year	GoI	GoUP	KNN	Total
2008-09 (25%)	25.92	10.37	15.55	51.84
2009-10 (40%)	41.47	16.59	24.88	82.94
2010-11 (20%)	20.74	8.29	12.44	41.47
2011-12 (15%)	15.55	6.22	9.34	31.11
G.Total	**103.68**	**41.47**	**62.21**	**207.36**

Ownership of Project :	Nagar Nigam, Kanpur
Implementing Agency	Uttar Pradesh Jal Nigam
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 1674.00 lakhs (Rs.495.208 lakhs for works proposed in present proposal)
Agency Responsible for O&M	Kanpur Nagar Nigam

Sewage Cess

Percentage of population to consume Prescribed slab of consumption of water	Slab of proposed consumption of water per month				Consumption of water per month (In KL)	Proposed Tariff (Rs/ KL)	Proposed Revenue Generation per annum (Rs in lacs)	
							Water tax	Sewerage cess @ 35% of water supply
Year 2010								
80.00%			10	KL	3960000	2	950.40	332.64
60.00%	10	to	20	KL	2970000	4	1425.60	498.96
40.00%	20	to	30	KL	1980000	6	1425.60	498.96
Total Revenue Generated							**3801.60**	**1330.56**
Year 2025								
90.00%			10	KL	8145000	3	2932.20	1026.27
60.00%	10	to	20	KL	5430000	6	3909.60	1368.36
40.00%	20	to	30	KL	3620000	9	3909.60	1368.36
Total Revenue Generated							**10751.40**	**3762.99**
Year 2040								
100.00%			10	KL	15114000	4	7254.72	2539.15
60.00%	10	to	20	KL	9068400	8	8705.66	3046.98
40.00%	20	to	30	KL	6045600	12	8705.66	3046.98
Total Revenue Generated						**Say**	**24666.04**	**8633.11**

Profit / Loss (Rs in crore			
Year	**Expenditure on maintenance**	**Income**	**Profit/ loss**
2010	16.74	13.30	-3.44
2025	34.80	37.62	2.82

2040	72.34	86.33	13.99

* The O&M cost of works proposed under this project is Rs. 4.95 crore per year which shall be borne by ULB through revenue generation from consumers.

On the above proposed tariff, the scheme will be self sustainable

Revenue Generation (Rs. In Lakh)	
Existing (Year 2006-07)	Sewer Tax : Rs. 355.11 Lakh Sewer Charges : Rs. 106.11 Lakh Total : Rs. 461.22 Lakh
Proposed	Upon implementation of user charges as proposed: Year 2010 : Rs. **1330.56 Lakh** Year 2025 : Rs. **3762.99 Lakh** Year 2040 : Rs. **8633.11 Lakh**

As the DPR for providing sewage treatment plant in Kanpur has been framed as per the Manual on Sewerage & Sewage Treatment taking into account the technical comments of CPHEEO, we may accord technical approval to the same at an estimated cost of Rs.207.368 crore as detailed below in the table. The State Government and Kanpur Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned below:-

Sl. No.	Proposed Component of DPR	As per the proposed DPR (cost recommended by State Government)	As recommended by CPHEEO
A	Construction cost of 130.90 Km long Sewerage network	**12692.92**	**12692.92**
B	Construction of 14 mld capacity IPS		
(i)	Civil works	349.79	349.79
(ii)	E& M works	579.00	579.00
	Sub Total 14 mld IPS	**928.79**	**928.79**
C	Construction cost of 40 mld IPS		
(i)	Civil works	1187.79	1187.79
(ii)	E& M works	1185.000	1185.000
	Sub Total 40 mld IPS	**2372.79**	**2372.79**
C	Construction cost of 42 mld MPS		
(i)	Civil works	483.65	483.65
(ii)	E& M works	1450.00	1450.00
	Sub Total 42 mld MPS	**1933.65**	**1933.65**

D	Construction cost of 42 mld STP		
(i)	Civil works	1948.32	1948.32
(ii)	E& M works	1417.23	1417.23
	Sub Total 42 mld STP	**3365.55**	**3365.55**
	Sub-Total	**21293.70**	**21293.70**
	Contingencies	1064.68	425.87
	Sub-Total	**22358.39**	**21719.58**
	5% reduction for proficiency (as per appraisal done by State Government)	**1117.92**	1085.98
	Sub-Total	**21240.47**	**20633.60**
	Supervision charges @ 12.5%	2655.06	**Nil**
	Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.	**0.000**	103.17
	Grand Total	**23895.53**	**20736.77**
	Say	**Rs. 207.36 Crore**	

CPHEEO's Comments on DPR :

1. The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution

2. All efforts should be made to connect sewerage system with individual houses so as to collect sewage and any connection with drain / nallah to tap waste water / sullage water need to be discontinued after commissioning of the project.

3. The population projection for the design year 2040 has been made considering the decadal growth during 1921-2001 using methods indicated in the Manual on Water Supply & Treatment. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

4. The water supply availability in the project area will be 150 lpcd as stated by KNN / UP Jal Nigam **(project sanctioned under JNNURM is under execution)**, which is the required for efficient functioning of sewage facility as per Manual.

5. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

6. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

7. KNN will ensure recycling/ reuse of at least 20% of treated waste water so as to recover part of O&M of scheme.

8. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

9. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

10. The sewer system for Kanpur has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

11. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 9.00 meters in open areas in small stretches of alignment. The average depth of cutting of Trunk sewer is kept as 5 to 8 m.

12. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 & NP-4 pipes as per BIS Standards have been proposed. NP-4 pipes have been proposed wherever depths are more than 6.0 m, as per proper design. In the original proposal only NP-3 & NP-4 pipes have been proposed. During project appraisal, it has been suggested to adopt 50% of lower diameter sewer pipes up to 200mm to be used to NP-2. Accordingly proposal has been got revised.

13. It has also been mentioned that KNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

14. The BAR Chart and implementation Schedule have also been enclosed.

15. The cost estimate has been prepared based on SOR of 2007-08 preveling in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by KNN / Govt of Uttar Pradesh.

General Comments for Project Implementation:

I. Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by KNN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the

statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. KNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by KNN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD
(Water Supply)

1.	Proposal		DPR of Water Supply Scheme for Remaining Part of Kanpur city under JNNURM (Other than those covered under Part-I under JNNURM.)
2.	Name of District / State		Kanpur, Uttar Pradesh
3.	Name of city		Kanpur
4.	Objectives		To augment and strengthen water supply system of Remaining Part of Kanpur City as per CPHEEO/JNNURM norms .
5.	Whether CDP is prepared		Yes
6.	Background	:	Kanpur, the largest city in Uttar Pradesh with 2001 census population of 2715555, is growing at a faster pace and is a major town of industrial, commercial and institutional activities. Kanpur is situated at 80^0 21' North latitude and 26^0 28' East longitude and is spread over 260 sq Km area. The DPR to augment and strengthen the Water Supply system in the Inner Old area of Kanpur City amounting to Rs. 270.95 Crore and has already been sanctioned under JNNURM phase-I. For the Remaining part of Kanpur city this project amounting to Rs. 417.81 Crore has been forwarded by State Govt. for the sanction under JNNURM Phase-II
7.	Present Status	:	As per the Master Plan of Water Supply for Kanpur city, the city has been divided into four water supply districts covering 110 wards in the city. Based on the system of existing water supply developed so far and considering topographical conditions, the salient features are detailed below:-

S. No.	District	No. of Wards	Source of Drinking Water
A.	City Service District	51	1. River Ganga (120 mld) and Lower Ganga Canal (68 mld) are the basic source. Water Works is at Benajhabar situated in the district. Besides this, 23 mld tube well water in supplied to this district.
B	West Service District	10	River Ganga (200 mld) is the main source of drinking water WTP is already existing near Barrage. Besides, 18 mld water is supplied from

			tube wells.
C	East Service District	18	Tube wells are the basic source at present with total discharge of 62 mld. However, many of the tubewells are very old with reduced discharge and needs reboring/replacment.
D	South Service District	31	Tube wells (32 mld) & Lower Ganga Canal (12 mld) are the basic source with surface water treatment plant at Gujaini.
E.	Cantonment		Water supply of Cantonment is maintained by Cantonment Board and not by Kanpur Jal Sansthan (KJS). Basic source of water supply are tube wells. However, 6 mld is given by KJS.
	TOTAL	**110**	

8. **Water availability** : (Existing water supply details)
   - Total production(MLD) : 427 (River & canal : 295, Tubewells : 132)
   - Water supplied at consumers point(mld) 299
   - Per capita (lpcd) : 87 for a population of 33.66 lacs at present.
   - UFW : 30%

9. **Population** -

		Kanpur City	**Area covered prior to JNNURM**	**Area covered under JNNURM Phase-I**	**Area proposed to be covered under JNNURM (Remaining part of Kanpur City)**
- As per 2001 Census	:	2715555	242730	1680651	792174
- Population - 2007	:	3080000	339092	1900000	840908
- Base year – 2010	:	3420000	414238	2100000	905762
- Intermediate year - 2025	:	5390000	1278854	2700000	1411146
- Design year – 2040	:	8310000	1611484	4500000	2198516

10. **Water Demand (Mld) @ 150 lpcd + 15% losses.**

i. Base year – 2010	:	590.00	71.51	362.25	156.24
II. Intermediate year-2025	:	930.00	220.83	465.75	243.42
ii. Design year – 2040	:	1432.00	276.51	776.25	379.24

11. **Existing water supply system**

Kanpur water works was established in the year 1892 at Benajhabar taking raw water from river Ganga through Bhaironghat intake. In the year 1920, due to change in course of river Ganga and its shifting to other side, a channel of about 5.4Km was constructed from lower Ganga canal to Benajhabar water works to arrange an alternative surface source.

Master plan for the water supply of town was prepared in seventies, accordingly the entire town has been divided in four water supply Districts.

In the year 1990, water supply of East service district has been rehabilitated under Indo-Dutch Mission by tube wells.

In the year 1994, a rapid gravity filter unit of 200 mld has been added at Benajhabar water works to replace the old slow sand filters.

In the year 2002, a new water works of 28 mld has been constructed at Gujaini to strengthen the south service district by using surface through lower Ganga canal.

The average annual rate of ground water depletion is about 1.47 mts. Hence, to avoid harnessing of ground water, dependence on tube wells is limited.

In the year 2005, Barrage has been constructed at the upstream of river Ganga to divert it to its original course and to ensure raw water supply demand of 1600 mld for the design year 2040 of whole Kanpur city. At the Barrage site, a new WTP of 200 mld has been constructed in 2005 to feed the western service district.

12. **Need of Project** : Presently, against a requirement of 580 mld of water for the year 2009 for population of about 34.50 lacs, the total water production in the city is about 427 mld, from the three water works and 132 nos. tube wells at rate of 87 lpcd. Thus, water production is inadequate for the present demand as per the CPHEEO norms i.e. 150 lpcd +15% UFW considering 30% losses in the system.

Need for extensive reorganization of the distribution network and its extension to the newly developed localities.

Need for isolation of the feeder mains / rising mains

from the distribution lines.

Need for renovation of Zonal pumping station and segregation of zones to ensure equitable distribution of water and to ensure operation of the

zonal pumping stations at desired efficiency.

Need for loss and leakage prevention to reduce the quantum of un-accounted for water and replacement of old and out lived pipe lines which, at certain places, are even responsible for contamination of water supply.

Need for augmentation of storage capacity in different zones as the same is inadequate compared to CPHEEO norms.

For the strenghtining of water supply of inner old area of Kanpur city the scheme amounting to Rs. 270.95 crore has been sanctioned in Phase-I under JNNURM Programme in October-2007 & execution of works ae under progress.

For the strenghning of water supply of remaining part of Kanpur city this project has been prepared in phase-II under JNNURM Programme.

13. **Proposed Scheme** - Under the present proposal, the part of south water supply district & east district has been considered.

The project components includes civil constructions like Raw water Pump House, water treatment plant, service reservoirs, laying of feeder mains, rising mains and distribution mains along with electrical mechanical components like pumping plants, for existing and proposed treatment works. The main components proposed are as under:

- One Unit of 400 mld Raw Water Pump House at Ganga Barrage above the plinth level for the demand of mid stage (2025).
- Raw Water Rising Main (1400 mm PSC pipe)
- Water Treatment Plant 200 MLD at Barrage site & 28.5 mld at Gujaini water works.
- Clear Water reservoir and Pump House at WTP - 4400 KL

- Clear Water Feeder Mains (65.85 Km)
- Service Reservoirs (CWR/OHT) -38 CWR's , 32 OHT's.
- Rising Main from CWR to OHT 300 mm to 500 mm- D.I. K-9 pipe.
- Strengthening of distribution network (1045 Km)
- Head and cross regulator at canal intake and raw water sump cum pump house.
- Pumping Plants & Power Connection
- Building Works :- Sub Station -39, Workshop-1, Residence Type-I and Guard room-40 Nos. each on Zonal Pumping Stations.
- Miscellaneous Works like Boundary wall & Approach Road etc.

14. Proposed Source — The source proposed for present project is river Ganga at newly constructed Ganga Barrage.

15. Estimated cost (Proposed) (Rs. in lakhs) : Rs. 41781.00 Lacs.

16. Cost for Consideration and approval — **Total Project Cost Rs. 37778.92 lakhs**

17. Sharing Pattern

	Share	Rs. (in Lacs)
GOI	50 %	18889.46
State Govt.	20 %	7555.78
KNN	30 %	11333.68

18. Financial Phasing

GOI Share	**Rs. 18889.46 lacs**	
Year 2008-2009	20 %	3777.89
Year 2009-2010	40 %	7555.78
Year 2010-2011	40 %	7555.78
State Share	**Rs. 7555.78 lacs**	
Year 2008-2009	20 %	1511.16
Year 2009-2010	40 %	3022.31
Year 2010-2011	40 %	3022.31
KNN Share	**Rs 11333.68 lacs**	

Year 2008-2009	20 %	2266.74
Year 2009-2010	40 %	4533.47
Year 2010-2011	40 %	4533.47

19. Period of Implementation : 24 months

20. Annual O&M Expenditure :

- Existing (year 2007-08) : **3439.05 lacs.**
- Proposed (year 2010) : **6212.74 lacs.**
  - Energy & Power charges : 1212.51 lacs.
  - Chemicals like Alum, Bleaching Powder etc. : 1049.99 lacs.
  - Maintenance and repair : 1170.63 lacs.
  - Wages of operating staff : 2746.41 lacs.
  - Other expenses 33.21 lacs.

21. Implementing Agency : Uttar Pradesh Jal Nigam.

22. Agency Responsible for O&M : Kanpur Jal Sansthan under Kanpur Nagar Nigam.

23. Revenue Generation Proposed for the year 2010:

Percentage of Population to consum prescribed slab of consumption of water	Slab of Proposed consumption of water per month KL		Consumption of water per month (in KL)	Proposed Tarrif (Rs./Kl)	Proposed Revenue Generation per annum (Rs in lacs)
From kanpur City					
80.00	0	3	8004650.40	3.00	2881.67
40.00	3	5	2668216.80	4.00	1280.74
30.00	5	7	2001162.60	6.00	1440.84
20.00	7	8	667054.20	8.00	640.37
10.00	8	10	667054.20	10.00	800.47
From Cantt. board as bulk consumer				10.00	27.01
Total Revenue Generated					**7071.10**

Year 2025

From Kanpur City					
90.00	0	3	14205434.4	3.00	5113.96
40.00	3	5	4209017.6	5.00	2525.41
30.00	5	7	3156763.2	8.00	3030.49
20.00	7	8	1052254.4	10.00	1262.71
10.00	8	10	1052254.4	12.00	1515.25
From Cantt. board as bulk consumer				12.00	431.87
Total Revenue Generated			**23675724.0**		**13879.68**

Year 2040					
From Kanpur City					
100.00	0.0	3.0	24329628.0	4.0	11678.2
40.00	3.0	5.0	6487900.8	6.0	4671.3
30.00	5.0	7.0	4865925.6	9.0	5255.2
20.00	7.0	8.0	1621975.2	12.0	2335.6
10.00	8.0	10.0	1621975.2	15.0	2919.6
From Cantt. board as bulk consumer				15.00	1602.53
Total Revenue Generated			**38927404.8**		**28462.44**

24. Present Revenue Generation (2007-08) 3912.11 lakhs

25. Yearwise expected revenue generation & expenditure

Year	Revenue Generation	Expenditure
2010	7071.10	6212.74
2025	13879.68	13072.78
2040	28462.44	24605.83

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Water Supply for Remaining part of Kanpur City may be accorded technical clearance at an estimated cost of Rs. 37778.92 lacs as per following break-up:

Rs. in Lacs.

Sl No.	ITEM	Cost appraised by State Govt.	As recommended by CPHEEO
Cl	C2	C4	C5
A	Civil Works.		
1	Head and cross regulator at Canal intake and raw water sump cum pump house.	28.21	28.21
2	Raw water pump house.	117.64	58.82
3	Raw water rising main(PSC pipe 1400 mm dia.,800 m length)	229.96	112.00
4	Water Treatment plant (200 mld) at Barrage Water works	2888.00	2884.00
5	Water Treatment plant (28.5 mld) at Gujani Water works	470.56	469.68
6	Clear water / Zonal reservoir, pump house, panel room	2349.45	2329.74
7	Estimate of Feeder main		
	i) Clear water feeder mains and cannel conveyance main	5258.98	4745.41
	ii) Road cutting and reinstatement		
8	Land escaping and site development of water works at campus and ZPS	200.00	148.55
9	Distribution system 1045 Km.	4595.22	4341.13
	i) Road cutting	256.35	256.35
	ii) Road reinstatement		
10	R.C.C. OVER HEAD TANKS	2334.45	2334.45
11	Rising main from C.W.R to O.H.T and by pass	109.79	109.79
12	Boundary wall, Approach road & gate etc.	360.00	255.63
13	Buildings		
	i) residential buildings	155.30	155.30
	ii) non residential buildings		
14	Specials T&P	24.00	0.00
15	Leak detection	55.00	0.00
16	Estimate of 16 nos PH and its Rising mains	470.72	470.72
17	Estimate of house connections	2775.97	2775.97
18	Estimate of Rain water harvesting	174.81	0.00
18	Estimate of SCADA System	0.00	1751.00
19	Estimate of three month maintenance	182.35	182.35
	SUB TOTAL CIVIL WORKS	**23036.76**	**23409.10**
	E&M WORKS:		
	Pumping plants.	4891.05	4891.05

Sub -stations and campous lighting	3559.00	3559.00
SUB TOTAL E&M WORKS	**8450.05**	**8450.05**
TOTAL CIVIL E&M WORKS	**31486.81**	**31859.15**
Contingencies @ 2%	629.74	637.18
TOTAL	**32116.55**	**32496.33**
(-) For Proficiency Saving @ 5%	1605.83	1624.82
TOTAL	**30510.72**	**30871.52**
Centage @125%	3813.84	-
TOTAL	**34324.56**	**30871.52**
- Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.	457.66	154.36
TOTAL	**34782.22**	**31025.87**
Power connection and Transmission line	1613.75	1579.75
Head works	25.00	25.00
Road reinstatement	5360.49	5148.30
GRAND Total Rs in lakh	**41781.46**	**37778.92**
SAY Rs in Crore	**417.81**	**377.79**

State Government should ensure the following during the project implementation.

1) Engineer-in-charge for project implementation should ensure that people do not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

2) During the project implementation, land for all the units may be acquired well in advance so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

3) During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the KNN / State Government from their own resources.

4) The design of feeder network may also be re-checked on UNDP branch software and in case any change in the design is observed the same may be intimated to CPHEEO.

5) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

6) The DPR has been framed based on SOR 2008. No cost escalation has been allowed during project implementation period.

7) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

8) The bar chart has been provided in the DPR for project implementation schedule. It is suggested that KNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

9) The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR. Consumer water meter to be provided by K.N.N. from its own funds.

10) The KNN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

11) Air valves and scour valves may be provided at strategic locations in the transmission mains.

12) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

13) The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

14) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

15) The material and equipment to be procured should conform to BIS specifications.

16) Uninterrupted electric power supply must be ensured by KNN for trouble free operation and maintenance of the scheme.

17) KNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

18) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

19) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

20) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD
(Water Supply)

1.	Proposal		DPR of Water Supply Works for Inner Old Area of Kanpur city under JNNURM
2.	Name of District / State		Kanpur, Uttar Pradesh
3.	Name of city		Kanpur
4.	Objectives		To augment and strengthen water supply system of City of Kanpur as per CPHEEO/JNNURM norms .
5.	Whether CDP is prepared		Yes
6.	Background	:	Kanpur, the largest city in Uttar Pradesh with 2001 census population of 2715555, is growing at a faster pace and is a major town of industrial, commercial and institutional activities. Kanpur is situated at 80^0 21' North latitude and 26^0 28' East longitude and is spread over 260 sq Km area. The U.P. Jal Nigam has prepared the DPR to augment and stregthen the Water Supply system in the Inner Old area of Kanpur City.
7.	Present Status	:	As per the Master Plan of Water Supply for Kanpur city, the city has been divided into four water supply districts which has been further divided into 110 wards. Based on the system of water supply, developments and topographical conditions, the salient features are detailed below:-

S. No.	District	No. of Wards	Source of Drinking Water
A.	City Service District	51	1. River Ganga (120 mld) and Lower Ganga Canal (68 mld) are the basic source. Water Works is at Benajhabar situated in the district. Besides this, 23 mld tube well water in supplied to this district.
B	West Service District	14	River Ganga (200 mld) is the main source of drinking water WTP is already existing near Barrage. Besides, 18 mld water is supplied from tube wells.
C	East Service District	23	Tube wells are the basic source (62 mld).
D	South Service District	22	Tube wells (32 mld) & Lower Ganga Canal (12 mld) are the basic source. Surface water treatment plant

			at Gujaini.
E.	Cantonment		Water supply of Cantonment is maintained by Cantonment Board and not by Kanpur Jal Sansthan. Basic source of water supply are tube wells. However, 6 mld is given by KJS.
	TOTAL	**110**	

8. **Water availability** : (Existing water supply details)
   - Total production(MLD) : 427 (River & canal : 295, Tubewells : 132)
   - Water supplied at consumers point (mld) 299
   - Per capita (lpcd) : 97 for a population of 30.8 lacs at present.
   - UFW : 30%

9. **Population**	-	**Kanpur City**	**Project Area (Under Present DPR.)**	**Remaining City (To be covered in next DPR)**
- As per 2001 Census	:	2715555	1680651	1034904
- Population - 2007	:	3080000	1900000	1180000
- Base year – 2010	:	3420000	2100000	1320000
- Intermediate year - 2025	:	5390000	2700000	2690000
- Design year – 2040	:	8310000	4500000	3810000
10. **Water Demand (Mld) @ 150 lpcd + 15% losses.**				
i. Base year – 2010	:	590.00	362.25	227.75
II. Intermediate year-2025	:	930.00	465.75	464.25
ii. Design year – 2040	:	1432.00	776.25	655.75

11. **Need of the Project** : Kanpur water works was established in the year 1892 at Benajhabar taking raw water from river Ganga through Bhaironghat intake. In the year 1920, due to change in course of river Ganga and its shifting to other side, a channel of about 5.4Km was constructed from lower Ganga canal to Benajhabar water works to arrange an alternative surface source.

Further, several minor improvements have been done in the water works and tube wells have been constructed in piece meal to cover new developed localities.

Master plan for the water supply of town was prepared in seventies, accordingly the entire town has been divided in four water supply Districts.

In the year 1990, water supply of East service district has been rehabilitated under Indo-Dutch Mission by tube wells.

In the year 1994, a rapid gravity filter unit of 200 mld has been added at Benajhabar water works to replace the old slow sand filters.

In the year 2002, a new water works of 28 mld has been constructed at Gujaini to strengthen the south service district by using surface through lower Ganga canal.

The average annual rate of depletion is about 1.47 mts. Hence, to avoid harnessing of ground water, dependence on tube wells is not feasible.

In the year 2005, Barrage has been constructed at the upstream of river Ganga to divert it to its original course and to ensure raw water supply demand of 1600 mld for the design year 2040 of whole Kanpur city. At the Barrage site, a new WTP of 200 mld has been constructed in 2005 to feed the western service district.

Presently, against a requirement of 554 mld of water for the year 2007 for population of about 30.80 lacs, the total water production in the city is about 427 mld, from the three water works and 132 nos. tube wells at rate of 97 lpcd. Thus, water production is inadequate for the present demand as per the CPHEEO norms i.e. 150 lpcd +15% UFW considering 30% losses in the system.

Need for extensive reorganization of the distribution network and its extension to the newly developed localities.

Need for isolation of the feeder mains / rising mains from the distribution lines.

Need for renovation of Zonal pumping station and segregation of zones to ensure equitable distribution of water and to ensure operation of the zonal pumping stations at desired efficiency.

Need for loss and leakage prevention to reduce the quantum of un-accounted for water and replacement of old and out lived pipe lines which, at certain places, are even responsible for contamination of water supply.

Need for augmentation of storage capacity in different zones as the same is inadequate compared to CPHEEO norms.

No major water supply works has been taken up in the City Service District in the past 50 years. The city service district and part of South Service District are having very old pipe networks, pumping plants and other infrastructures.

This area requires major renewal and rehabilitation works, accordingly this project has been prepared for the inner old area of Kanpur city by covering 67 wards out of 110 wards of the city.

12. **Proposed Scheme** - Under the above Mission, to update the infrastructure of Water Supply System of Kanpur city it has been divided in to two parts. In the first part the Inner Old Area of Kanpur City has been considered. The project namely “Kanpur Water Supply Scheme Through Ganga Barrage For Inner Old Area of Kanpur City” amounting to Rs. 377.57 crores has been prepared with the consideration to take up to the renewal works of inner old area part of city in first priority in compliance with instruction of the Commissioner, Kanpur Division, Kanpur along with a resolution by Kanpur Nagar Nigam.

To improve the water supply of the remaining parts of city, a separate D.P.R. will be prepared and submitted within this financial year.

The total requirement of water for the project area in the year 2007 is 350.48 mld against available 225 mld water.

The project components includes civil constructions like Raw water Pump House, water treatment plant, service reservoirs, laying of feeder mains, rising mains and distribution mains along with electrical mechanical components like pumping plants, for existing and proposed treatment works. The main components proposed are as under:

- Raw Water Pump House at Ganga Barrage up to mid stage (2025).
- Raw Water Rising Main (1400 mm PSC pipe)
- Water Treatment Plant 200 MLD
- Clear Water reservoir and Pump House at WTP - 4400 KL
- Clear Water Feeder Mains (47 Km)
- Service Reservoirs (CWR/OHT) -39 CWR's and 16 OHT's, out of 39 CWR's 26 are existing & 13 are proposed.
- Rising Main from CWR to OHT 300 mm 500 mm- D.I. K-9 pipe.
- Strengthening of distribution network .
- Renovation works of Benajhabar Water Works (200 mld & 80 mld)
- Renovation of Bhaironghat Raw Water Pumping Plants
- Leak Detection Works
- Building Works :- Sub Station -41, Workshop-1, Residence Type-I -12 Nos (at WTP) and Guard rooms for ZPS- 36 Nos.
- Miscellaneous Works like Boundary wall & Approach Road etc.

13. Proposed Source — The source proposed for present project is river Ganga at newly constructed Ganga Barrage.

14. Estimated cost (Proposed) (Rs. in lakhs) : Rs. 27094.89 lakhs

Component-wise break-up of cost estimate.

(Rs. in lacs.)

CIVIL WORKS:

- Raw Water Pump House	353.40
- Raw Water Rising Main(1400mm dia, 800 m)	112.00
- Water Treatment Plants (200 MLD)	2860.00
- Feeder Mains (200mm dia to 2000mm dia -48 Km.)	6028.43
- Rising Main D.I. K-9 (300 mm to 500 mm dia)	52.36
- CWR at WTP-1 No. (4400KL)	196.72
- CWR at ZPS-39 Nos. (500 to 3900 KL)	3285.43
- O.H.T. -16 Nos. (800 to 2400 KL)	1397.64
- Distribution Mains (100mm to 600mm Dia - PVC & AC -700 Km.)	4294.66
- Renovation works:	
(A) Civil works:- Existing filter beds, Existing Settling tanks, Existing clariflocculators, Existing CWR, Existing chlorinating plants.	790.18
(B) E&M works:- Existing raw water pumping plants of Bhaironghat pumping station, Existing clear water pumping plants of Benajhabar WTP.	225.00
- Building Works :- Sub Station -41, Workshop-1, Residence Type-I -12 Nos (at WTP) and Guard rooms for ZPS- 36 Nos.	343.65
- Boundary wall, approach road & Gate.	344.64
- Leak detection equipments.	64.35
E&M WORKS:	
- Raw water pumping station:	
a. Pumping plant	266.50
b. Sub-station	264.00

	- Clear water pumping station:	
	a. Pumping plant	420.00
	b. Sub-station	357.00
	c. power connection	165.00
	- Zonal pumping stations (39 Nos.):	
	a. Pumping plant	1916.24
	b. Sub-station	1741.54
	c. power connection	700.00
	Sub Total	**26178.74**
	Contingency Charges @ 3%	785.36
	Sub total	**26964.00**
	- *Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.*	130.89
	Grand Total	**27094.89**

10. Cost for Consideration and approval — **Total Project Cost Rs. 27094.89 lakhs**

PER CAPITA COST OF THE PROJECT

	Year 2010	Year 2025	Year 2040
Per capita cost (in Rs)	1290.23	1003.51	602.11

11. Sharing Pattern		Share	Rs. (in Lacs)
	GOI	50 %	13547.45
	State Govt.	20 %	5418.98
	KNN	30 %	8128.47

12. Financial Phasing	**GOI Share**	**Rs. 13547.45 lacs**	
	Year 2007-2008	20 %	2709.49
	Year 2008-2009	40 %	5418.98
	Year 2009-2010	40 %	5418.98
	State Share	**Rs. 5418.98 lacs**	
	Year 2007-2008	20 %	1083.80
	Year 2008-2009	40 %	2167.59

	Year 2009-2010	40 %	2167.59
	KNN Share	**Rs 8128.47 lacs**	
	Year 2007-2008	20 %	1625.67
	Year 2008-2009	40 %	3251.40
	Year 2009-2010	40 %	3251.40

13. Period of Implementation : 36 months

14. Implementing Agency : U.P JAL NIGAM

15. Annual O&M Expenditure :

- Existing (year 2006) : 3619.91 lacs.
- Proposed (year 2010) : 5529.98 lacs.
  - Energy & Power charges : 1784.67 lacs.
  - Chemicals like Alum, Bleaching Powder etc. : 313.17 lacs.
  - Maintenance and repair : 813.35 lacs.
  - Wages of operating staff : 2625.61 lacs.
  - Other expenses 26.20 lacs.

16. Agency Responsible for O&M : Kanpur Jal Sansthan under Kanpur Nagar Nigam.

17. <u>Proposed Tariff & Revenue Generation:</u>

Proposed Tariff & Revenue Generation is based on Telescopic basis considering that 80% population will pay water charges at the initial stage 90% population will pay at middle stage and 100% population will pay the water charges at the ultimate stage with the provision that those who consume more water will pay more at higher rate compared to those who consume less water and pay lesser at subsidized rates.

Year.	**Projected Population of the city**
2010	3420000
2025	5390000
2040	8310000

Revenue Generation Proposed for the year 2010:

Percentage of Population consuming water in prescribed slab of consumption.	Slab of Proposed consumption of water per month	Consumption of water per month (in KL)	Propose d Tarrif (Rs./Kl)	Proposed Revenue Generation per annum (Rs in lacs)
80.00	3 KL	8208000.00	2.00	1969.92
60.00	3-5 KL	2052000.00	4.00	984.96
40.00	5-7 KL	2736000.00	6.00	1969.92
20.00	7-8 KL	1026000.00	8.00	984.96
10.00	8-10 KL & above	513000.00	10.00	615.60
Total		**14535000.00**		**6525.36**

Revenue Generation Proposed for the year 2025:

90.00	3 KL	14553000.00	3.00	5239.08
60.00	3-5 KL	3234000.00	6.00	2328.48
40.00	5-7 KL	4312000.00	9.00	4656.96
20.00	7-8 KL	1617000.00	12.00	2328.48
10.00	8-10 KL & above	808500.00	15.00	1455.30
Total		**24524500.00**		**16008.30**

Revenue Generation Proposed for the year 2040:

100.00	3 KL	24930000.00	4.00	11966.40
60.00	3-5 KL	4986000.00	8.00	4786.56
40.00	5-7 KL	6648000.00	12.00	9573.12
20.00	7-8 KL	2493000.00	16.00	4786.56
10.00	8-10 KL & above	2077500.00	20.00	4986.00
Total		**41134500.00**		**36098.64**

18. Present Revenue Generation — 3078.80 lakhs

19. Present Expenditure — 2835.42 lakhs

20. Yearwise expected revenue generation & expenditure

Year	Revenue Generation	Expenditure
2010	6525.36	5529.98
2025	16008.30	12509.51
2040	36098.64	21137.02

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Water Supply for Inner Old Area of Kanpur City may be accorded technical clearance at an estimated cost of Rs. 27094.89 lacs as per following break-up:

Rs. in Lacs.

S.No.	Component	Cost as per Proposed DPR	As recommended by CPHEEO
	CIVIL WORKS:		
1.	Raw Water Pump House	353.40	353.40
2.	Raw Water Rising Main(1400mm dia)	114.72	112.00
3.	Water Treatment Plants (200 MLD)	2860.00	2860.00
4.	Feeder Mains (200mm dia to 2000mm dia)	9504.56	6028.43
5.	Rising Main D.I. (300 mm to 500 mm dia)	56.79	52.36
6.	O.H.T. (16 Nos.- Total capacity 27000 KL)	1397.64	1397.64
7.	CWR at WTP (4400KL)	196.72	196.72
	CWR at ZPS (39 Nos. Total capacity 66650 KL)	3285.43	3285.43
8.	Distribution Mains (100mm to 600mm dia)	4474.06	4294.66
9.	Renovation works:		
	(A) Civil works:- Existing filter beds, Existing Settling tanks, Existing clariflocculators, Existing CWR, Existing chlorinating plants.	790.18	790.18
	(B) E&M works:- Existing raw water pumping plants of Bhaironghat pumping station, Existing clear water pumping plants of Benajhabar WTP.	225.00	225.00
10.	Building Works :- Sub Station -41, Workshop-1, Residence Type-I -12 Nos (at WTP) and Guard rooms for ZPS- 36 Nos.	343.65	343.65
11.	Boundary wall, approach road & Gate.	344.64	344.64
12.	Leak detection	64.35	64.35
	E&M WORKS:		
13.	(A) Raw water pumping station:		

	a. Pumping plant	281.50	266.50
	b. Sub-station	264.00	264.00
	(B) Clear water pumping station:		
	a. Pumping plant	435.00	420.00
	b. Sub-station	357.00	357.00
	c. power connection	165.00	165.00
	(C) Zonal pumping stations (39 Nos.):		
	a. Pumping plant	1968.89	1916.24
	b. Sub-station	1741.54	1741.54
	c. power connection	700.00	700.00
	Sub Total	**29942.07**	**26178.74**
14.	Contingency Charges @ 3%	898.00	785.36
	Sub total	**30822.00**	**26964.00**
	Administrative & other expenses @ 5%	1541.00	-
	Training capacity building @ 5%	1541.00	-
15.	*Supervision Charges @ 12.5%*	3853.00	-
	Sub Total	**37757.00**	**26964.00**
16.	*Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5%*		130.89
	Grand Total	**37757.00**	**27094.89**

State Government should ensure the following during the project implementation.

1) Based on the discussion with UP Jal Nigam officials, it has been concluded to keep the city water supply based on surface as well as ground water source rather than entirely switching over to the surface based system which would be a costly proposition. This would further add to the reliability of the system. However, in the inner old area, the existing tube wells are very less in number (22 Nos.) and space is also not available for further tube wells. Moreover, it would add to recurring expenses in terms of O&M. That is why inner old area is entirely based on surface source.

2) Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and

implementation should be duly planned well in advance to avoid any water scarcity to the people.

3) During the project implementation, land for all the units may be acquired well in advance so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

4) During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the KNN / State Government from their own resources.

5) The design of feeder network may also be re-checked on UNDP branch software and in case any change in the design is observed the same may be intimated to CPHEEO. Further, the efforts may be made during execution to break feeder network in 2-3 suitable parts, if land is available, to ensure equitable distribution and better control over the system.

6) The rates adopted in the estimation of DPR, is of year 2005 with price escalation at rate of 10% per annum equating to 2007 with due approval of competent authority of the project. However, it has been restricted to @ 6% per annum to 2 year equating to 2007 price level. However, no escalation is allowed during the project implementation period.

7) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

8) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

9) The bar chart has been provided in the DPR for project implementation schedule. It is suggested that KNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

10) The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR.

11) The KNN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

12) Air valves and scour valves may be provided at strategic locations in the transmission mains.

13) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

14) The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

15) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

16) The material and equipment to be procured should conform to BIS specifications.

17) Uninterrupted electric power supply must be ensured by KNN for trouble free operation and maintenance of the scheme.

18) KNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

19) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

20) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

21) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development

1.	Proposal	:	**Sewerage Works for city of Lucknow – Sewerage District-1.**
2.	Name of State	:	Uttar Pradesh
3.	Name of City	:	**Lucknow**
4.	Objectives	:	a. To provide Sewerage facility in Sewerage District-1 in a comprehensive manner, out of four sewerage districts of Lucknow city. b. To collect, convey & treat the sewage and disposal as per PCB standards.
5.	Whether CDP is prepared	:	Yes
6.	Background	:	Lucknow, the capital city of Uttar Pradesh, is also a city of historical and cultural importance. It is also developing industrially with several industries. It is considered a Centre of education in the region. Due to all these factors, Lucknow is facing rapid urbanization. With the rapid urbanization, there is an urgent need to cover sewerage facilities to the entire population of Lucknow, for promoting environmental hygiene and to prevent pollution of local water bodies and river Gomati.
7.	Present Status	:	The existing sewerage system in Lucknow is available only in about 40% of the core city area. The newly developed areas such as Gomti Nagar, Indira Nagar, Jankipuram etc., do have the sewerage facilities but not treatment facilities. Overall, 30-35% of Lucknow is sewered but there was no treatment facility. Under the Gomati Action Plan of NRCD, MoEF, a 42 MLD Sewage Treatment Plant was set up at Daulat Ganj which operates on the concept of intercepting Nallah sullage and diverting them to STP. The present proposal is to sewer the area of Sewerage District-1 and bring the sewage to Daulat Ganj STP of 42 mld which at present is working based on lifting sullage from nearby drains. Thus, to utilize the STP in most desired manner. Another 345 MLD STP has been sanctioned under NRCD for which the land acquisition is said to be in progress. Under sewerage district-III & IV it is

			proposed to lay sewer lines under JNNURM so that sewerage system can function efficiently along with 345 mld STP.	
8.	Need of the Project	:	The basic service of Sewerage System network needs to be extended to all developed areas of the city. Though some STPs have been set up / proposed under Gomati Action Plan of NRCD, they will be ineffective unless sewerage network is developed all over the city area and entire sewage is captured and conveyed to the said STPs. Accordingly, UP Jal Nigam has prepared a Sewerage Master Plan for Lucknow Nagar Nigam (LNN) in 2005. Under this Master Plan, sewerage network will be development /augmented in all the areas of the city and the sewage will be transported to various STPs (existing / proposed) under JNNURM with proper integration with the facilities already developed or proposed under Gomati Action plan of NRCD. Under present proposal sewers in sewerage district-1 has been proposed which would function in integration with existing 42 MLD STP at Daulatganj.	
9.	Area of the city		338.17Sq. Km. (total including Cantonment), 310.69 sq.Km.(LNN)	
10.	Details of area coverage		Lucknow city	Sewerage District-1 (Project Area)
	Total area		310.69 Sq. Km.	35.00 Sq. Km.
	Sewered area		59.72 Sq. Km.	6.00 Sq. Km.
	Area to be sewered under the project		250.97 Sq. Km.	29.00 Sq. Km.
11.	Balance area to be sewered (excluding the proposed area of sewerage district-1 under present DPR)		215.97 Sq.Km (proposed under separate DPRs)	Nil
12.	Population	:	Lucknow city	Sewerage District-1 (Project Area)
	Census 2001		21,85,927	1,66,700
	Base Year 2010		28,03,000	2,87,335
	Inter'Year 2025		42,43000	4,48,634
	Design Year 2040		64,22,000	5,65,069
13.	Sewage contribution		120 lpcd 2% is added towards infiltration	
14.	Sewerage Generation (MLD)	:	Lucknow city	Sewerage District-1 (Project Area)

	Base Year 2010		344 MLD		36 MLD	
	Inter'Year 2025		519 MLD		55 MLD	
	Design Year 2040		787 MLD		70 MLD	
15.	Existing Sewerage System In Sew Dist-1		U km of sewerage network Pumping Stations _ Nil STP of total capacity – 42 MLD (existing)			
16.	STPs (MLD)		Required	Existing		Proposed
	2025		520	42 MLD existing & 345 under implementation with NRCD.		133 (14 mld proposed under present DPR and remaining 119 mld to be proposed in subsequent DPRs)
	2040		793	Balance 273 mld to be provided later on after 2025.		
17.	Project Components of proposed DPR	:	(1) Gravity Sewer Network – 337.00 Km (2) Rising Main – 0.05 Km (3) Construction of new Sewage Pumping Stations – 1 No. (4) Construction of New Sewage Treatment Plant – 1 No.-14 mld			
18.	Estimated Cost (proposed)	:	Rs. 27756.82 lakh including centage Rs.23622.82 lakh (with 3% contingencies only and without 12.5% state centage)			
19.	Period of implementation	:	36 months			
						(Rs in lakh)
20.	Funding pattern GOI: GoUP: ULB	:	GoI	GoUP	Lucknow Nagar Ni.	Total
			50%	20%	30%	100%
	As proposed		11811.41	4724.56	7086.85	23622.82
	As approved (after deduction of lump sump etc.)		11811.41	4724.56	7086.85	23622.82
21.	Financial Phasing	:	2007-08, 2008-09, 2009-10,2010-11 given below:			

(Rs in lakh)

Year	GoI	GoUP	LNN	Total
2007-08	1489.25	595.70	893.55	2978.50
2008-09	3803.50	1521.40	2282.10	7607.00
2009-10	4510.30	1804.12	2706.18	9020.60
2010-11	2008.36	803.34	1205.02	4016.72

22.	Ownership of Project	:	Lucknow Nagar Nigam
23.	Implementing Agency	:	U.P.Jal Nigam
24.	Annual O & M Expenditure (Rs. lakh)	:	
	Existing		Rs. 286.47 lakh for all operations of existing STP in the district-1 by UPJN.
	Proposed		For Proposed Project components – Rs. 171.47 Lakh (Sewer lines and proposed 14 mld STP)
25.	Agency Responsible for O&M	:	Lucknow Nagar Nigam
26.	Sewage Cess		Existing and proposed given in Table below.

(Rs. In lakh)

Item	For assets existing in 2006-07	For assets created as per DPR	Total Estimated Operation & Maintenance expenditure during the year 2010-11 (4=2+3)
1	2	3	4
Establishment	57.66	3.43	61.09
Chemicals	0.71	0.90	1.61
Maintenance	105.50	76.91	182.41
Electricity	122.60	90.32	212.92
Total	286.47	171.56	458.03

Proposed Tariff (Associated percentage of W/S tariff) and revenue

% consumption in slab	Slab	Qty. of water supply (in KL)	Waste water generation (in KL)	Proposed rate of water supply (Rs per KL)	Proposed Revenue from water supply (in lakh)	Extra percentage to be levied with respect to W/S tariff of 50% for O&M of sewerage system
10	0-3 KL	4412	3600	3.50	56.36	28.18
50	3-5 KL	22059	18000	6.00	483.09	241.54

30	5-10 KL	13235	10800	8.00	386.46	193.23
10	>10 KL	4412	3600	10.00	161.04	80.53
Total		44118	36000	-	1086.86	543.48

On the above proposed tariff, the scheme will be self sustainable.

27.	Revenue Generation (Rs.Lakh)	:	
	Existing		Not identified separately as sewerage cess is merged with property tax since 2003-04.
	Proposed		Upon implementation of user charges as proposed, Rs. 543.48 lakh for the year 2010-11.
28.	Estimated Cost for Consideration & approval	:	**Rs. 23622.82 lakh**

CPHEEO's Comments on DPR :

1. **The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line, which is often not easy to carry out in the field. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution.**

2. The population projection for the design year 2040 has been made considering the decadal growth during 1951-2001 using methods indicated in the Manual on Water Supply & Treatment and is in order.

3. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

4. The water supply availability in the project area will be 150 LPCD as stated by LNN **(separate DPR is proposed for WS augmentation)**, which is the required standard for providing sewerage facilities as per the Manual.

5. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

6. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

7. The sewer system for Lucknow has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

8. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 11.30 meters in a small stretch of 1.5 Km or so while passing of sewer through ridge area.

9. The distance between manholes has been considered as per guidelines values given in the Manual on Sewerage and Sewage Treatment.

10. Wherever it is warranted, drop manhole arrangements have been made for the following :-
    - to convey the sewage to the manhole without splashing
    - to minimize the scour action
    - Safety of the personnel entering the manhole.

11. Considering the capital cost, the durability and availability of the pipes, RCC pipes NP-3 & NP-4 as per BIS Standards have been proposed. NP-4 pipes have been proposed wherever depths are more than 6.0 m, as per proper design.

12. The life of pumping equipment is considered as 15 years.

13. The required STP capacity for 2025 is 520 MLD. An STP of 42 MLD is already existing and another STP of 345 MLD is already sanctioned by NRCD and under implementation. Augmentation of the existing STP in the district-1 by 14 MLD is proposed in present project. Balance STP requirement of 119 MLD is proposed under sewerage districts No. 2 & 4. Thus, STP capacity requirement for 2025 will be fully provided once all four sewerage districts are covered under JNNURM.

14. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system and the sewerage system to be installed in future so that there is no replication of work/components.

15. It has also been mentioned that LNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

16. The BAR Chart and implementation Schedule have also been enclosed.

17. LNN has informed that all the capital investment will be grant-in-aid from Govt. of India, Govt. of Uttar Pradesh and loans availed by LNN / Lucknow Jal Sansthan.

18. LNN has prepared the DPR in detail with proper input data. The cost estimate has been prepared based on the detailed quantity survey and

rates considered as per current SOR of 2007. For non-SOR items, market rates have been considered.

19. The cost estimates have been firmed-up to 2007 price level and no cost escalation shall be admissible during the implementation period. If at all there is any cost escalation, the same shall met by LNN / Govt of Uttar Pradesh.

20. As the DPR for providing sewerage system in Lucknow has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at The DPR may be accorded technical clearance at an estimated cost of Rs. 236.22 crore as detailed below in the table. The State Government and Lucknow Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

APPROVED COST ESTIMATE

Rs in LAKH

Sl.No	**Components**	**As per the Proposed DPR**	**As recommended by CPHEEO**
Civil Works			
1.	Cost of Trunk, Lateral & Branch Sewers	27465.00	21816.49
2.	Cost of Pumping Station and Rising Main	171.40	171.40
3.	Cost of 14 mld STP	547.60	424.12
E&M Works			
4.	Cost of Pumping Station and its connected accessories	234.49	198.17
5.	Cost of 14 MLD additional works	205.60	205.60
6.	Cost of Genset	85.50	69.50
7.	Cost of Substation	49.50	49.50
	Sub-total	**33934.90**	**22934.78**
	3% contingencies	1018.05	688.04
	Training, Capacity building, IEC (5%)	873.82	
	Administrative Expenses (5%)	873.82	
	Supervision charges (12.5%)	4369.12	
	Total	**41069.71**	**23622.82**
	Say	**411.00 crore**	**236.22 crore**

PER CAPITA COST OF THE PROJECT

	Year 2010	**Year 2025**	**Year 2040**
Per capita cost (in Rs.)	8221.35	5265.50	4180.52

General Comments for Project Implementation:

- Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing

velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

- Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

- While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

- Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by LNN for record.

- Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

- While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

- All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

- The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

- LNN may explore the possibility of various treatment options including the proposed one and cost effective treatment option may be adopted based on the cost economics. LNN may float tenders accordingly. LNN / State Govt. may explore the possibility of providing cost effective, less power intensive treatment facilities with less recurring cost and also recover revenue from the bye product for sustainable O&M and suitable to local condition.

- LNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

- Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

- A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

- The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by LNN to this Ministry regularly for perusal and record.

- A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

- Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

- All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

- An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

- The project has been approved with price level of 2006-07, without price contingencies during the implementation period. Cost Escalation, if any, shall be met by LNN / Govt of Uttar Pradesh.

- The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

- All possible efforts may be made to involve Public-Private-Partnership in O&M of STPs and other components of project.

- No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development (Solid Waste Management)

➢ Proposal	Municipal Solid Waste Management in Lucknow City
➢ Name of District / State	Lucknow, Uttar Pradesh
➢ Name of City	Lucknow
➢ Objectives	To make an efficient solid waste management system in Lucknow in compliance with MSW Rules 2000
➢ Whether CDP is prepared	Yes
➢ Background	Lucknow Nagar Nigam (LNN) has appointed Regional Center for Urban and Environmental Studies (RCUES) to make a Detailed Project Report for formulating an integrated municipal solid waste management system for Lucknow meeting the requirements of MSW Rules, 2000.
➢ Present Status of MSW	Presently, Lucknow has a population of 2490127. It is spread over area of 247.7 square kilometers. The length of roads is about 2907 kilometers. There are 303 open dumps, 58 dhalao and 39 bins/DP container spread all over city for collection of municipal solid waste. LNN carries out the work of MSW Management in Lucknow. It has 110 wards and has about 4705 Safai Karamcharis. It has a fleet of close to 152 vehicles of different type/age to carry out the MSWM activity. The waste in the city is being dumped at 3 sites 12 to 13 kilometers away from the city. The present Municipal Solid Waste Management in Lucknow is not meeting the MSW Rules, 2000. It lacks segregation at source, door to door collection system, primary and secondary waste storage facility and the waste transportation system. Moreover, waste is being dumped in unscientific manner. The present status is reflected by the dumping of garbage on road sides and open dumps, nallahs and storm water drains in Lucknow.
➢ Need of the Project	The deteriorating situation of solid waste management reflects clearly in the streets/roads of Lucknow. This along with requirement as per law is

to have a system in compliance with MSW Rules, 2000 into place, at the earliest and has necessitated this activity.

➢ Proposed Municipal Solid Waste Management Plan for Lucknow	➢ Source Segregation is proposed to be implemented through a two bin system – one for bio-degradable and the other for recyclables. It is also proposed to make it mandatory for citizens to segregate waste. ➢ Primary Collection is proposed to be implemented door-to-door through cycle rickshaws. The rickshaws will have separate bin system for bio-degradable and recyclable waste stream. There is a proposal to involve NGO/private operator for O&M in primary collection. ➢ It is proposed that existing ragpickers shall be made part of the MSW management and this sector shall be formalized through NGOs/ CBOs. Primary waste collectors (mostly ragpickers) will be allowed to sell the recyclables in the market. ➢ Waste collected by street sweepers is proposed to be collected in wheelbarrows. ➢ Secondary Storage will be through the use of Refuse Collector bins of 0.6 cum and 1.1 cum and dumper placer containers of 3.5 m3 and 4.5 m3 capacity. These bins/dumper containers are suitably placed at strategic locations in each sector/colony depending on available area for placement of these bins. ➢ Biodegradable waste collected from the households and non-biodegradable waste collected by street sweeping will be dumped in the respective bins/dumper placer containers placed at the secondary collection location. ➢ Twin Litter bins are also proposed to be installed at public places like parks, institutional areas and so on. ➢ Manual handling has been avoided at all stages of waste transportation. The refuse collector bins will be hydraulically lifted for emptying into the refuse collector trucks. Dumper placer containers will be transported by dumper placer vehicles and their waste will be emptied at the designated facility. Existing vehicles which are in good condition have been used in the proposed plan after due renovation. ➢ Two transfer stations are proposed to economize on waste transportation costs and reduce vehicular traffic in the city area. Waste from the areas situated near the waste treatment and disposal facility site will be transported directly to the facility. For the remaining areas, two transfer stations have been located at the strategic locations. Waste from these areas will be sent to the two transfer stations and from there it will be transported in bigger compactor trucks to the waste treatment and disposal facility site. ➢ A Compost Plant is proposed to be established for treatment of biodegradable waste. Sanitary Landfill is also proposed to be established for inerts and rejects of compost plant. The O&M of the compost plant and landfill facility will be given to Private Partner in a PPP mechanism.

- Population — In area under the purview of LNN
  - as per 2001 census — 2185927
  - base year (2006) — 2490127
  - design year (2011) — 2817384
- Solid Waste Generation
  - base year — 1198 TPD (as per survey)

Waste Composition	Percentage Waste	Quantity (MT/day)
Bio-degradable	47	567
Recyclable	17	204
Non-biodegradable (Inert)	36	427
Total Waste	100	1198
Per-capita waste generation		481 gms/day/person

  - design year (2011) — 1424 TPD
- Project Components — The requirement of the total waste generation has been worked out in the DPR after a detailed survey of waste generating areas. The requirement of funds for purchase of the equipment for its collection, storage and transportation has been worked out as under:

  - Collection: Rs. 751.51 lacs
  - Storage: Rs. 629.55 lacs
  - Transportation: Rs. 908.13 lacs

Estimation of the cost of the waste to compost and development of an engineered landfill for waste disposal has been evaluated.

- Compost Plant (250 TPD): Rs. 627.78 lacs
- Landfill site (for use for 5 years): Rs. 1250.38 lacs

The compost plant capacity required as per present waste generation is 550 TPD. However LNN is making efforts to revive Asia Bio Energy Plant at Lucknow by entering into a PPP arrangement with some private entrepreneur. This will require 300 TPD compostable waste. In case this plant does not start, LNN may set up an additional plant for 300 TPD based on its own resources.

The land for the Integrated Sanitary Landfill facility, design life of 25 years, is proposed in northern side of Asia Bio Energy Plant at Village *Barawan Kalan*. Presently 21 acres of land is in the possession of the Lucknow Nagar Nigam at the same location and is being used as dumping ground over years. Additional 101 acres of land adjoining to the same is in the process of acquisition and is an extension to the existing dumping ground. The additional land of 101 acres is expected to be acquired within 2-3 months. This land would be more than 20 kilometers from the airport.

Provisions for IEC have been made in the DPR and provision is also made for areas that can be brought under PPP especially door-to-door collection, treatment and disposal of waste.

- Estimated Cost (Proposed)

	Particulars	**Total Outlay Rs. in lacs**
	- Collection	751.51
	- Storage	629.55
	- Transportation to site/plant	908.13
A.	Sub total of above (Collection/Storage/Transportation)	2289.19
B.	Compost plant	627.78
C.	Landfill site (for use during the first 5 years):	1250.38
D.	Contingencies @ 3% on A to C	125.02
E.	**Capital Cost (A+B+C+D)**	**4292.37**

Cost to be reimbursed

F.	Preparing of Detailed Project Report @1.5% of E	64.39
G.	Capacity Building , IEC @ 1.5% of E above	64.39
H.	Efficiency @ 1% of E above	42.92
I.	Innovative Approach @ 1 % of E above	42.92
J.	**Incentives (F+G+H+I+J)**	**214.62**
K.	**Third Party Project Monitoring and Evaluation @ 5% of E above**	**214.62**
L.	**Total Cost of the Proposed Scheme (E+J+K)**	**4721.61**

- Period of Implementation: 13 months from date of sanction
- Implementing Agency: Lucknow Nagar Nigam
- Funding Pattern: The funds yet to be devolved from TFC is as follows:
  2006-07: Rs. 398.88 lacs
  2007-08: Rs. 398.88 lacs

  Therefore, total capital cost required = Rs. 4292.37 Lacs – (Rs. 398.88 lacs+ Rs. 398.88 lacs) = Rs. 3494.61 lacs

  Sharing Pattern

	Share	Rs. in lacs
GOI	50%	1747.30
State Govt	20%	698.92
ULB	30%	1048.38
Total	100%	3494.61

- Financial Phasing
  - 10% of the GOI's share(Rs. 174.73 lacs) and 10% share of State Govt. (Rs. 69.9 lacs) of capital cost to be devolved in the Year 2006-2007
  - 90% of the GOI's share (Rs. 1572.57 lacs) and 90% share of State Govt. (Rs. 629.02 lacs) of capital cost to be devolved in the Year 2007-2008
- Annual O&M Expenditure
  - existing: The expenditure on SWM activity is financed from the funds it receives from the State Finance Commission. The details are as under:

Year	Rs. in crores
2004-05	33.7
2005-06	36.0

The detailed breakup of Rs. 36 crores incurred during 2005-06 is as follows:

	Rs. in Crores (2005-06)
Administration and establishment including salary/wages for Safai Karamcharis	25.6
Workshop	1.8
Diesel	5.0

Equipment/ Machinery	2.6
Others	1.0
Total O&M	36.0

- proposed

	Year	2009	2010	2011	2012	2013
					Rs. in Lacs	
A	Surplus with NNL from H/H	512	524	535	547	559
	and Compost Plant					
B	20% share of Rates/Taxes	820	861	904	949	997
	& Municipal Revenue					
C	Conservancy Tax	1073	1100	1127	1731	2364
D=A+B+C	Total Surplus	2406	2485	2566	3228	3920
E	Expenditure on	2560	2048	1638	1311	1180
	Safai Karamchari					
F	Expenditure on Transportation	680	697	714	731	749
G=D+E	Total Expenditure	3240	2745	2352	2042	1929
H=G-D	Dependency on SFC Funds	834	260	Nil	Nil	Nil

- Agency Responsible for O&M — LNN under PPP for its sub components

- Charge for Solid Waste Management
  - existing — Nil
  - proposed
    - The revenue from house taxes (Rs. 31.2 crores) and municipal revenue other than taxes (Rs. 9.2 crores) aggregated Rs. 41 crores in2005-06. This is likely to part finance the SWM expenditure in future.
    - Conservancy charges can be levied by/from NNL to recover the O&M

costs.

- Surplus from house to house hold collection, compost plant would also fund the SWM expenditure in future.

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for solid waste management for Lucknow city may be considered at and estimated cost of Rs. 3494.61 lacs and subject to following conditions:

PROJECT SPECIFIC COMMENTS.

1. Lucknow Nagar Nigam is in the process of acquiring land for sanitary land fill adjoining to the existing dump site. All efforts should be made by State Govt. to acquire land expeditiously which otherwise would hamper the progress of implementation. However, the funds under the project should be released to State Govt. only after getting land acquisition certificate from State Govt. by NURM Divn.

2. Before start of execution, State Govt. should satisfy itself that the proposed waste treatment / processing plant does not fall within 20 Km radius from the existing airport and if required necessary 'No Objection' certificate be obtained from AAI.

3. The funds already devolved under 12th Finance Commission grants needs to be fully utilized for purchasing the tools and equipments for SWM for which it is meant for and the same should be integrated in the proposed scheme. The remaining funds to be devolved in subsequent years as mentioned under funding pattern should also be integrated with the present scheme and NURM Directorate may take appropriate action in this regard to ensure integration of funds devolved under TFC while releasing the funds under the scheme.

4. The present waste generation in Lucknow is 550 MT. But, in the proposal the capacity of compost plant has been adopted as 250MT only and for remaining 300 MT of waste it has been mentioned that existing Asia Bio-Energy Plant based on Bio-methanation is likely to be revived with help of private entrepreneurs and it will take care of 300MT of bio-degradable waste. In case, the proposed arrangement does not work State Govt. will set up another unit of 300MT capacity compost plant to take care of the bio-degradable waste.

5. In the modified proposal a provision of two transfer stations has been considered based on CPHEEO suggestions to bring efficiency and economy in collection of waste and its transportation to waste disposal site.

6. Based on the scrutiny of the project, the cost of collection, storage and transportation has been increased to Rs. 2289.19 lakhs from Rs. 1844.45 lakhs, to bring efficiency in the collection of waste due to inclusion of provision made for providing bins at households and transfer stations.

7. Sufficient land should be made available for setting up of two transfer stations in the project. Advance action may be initiated in this regard.

GENERAL COMMENTS

8. While implementing the project the MSW Rules (Management & Handling) Rules 2000 may be adhered to.

9. The quality of compost should meet the specification brought out under Fertilizer Control (Amendment) order 2006 by Ministry of Agriculture.

10. Before setting up the waste treatment and disposal facility necessary authorization may be obtained from the State Pollution Control Board (SPCB). The land area earmarked should have No Objection certificate of SPCB.

11. Wherever possible the involvement of community and private sector participation may be encouraged.

12. Wherever required advance necessary steps may be initiated to acquire the land to avoid the delay in implementation of project.

13. It should be ensured by the implementing agency that through enhancement of tariff and by other alternative means the project become viable as far as O & M of project is concerned.

14. Before implementation of project, the need for various components proposed in the DPR needs to be rechecked vis-à-vis the available facility along with the proposed cost estimate in the DPR, and the same may be got approved from the competent authority in the State.

15. In case of change, the same may be immediately referred to CPHEEO for further necessary action.

16. All procured material for SWM project needs to be as per BIS specification.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development

1.	Proposal	:	**Sewerage Works for city of Lucknow – Sewerage District-III (Part-II).**
2.	Name of State	:	Uttar Pradesh
3.	Name of City	:	**Lucknow**
4.	Objectives	:	a. To provide Sewerage facility in Sewerage District-III (Part-II) in a comprehensive manner, out of four sewerage districts of Lucknow city. b. To collect, convey & treat the sewage and disposal as per PCB standards.
5.	Whether CDP is prepared	:	Yes
6.	Background	:	Lucknow, the capital city of Uttar Pradesh, is also a city of historical and cultural importance. It is also developing industrially with several industries. It is considered a Centre of education in the region. Due to all these factors, Lucknow is facing rapid urbanization. With the rapid urbanization, there is an urgent need to provide sewerage facilities to the entire population of Lucknow, for promoting environmental hygiene and to prevent pollution of local water bodies and river Gomati.
7.	Present Status	:	The existing sewerage system in Lucknow is available only in about 40% of the core city area. The newly developed areas such as Gomti Nagar, Indira Nagar, Jankipuram etc., do have the sewerage facilities but not having its treatment facilities. Overall, 30-35% of Lucknow is sewered without having proper treatment facility. Under the Gomati Action Plan of NRCD, MoEF, a 42 MLD Sewage Treatment Plant was set up at Daulat Ganj which operates on the concept of intercepting Nallah sullage and diverting them to STP. A project has been sanctioned under JNNURM for sewerage Distt.-I of an estimated cost of Rs. 236.23 crore for providing sewer network and also additional STP of 14 mld so as to collect / carry and treat sewage upto year 2025 in desired manner as per norms. Besides, the project for District-III (Part-I) with an estimated cost of Rs. 262.16 Crore has also been sanctioned recently on 21.11.2008.

<table>
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<td>Another 345 MLD STP has been sanctioned under NRCD and its construction is in progress. In the present sewerage district-III (Part-II) proposal, it is proposed to lay sewage collection network under JNNURM so that sewerage system can function efficiently and Sewage generated in the area can be treated at upcoming 345 mld STP.

Apart from above, Kukrail IPS and main pumping station at Gwari culvert been undertaken under Gomti Action Plan to divert sullage to treatment plant, so as to treat the same to reduce pollution of river Gomti. The above works have been integrated in the present sewerage proposal of Lucknow to the extent possible.

530 km of sewerage network is existing in the colonies developed by UP Avas Vikas Parishad & LDA for Indiranagar and Gomti Nagar area. Maximum sewer laid in Indira Nagar during 1980 to 1985 and in Gomti Nagar area maximum sewer laid in between 1982 to 1995. Approximately 25 km sewer line is found to be non functional based on survey and O&M records and needs renovation / replacement.
Pumping Stations _

<table>
<tr><th>Description of works</th><th>Upto date status</th></tr>
<tr><td>Pumping Station</td><td>Kukrail IPS – 30% complete

Main PS at Gwari culvert – 90%.comp</td></tr>
<tr><td>Rising main.</td><td></td></tr>
<tr><td>Sewage Treatment Plant</td><td>345 mld capacity at Bharwara under progress.</td></tr>
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<td>8.</td>
<td>Need of the Project</td>
<td>:</td>
<td>The basic service of Sewerage System network needs to be extended to all developed areas of the city.

Though some STPs have been set up / proposed under Gomati Action Plan of NRCD, they will not be properly utilized unless sewerage network is developed all over the city area and entire sewage is captured and conveyed to the said STPs.

Accordingly, UP Jal Nigam has prepared a Sewerage Master Plan for Lucknow Nagar Nigam (LNN) in 2007. Under this Master Plan, sewerage network will be development /augmented in all the areas of the city and the sewage will be conveyed to various STPs (existing / proposed) under JNNURM with proper integration with the facilities already developed or proposed under Gomati Action plan of NRCD.</td>
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9.	Area of the city		338.17Sq. Km. (total including Cantonment falling under Zone-IV), 310.69 sq.Km.(LNN)

10. Details of sewer coverage in Lucknow City

Details of area coverage	Lucknow city	Sewerage Dist-I (already sanctioned)	Sewerage Dist-III (Part-I) already sanctioned)	Sewerage Dist-III(Part-II (under presentation)	Sewerage Dist-II & IV (under preparation)
1	2	3	4	5	7
Total area (Sq.km)	310.69	35.00	105.00	50.00	120.69
Sewered area before start of JnNURM (Sq.km)	94.72	6.00	18.00	26.00	44.72
Balanced area to be sewered under JNNURM (Sq.km)	215.97	186.97 (After commissioning)	104.97 (After commissioning)	80.97 (After commissioning)	NIL (After commissioning)

11.	Population	:	Lucknow city	Sewerage District-III (Part-II) (Proposed project area)	
	Census 2001		21,85,927	3,02,603	
	Base Year 2010		28,03,000	4,65,860	
	Inter'Year 2025		42,43000	7,16,805	
	Design Year 2040		64,22,000	10,59,143	
12.	Water supply		Rate of water supply will be available at 155 lpcd in 2010 as DPR for Lucknow water supply Phase-I Part-I has already been sactioned under JNNURM and is under execution.		
	Sewage contribution		120 lpcd (+) 2% is added towards infiltration		
13.	Sewage Generation (MLD)	:	Lucknow city	Sewerage District III (Part-II) (Project Area)	
	Base Year 2010		344 MLD	57 MLD	
	Inter'Year 2025		519 MLD	88 MLD	
	Design Year 2040		787 MLD	130 MLD	
14.	STPs (MLD)		Required	Existing	Proposed
	2025		519	42 MLD existing &	Remaining 118 mld to be proposed in

				345 under construction through NRCD. 14 mld under construction in Distt-I under JNNURM	subsequent DPRs for remaining Sewerage Districts.
15.	Project Components of proposed DPR District-III(Part-II)	:	**Required** / **Existing** / **Proposed**: Gravity sewer network – 882 km / 530 km already laid by LDA/ Avas Vikas Prisad (150mm to 1600mm) / 352 km (150mm to 1600mm) Rising main – 14.6 km / 11.3 km under GoAP / 3.3 km. (300,350,900 mm) Pumping Station – 5 Nos. / 2 Nos. under construction through GoAP. / 3 No. STP – 88 mld / 345 mld under construction through GoAP. / -		
16.	Period of implementation	:	30 months (Jan. 2009 to June. 2011)		
17.	1)Estimated Cost(Appraised by State Govt. including 12.5% centage)		Rs. 253.79 Crore		
18.	2)Cost Recommended by CPHEEO		Rs.214.43 Crore (Without Centage)		

						(Rs in crore)
19.	Funding pattern GOI: GoUP: ULB	:	GoI	GoUP	Lucknow Nagar Ni.	Total
			50%	20%	30%	100%
		:				
20.	Financial Phasing		107.22	42.89	64.32	214.43

Year	GoI	GoUP	LNN	Total
2008-09(25%)	26.81	10.72	16.08	53.61
2009-10(35%)	37.53	15.00	22.51	75.05
2010-11(25%)	26.80	10.72	16.08	53.60
2011-12(15%)	16.08	6.44	9.65	32.17
Total :	107.22	42.89	64.32	214.43

21.	Ownership of Project	:	Lucknow Nagar Nigam
22.	Implementing Agency	:	U.P.Jal Nigam
23.	Agency Responsible for O&M	:	Lucknow Nagar Nigam / Lucknow Jal Sansthan
24.	Annual O & M Expenditure &Revenue Generation (Rs. lakh)	:	

Sno	Particulars	Year 2010	Year 2025	Year 2040
1	Annual O/M expenditure	365.00	758.81	1577.51
2	Annual Income	929.42	2245.02	5287.15
3	Nett Profit / Loss	(+) 564.42	(+) 1486.21	(+) 3709.64

25.	Sewage Cess		Proposed given in Table below.

Proposed Tariff (sewage cess 50% of W/S tariff)

% consumption in slab	Slab	Proposed rate of water supply (Rs per KL) **Yr--2010**	Proposed rate of water supply (Rs per KL) **Yr--2025**	Proposed rate of water supply (Rs per KL) **Yr--2040**
10	0-3 KL	2.50	4.00	6.50
50	3-5 KL	4.00	6.50	10.00
30	5-10 KL	6.00	9.50	15.00
10	>10 KL	10.00	15.00	25.00

26.	Revenue Generation (Rs.Lakh)	:	
	Existing		Not identified separately as sewerage cess is merged with property tax since 2003-04.
	Proposed		Upon implementation of user charges (50% of water charges) as proposed, Rs. 929.42 lakh for the year 2010-11.

CPHEEO's Comments on DPR :

1. **The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution.**

2. The sewage pumping stations are under construction under Gomti Action Plan with an objective to collect sullage from drains and pump the same to upcoming 345 mld STP at Bharawara. In light of the comprehensive proposal under JnNURM, it would be better to construct the sewage collecting sumps in such a way that it can collect sewage through trunk mains at comparatively higher slope. A copy of modified sump well design / drawing as well as that of trunk mains leading to these sumps may be forwarded to CPHEEO before start of execution.

3. All efforts should be made to connect sewerage system / sewage pumping station from sewerage network only and any connection with drain / nallah to tap waste water / sullage water need to be discontinued while commissioning the project.

4. The population projection for the design year 2040 has been made considering the decadal growth during 1951-2001 using methods indicated in the Manual on Water Supply & Treatment. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

5. The water supply availability in the project area will be 150 LPCD as stated by LNN / UP Jal Nigam **(project sanctioned under JNNURM is under execution)**, which is the required for efficient functioning of sewage facility as per Manual.

6. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

7. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

8. LNN will ensure recycling/reuse of atleast 20% of treated waste water so as to recover part of O&M of scheme.

9. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for

present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

10. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

11. The sewer system for Lucknow has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

12. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 9.25 meters in a small stretch of 0.23 Km while passing of sewer through ridge area. The average depth of cutting of Trunk sewer is kept as 3 to 4m.

13. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 & NP-4 pipes as per BIS Standards have been proposed. NP-4 pipes have been proposed wherever depths are more than 6.0 m, as per proper design. In the original proposal only NP-3 & NP-4 pipes have been proposed. During project appraisal, it has been suggested to adopt 50-60% of lower diameter sewer pipes upto 200mm to be used to NP-2. Accordingly proposal has been got revised.

14. The required STP capacity for 2025 is 520 MLD. An STP of 42 MLD is already existing and another STP of 345 MLD is already sanctioned by NRCD and under implementation. Augmentation of the existing STP in the district-1 by 14 MLD is already sanctioned under JNNURM and is under construction. Balance STP requirement of 118 MLD is proposed under sewerage districts No. 2 & 4. Thus, STP capacity requirement for 2025 will be fully provided once all four sewerage districts are covered under JNNURM.

15. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system and those being implemented under Gomti Action Plan with NRCD funding.

16. It has also been mentioned that LNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

17. The BAR Chart and implementation Schedule have also been enclosed.

18. The cost estimate has been prepared based on SOR of 2007-08 preveling in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by LNN / Govt of Uttar Pradesh.

As the DPR for providing sewerage system in Lucknow has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 214.43 crore as detailed below in the table. The State Government and Lucknow Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

RECOMMENDED COST OF ESTIMATE

(Rs in lacs)

Sl.No	Components wise Project Cost	Cost appraised by State Govt.	As recommended by CPHEEO
A.	**Civil Works**		
1	Supply and laying of NP-2/ NP-3/ NP-4 RCC pipes for Trunk, Lateral & Branch Sewers(excluding road reinst.)	15537.91	14859.18
2	Constt. of Pumping Station	147.06	147.06
3	Supply and laying of Rising Main	255.51	255.51
4	Constt. Of Generator room, Panel room & Staff quarter.	76.64	76.64
5	Constt. Of Boundary wall, site development & hiring of godown at SPS	75.96	75.96
	Sub Total(A) :	**16093.08**	**15414.35**
B.	**E&M Works**		
1	Supply & installation of Pumping plants, generator and arrangement for W/S system at SPS & its connected accessories	529.81	453.92
2	Construction of sub station	128.85	128.85
3	Operation charges for Pumping Plant & Sub station.	11.43	0
	Sub Total(B) :	**670.09**	**582.77**
	Total(A+B) :	**16763.17**	**15997.12**
C	**Contingencies 2% on A+B**	**335.26**	**319.94**
D	*-Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.*	**-**	**79.99**
	Total(A+B+C+D) :	**17098.43**	**16397.05**
E	**Deduct 5% for Nigam Profiency on Total(A+B+C+D) :** (-)	**(-)854.92**	**819.85**
F 1	Reinstatement of road	6177.63	5541.7
2	Shifting of Electric & Telephone cables.	352.13	52.82
3	Provision for crossing of Railway line	100	40.00
4	Transmission line & power connection.	231.6	231.60
G	Training, Capacity building, IEC (1.5%)	243.65	0

H	Centage charges 12.5%	2030.44	0
	Grand Total:	**25378.96**	**21443.32**

General Comments for Project Implementation:

I. Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by LNN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. LNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by LNN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development

1.	Proposal	:	**Sewerage Works for city of Lucknow – Sewerage District-III (Part-I).**
2.	Name of State	:	Uttar Pradesh
3.	Name of City	:	**Lucknow**
4.	Objectives	:	a. To provide Sewerage facility in Sewerage District-III (Part-I) in a comprehensive manner, out of four sewerage districts of Lucknow city. b. To collect, convey & treat the sewage and disposal as per PCB standards.
5.	Whether CDP is prepared	:	Yes
6.	Background	:	Lucknow, the capital city of Uttar Pradesh, is also a city of historical and cultural importance. It is also developing industrially with several industries. It is considered a Centre of education in the region. Due to all these factors, Lucknow is facing rapid urbanization. With the rapid urbanization, there is an urgent need to provide sewerage facilities to the entire population of Lucknow, for promoting environmental hygiene and to prevent pollution of local water bodies and river Gomati.
7.	Present Status	:	The existing sewerage system in Lucknow is available only in about 40% of the core city area. The newly developed areas such as Gomti Nagar, Indira Nagar, Jankipuram etc., do have the sewerage facilities but not having its treatment facilities. Overall, 30-35% of Lucknow is sewered but there was no treatment facility. Under the Gomati Action Plan of NRCD, MoEF, a 42 MLD Sewage Treatment Plant was set up at Daulat Ganj which operates on the concept of intercepting Nallah sullage and diverting them to STP. A project has been sanctioned under JNNURM for sewerage Distt.-I of an estimated cost of Rs. 236.23 crore for providing sewer network and also additional STP of 14 mld so as to collect / carry and treat sewage upto year 2025 in desired manner as per norms. Another 345 MLD STP has been sanctioned under

			NRCD and its construction is in under progress. Under sewerage district-III (Part-I), it is proposed to lay sewage collection network under JNNURM so that sewerage system can function efficiently and Sewage generated in the area can be treated at upcoming 345 mld STP. Apart from above, six pumping stations namely Rooppur Khadra, Mohan Meakings, Daliganj No. 1 & 2, trans Gomti, Kukrail and main pumping station at Gwari culvert related to Nala tapping have been undertaken under Gomti Action Plan to intercept and divert sullage from drains to treatment plant either through gravity or pumping, so as to treat the same to reduce pollution of river Gomti. The above works have been integrated in the sewerage proposal of Lucknow to the extent possible.	
8.	Need of the Project	:	The basic service of Sewerage System network needs to be extended to all developed areas of the city. Though some STPs have been set up / proposed under Gomati Action Plan of NRCD, they will not be properly utilised unless sewerage network is developed all over the city area and entire sewage is captured and conveyed to the said STPs. Accordingly, UP Jal Nigam has prepared a Sewerage Master Plan for Lucknow Nagar Nigam (LNN) in 2007. Under this Master Plan, sewerage network will be development /augmented in all the areas of the city and the sewage will be conveyed to various STPs (existing / proposed) under JNNURM with proper integration with the facilities already developed or proposed under Gomati Action plan of NRCD.	
9.	Area of the city		338.17Sq. Km. (total including Cantonment), 310.69 sq.Km.(LNN)	
10.	Details of area coverage		Lucknow city	Sewerage District-III (Part-I) (Project Area)
	Total area		310.69 Sq. Km.	105.00 Sq. Km.
	Sewered area		94.72 Sq. Km.	18.00 Sq. Km.
	Area to be sewered under the project		215.97 Sq. Km.	82.00 Sq. Km.
11.	Balance area to be sewered (excluding the proposed area of sewerage district- III (Part-I)		133.97 Sq.Km (proposed under separate DPRs)	Nil

	under present DPR)			
12.	Population	:	Lucknow city	Sewerage District-III (Part-I)
	Census 2001		21,85,927	4,77,439
	Base Year 2010		28,03,000	7,09,558
	Inter'Year 2025		42,43000	11,30,121
	Design Year 2040		64,22,000	17,65,143
13.	Water supply		155 lpcd in 2010 and further augmentation proposed to ensure adequate water supply for efficient functioning of sewerage network.	
	Sewage contribution		120 lpcd (+) 2% is added towards infiltration	
14.	Sewage Generation (MLD)	:	Lucknow city	Sewerage District III (Part-I) (Project Area)
	Base Year 2010		344 MLD	87 MLD
	Inter'Year 2025		519 MLD	139 MLD
	Design Year 2040		787 MLD	216 MLD
15.	Existing Sewerage System In Sewerage Dist-III (Part-I)		460 km of sewerage network especially in the colonies developed by LDA/Avas Vikas and Local body. Pumping Stations _	

Description of works	Upto date status
A. Pumping Station and its Rising main.	1. Rooppur Khadra - 90% complete 2. Mohan Meakings- 90% complete 3. Daliganj No.1 – 90%.complete 4. Daliganj No.2 – 90%.complete 5.Trans Gomti PS – 40% complete 6. Main PS at Gwari culvert – 90%.comp. 7. Kukrail IPS – 30% complete
B. Sewage Treatment Plant	345 mld capacity at Bharwara under progress.

16.	STPs (MLD)		Required	Existing	Proposed

	2025		519	42 MLD existing & 345 under construction through NRCD. 14 mld under construction in Distt-I under JNNURM	Remaining 118 mld to be proposed in subsequent DPRs for remaining Sewerage Districts.
17.	Project Components of proposed DPR District-III(Part-1)	:	**Required** / **Existing** / **Proposed** Gravity sewer network – 945 km / 460 km already laid by Local body/LDA/ Avas Vikas Prisad. / 485 km Rising main – 6 km / 3 km under GoAP / 3 km. Pumping Station – 7 Nos. / 6 Nos. under construction through GoAP. / 1 No. STP – 140 mld / 345 mld under construction through GoAP. / -		
18.	Period of implementation	:	24 months (Dec. 2008 to Dec. 2010)		
19.	1)Estimated Cost(Appraised by State Govt. including 12.5% centage)		Rs.325.98Crores		
20.	2)Cost Recommended by CPHEEO		Rs.262.12 Crores (Without Centage)		

						(Rs in crore)
21.	Funding pattern GOI: GoUP: ULB	:	GoI	GoUP	Lucknow Nagar Ni.	Total
			50%	20%	30%	100%
	Recommended by CPHEEO		131.06	52.42	78.64	262.12
		:				
22.	Financial Phasing					

Year	GoI	GoUP	LNN	Total
2008-09(20%)	26.21	10.48	15.73	52.42
2009-10(50%)	65.53	26.21	39.32	131.06
2010-11(30%)	39.32	15.73	23.59	78.64
Total :	131.06	52.42	78.64	262.12

23.	Ownership of Project	:	Lucknow Nagar Nigam
24.	Implementing Agency	:	U.P.Jal Nigam

25. Annual O & M Expenditure &Revenue Generation (Rs. lakh) :

Sno.	Particulars	Year 2010	Year 2025	Year 2040
1(i)	Annual O/M expenditure	646.00	1162.80	2093.04
(ii)	Annuity for repay. of loan	919.53	464.03	00.00
	Total Expenditure	1565.53	1626.83	2093.04
2	Annual Income	1415.49	4071.6	8810.88
3	Nett Profit / Loss	(-) 150.04	(+) 2444.77	(+) 6717.84

26.	Agency Responsible for O&M	:	Lucknow Nagar Nigam
27.	Sewage Cess		Proposed given in Table below.

Proposed Tariff (Associated percentage of W/S tariff) and revenue

% consumption in slab	Slab	Proposed rate of water supply (Rs per KL) **Yr--2010**	Proposed rate of water supply (Rs per KL) **Yr--2025**	Proposed rate of water supply (Rs per KL) **Yr--2040**		
10	0-3 KL	2.50	4.00	6.50		
50	3-5 KL	4.00	6.50	10.00		
30	5-10 KL	6.00	9.50	15.00		
10	>10 KL	10.00	15.00	25.00		

On the above proposed tariff, the scheme will not be self-sustainable in the start , but later on.

28.	Revenue Generation (Rs.Lakh)	:	

	Existing		Not identified separately as sewerage cess is merged with property tax since 2003-04.
	Proposed		Upon implementation of user charges as proposed, Rs. 967.32 lakh for the year 2010-11.
29.	Estimated Cost for Consideration & approval	:	**Rs. 262.12 Crore**

CPHEEO's Comments on DPR :

1. **The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution.**

2. The sewage pumping stations are under construction under Gomti Action Plan with an objective to collect sullage from drains and pump the same to upcoming 345 mld STP at Bharawara. In light of the comprehensive proposal under JnNURM, it would be wiseful to construct the sewage collecting sumps in such a way that it can collect sewage through trunk mains at comparatively higher slope. Accordingly, the diameter of 2600 mm has been allowed to be reduced to 2200 mm and cost has been got modified accordingly. A copy of modified sump well design / drawing as well as that of trunk mains leading to these sumps may be forwarded to CPHEEO before start of execution.

3. The population projection for the design year 2040 has been made considering the decadal growth during 1951-2001 using methods indicated in the Manual on Water Supply & Treatment. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

4. The water supply availability in the project area will be 150 LPCD as stated by LNN / UPJal Nigam **(further augmentation of water supply is proposed)**, which is the required for efficient functioning of sewage facility as per Manual.

5. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

6. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing

the project. Wherever needed damaged pipes may be replaced with new ones.

7. LNN will ensure recycling/reuse of atleast 20% of treted waste water so as to recover part of O&M of scheme.

8. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guideline value of the Manual. The design maximum velocity is kept below 3.0 MPS.

9. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

10. The sewer system for Lucknow has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

11. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 8.50 meters in a small stretch of 0.5 Km while passing of sewer through ridge area. The average depth of cutting of Trunk sewer is kept as 5 to 6m.

12. Considering the capital cost, the durability and availability of the pipes, RCC NP—2, NP-3 & NP-4 pipes as per BIS Standards have been proposed. NP-4 pipes have been proposed wherever depths are more than 6.0 m, as per proper design. In the original proposal only NP-3 and NP-4 pipes have been proposed. During project appraisal, it has been suggested to adopt 50-60% of lower diameter sewer pipes upto 200 mm to be used of NP-2. Accordingly the proposal has been got revised.

13. The required STP capacity for 2025 is 520 MLD. An STP of 42 MLD is already existing and another STP of 345 MLD is already sanctioned by NRCD and under implementation. Augmentation of the existing STP in the district-1 by 14 MLD is already sanctioned under JNNURM and is under construction. Balance STP requirement of 118 MLD is proposed under sewerage districts No. 2 & 4. Thus, STP capacity requirement for 2025 will be fully provided once all four sewerage districts are covered under JNNURM.

14. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing sewerage system and those being implemented under Gomti Action Plan with NRCD funding.

15. It has also been mentioned that LNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

16. The BAR Chart and implementation Schedule have also been enclosed.

17. The cost estimate has been prepared based on current SOR of 2007. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by LNN / Govt of Uttar Pradesh.

18. As the DPR for providing sewerage system in Lucknow has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 262.12 crore as detailed below in the table. The State Government and Lucknow Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

RECOMMENDED COST OF ESTIMATE

(Rs in lacs)

Sl.No	Components wise Project Cost	Cost appraised by State Govt.	As recommended by CPHEEO
A.	**Civil Works**		
1.	Supply and laying ofNP-2/ NP-3/ NP-4 RCC pipes for Trunk, Lateral & Branch Sewers(excluding road reinst.)	20396.07	19484.00
2.	Constt. of Pumping Station	114.00	114.00
3.	Supply and laying of 800 mm dia PSC Rising Main	342.30	342.30
4.	Constt. Of Generator room, Panel room & Staff quarter.	25.55	25.55
5.	Constt. Of Boundary wall, site development & hiring of godown at SPS	26.07	26.07
	Sub Total(A) :	**20903.99**	**19991.92**
B.	**E&M Works**		
1.	Supply & installation of Pumping plants, generator and arrangement for W/S system at SPS & its connected accessories	296.81	268.31
2	Construction of sub station	89.55	89.55
3	Operation charges for Pumping Plant & Sub station.	7.47	-
	Sub Total(B) :	**393.83**	**357.86**
	Total(A+B) :	**21297.82**	**20349.78**
C	**Contingencies 2% on A+B**	**425.96**	**406.997**
	Total(A+B+C) :	**21723.78**	**20785.85**
D	**Administrative Expenses (2%)**	**412.75**	**108.62**
E	**Deduct 5% for Nigam Profiency on Total(A+B+C) :**	**(-)1086.19**	**(-)1039.29**
	Total(A+B+C+D+E) :	**21050.34**	**19856.64**
F	Reinstatement of road	8004.91	6180.70

1			
2	Shifting of Electric & Telephone cables.	486.62	48.66
3	Transmission line & power connection.	166.70	166.70
	Sub Total(F) :	**8658.23**	**6396.06**
	Total(A+B+C+D+E+F) :	**29708.57**	**26252.70**
G	**Training, Capacity building, IEC (1.5%)**	309.56	-
	Total(A to G):	**30018.13**	**26252.70**
H	Centage charges 12.5% on (A+B+C+D)	2579.70	-
	Grand Total:	**32597.83**	**26252.70**
	Say	**32598.00**	**26253.00**

General Comments for Project Implementation:

I. Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by LNN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. LNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by LNN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest .

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO
Appraisal note for Consideration of Central Sanctioning & Monitoring Committee,
Ministry of Urban Development (under JNNURM)

(Storm Water Drainage)

1.	Proposal	Storm water drainage work for Lucknow city
2.	Name of State	Uttar Pradesh
3.	Name of City	Lucknow
4.	Objective	1. To provide drainage facility in Lucknow city in a comprehensive manner to avoid water logging problem. 2. Development of drainage system (separate from sewerage system) in integration with the old drainage system in a holistic manner.
5.	Whether CDP has been prepared	Yes
6.	Background	Lucknow is capital of Uttar Pradesh & is functioning as a centre of religion, trade, commerce and education. It is popular international tourist destination in India. The population of city as per 2001 census is 21.85 lacs, and that of Cantonment Board is 0.59 lacs. At present, Lucknow is covering an area of 337 sq.km. The city is situated on the bank of river Gomti. The highest flood level of River Gomti is 113.2 m (1960) above MSL recorded at Gaughat. Geographical coordinates of the city are 26°30' & 27°.10' North latitude and 80°30' & 81°13' East longitude. The city has major natural existing drains viz. Hyder Canal, Sarkata, Pata, Kukrail & Nagariya all culminating in Gomti River. Average annual rainfall is 1010 mm and average no. of rainy days per annum is 65. It is well connected with Airport, Rail & Road network.
7.	Present Status	Presently Storm water of Lucknow city is being drained off through very old & incomplete/insufficient Kachcha/Pucca open drainage system. With the passage of time, most of the existing drains have been encroached upon or got damaged.

		- The existing drainage system of Lucknow is very typical as the river Gomati passes through the heart of city dividing it into two parts. The city is protected by a 15 km stretch of Flood Protection (FP) Bund on both sides of Gomti River. The average level of the top of FP-Bund is 112.0 m from MSL. General ground profile of the river inside the bund is varying from 99.0m to 103.0 m. These drains cater to about 80% of municipal area. - The Sill Level of Drains culminating in river Gomti is varying from 105 to 107 m from MSL. Almost every year the flood levels in river crosses 106 m level resulting in the closure of the Flood gates. Thus, during the days of gate closure city storm water is pumped out from the existing pumping stations. There are a total of 42 existing pumping stations in Lucknow along river Gomti and major drains like Kukrail Drain & Hyder Canal. - Due to improper/reverse slope, inadequate and improper size of drains including damaged pucca drains at various locations, there is frequent problem of water fogging at various locations in the city during rains.
8.	Need of the Project	(a) To extend the drainage network to uncovered areas and to improve the drainage condition in the city. (b) Avoid water logging problem especially during rainy season from July to October. (c) Due to water logging, roads & streets are badly damaged for which huge amount (Rs. 8 to 10 crore) is being spent every year by Lucknow Nagar Nigam (LNN), Lucknow Development Authority (LDA) & P.W.D for repairs & maintenance. (d) The need for storm water drainage system has important social aspect in as much as some of the urban poor population is residing in low lying areas like Cambel road, Vinayaka etc. which would be directly benefited.
9.	Area of City	33700 hectare

<table>
<tr><td>10.</td><td>Proposed drainage system</td><td>

Drainage Master Plan has been prepared for the city considering the topography of the city. The whole city is divided into six storm water drainage zones.
Major Natural Drains have been provided with RCC retaining walls to train the cross-sections and enhance storm carrying capacity apart from protecting encroachments especially in the areas where width of drain is not a problem.
Proposed drainage network involves construction of covered & open brick drains & covered RCC drains along all natural drains, major roads and other connecting roads as per techno-economic considerations.
Augmentation of existing pumping systems has also been undertaken as per requirement.
Areas lying outside the city but draining off toward the city area have been considered in the proposal.

</td></tr>
<tr><td>11.</td><td>Details of drains proposed</td><td>
<table>
<tr><td colspan="3">OPEN BRICK</td></tr>
<tr><td>Width (m)</td><td>Height (m)</td><td>L (Km)</td></tr>
<tr><td>0.6</td><td>0.6</td><td>2.5</td></tr>
<tr><td>0.75</td><td>0.75</td><td>1.5</td></tr>
<tr><td>0.75</td><td>0.9</td><td>4.8</td></tr>
<tr><td>1</td><td>1</td><td>11.5</td></tr>
<tr><td>1</td><td>1.5</td><td>2.9</td></tr>
<tr><td>1.5</td><td>2</td><td>0.3</td></tr>
<tr><td>2</td><td>2</td><td>0.8</td></tr>
<tr><td>2</td><td>2.5</td><td>2.9</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="3">Covered Brick</td></tr>
<tr><td>Width (m)</td><td>Height (m)</td><td>L (Km)</td></tr>
<tr><td>1.0</td><td>1.00</td><td>22.2</td></tr>
<tr><td>1.0</td><td>1.50</td><td>17.0</td></tr>
<tr><td>1.0</td><td>2.00</td><td>11.0</td></tr>
<tr><td>1.5</td><td>1.50</td><td>24.5</td></tr>
<tr><td>1.5</td><td>2.00</td><td>22.0</td></tr>
<tr><td>1.5</td><td>2.50</td><td>3.4</td></tr>
<tr><td>2.0</td><td>2.00</td><td>20.9</td></tr>
<tr><td>2.0</td><td>2.50</td><td>18.5</td></tr>
<tr><td>2.0</td><td>3.00</td><td>1.3</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="3">Retaining Wall</td></tr>
<tr><td>Width (m)</td><td>Height (m)</td><td>L (Km)</td></tr>
<tr><td>2.5</td><td>3.5</td><td>47.6</td></tr>
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		3	4	18.7
12.	PROJECT COST			
Cost as per DPR		Rs.441.73 Crore		
Cost recommended by CPHEEO		Rs. 325.21 Crore		
Period of Implementation		27 months (Jan. 2009 –March 2011)		

				(Rs. in Crores)
Funding pattern GoI; GoUP: ULB	**GoI**	**GoUP**	**LNN**	**Total**
	50%	20%	30%	100%
TOTAL Rs Cr.	**162.61**	**65.04**	**97.56**	**325.21**
Financial Phasing				(Rs. in Crores)
Year	**GoI**	**GoUP**	**LNN**	**Total**
2008-09 (20%)	32.52	13.01	19.52	65.05
2009-10 (50%)	81.31	32.52	48.78	162.60
2010-11 (30%)	48.78	19.51	29.26	97.56
SUB TOTAL	**162.61**	**65.04**	**97.56**	**325.21**

Ownership of Project:	Lucknow Nagar Nigam, LUCKNOW.
Implementing Agency	Lucknow Nagar Nigam, LUCKNOW.
Agency Responsible for O&M	Lucknow Nagar Nigam, LUCKNOW.

TARIFF MODEL

Existing Tariff:

Presently no direct tax, fees or cess is being levied by the LNN or any other parastatal body in respect of Storm Water Drainage System in the City. Expenditure reported on maintenance of drains is approximately Rs.303 lacs in year 2005-06, Rs.347 lacs in year 2006-07 and that in year 2007-08 is Rs. 357 lacs.

PROPOSED TARRIF STRUCTURE

Particulars	**General**
Annual Drainage Tax	1% of the annual rental value.

Comparison of O & M and Revenue generation (Rs in Lacs)

Year	**Expenditure on maintenance**	**Income**	**Profit/ loss**
2010	365.0	390.0	(+)15.0
2025	450.0	470.0	(+) 20.0
2040	515.0	600.0	(+) 85.0

CPHEEO's Comments on DPR :

1. Efforts need be made to totally separate out sewerage and storm water drainage networks in the city so as to prevent storm water from entering into sewers. Sewerage system for Lucknow in tandem with storm water drainage system, needs to be implemented simultaneously.

2. The present DPR has been prepared considering overall drainage catchment in Lucknow city based on master planning. However, in the present DPR, the main drainage network including roadside drains have been considered in the present DPR. It is proposed that existing drainage system in different localities may be used as connecting network to the main drainage system after the city is covered under ensuing sewering drive under JNNURM. Necessary improvement of smaller size drains along lanes may be undertaken by LNN from their own resources/MPLAD/MLALAD funds etc.

3. Before start of execution, State Government should re-check the design of Storm Water Drainage in respect of actual field spot levels / slope of drainage area and inlet time of each drainage section including its overall feasibility and effective operation during design period.

4. Overall planning of storm water drainage in Lucknow City in integrated manner, may be ensured by State Government/LNN, so that full benefit of project execution reaches to the people and efficient functioning of storm water drainage system may be ensured including its disposal in nearby water body.

5. The structural design of the drains may be rechecked before start of implementation of the project in the light of actual ground conditions including soil pressure bearing capacity and over turning moment.

6. The State Govt./ implementing Agency may ensure that there is no encroachment on the alignment, if so, it should be removed so as to avoid time over run and cost over run of the scheme and to facilitate smooth execution of the project.

7. It has also been mentioned that LNN will carry out necessary O & M activities and O&M estimate for the project components has been furnished in the DPR.

8. The BAR Chart and implementation Schedule have also been enclosed.

9. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current schedule of rates for 2007 prevailing in the city. For non-SOR items, market rates have been considered.

10. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by LNN/ Govt of Uttar Pradesh.

11. No expenditure shall be incurred without Administrative approval of the U.P. Government / Expenditure Finance Committee. The DPR need to be got

appraised by Expenditure Finance Committee before start of execution. No central grant can be utilized for the purchase of land, vehicle tools and plants etc., since they are not allowed under the existing programme.

As the DPR for providing storm water drainage system in LUCKNOW has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 325.21 crore as detailed below in the table. The State Government and Lucknow Nagar Nigam, LUCKNOW shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

COST ESTIMATE

Sl. No.	Description of work	Cost approved by SLNA in Rs. Cr	Cost Recommended by CPHEEO
(A)	**Civil Work**		
1-	Improvement of Existing drainage network	318.83	298.49
2-	Future Provisions of New Drains	53.78	-
3-	Cost of Implementing Environmental Management Programme	0.06	-
4-	Cost of Improvement of Existing Pumping capacity	17.25	17.25
	Sub-Total	**389.92**	**315.74**
	Work contingencies @ 3%of Rs.	11.70	9.47
	Sub-Total	**401.62**	**325.21**

General Comments for Project Implementation:

a) Ground levels for the project area may be rechecked along with design of storm water drainage network before start of the execution so as to ensure 'self-cleansing velocity' in each and every section of the network.

b) All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

c) Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

d) The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by LNN to this Ministry regularly for perusal and record.

e) The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

f) Suitable Storm Water Cess / tariff and storm water connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest . It should be ensured at house hold level that waste water and storm water are not allowed to mix.

g) All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored..

h) The State Govt./Implementing Agency must take prior permission of Railway/State Environment & Forests Deptt./Transport Deptt. , if necessary before execution of the works.

i) Before start of execution the State Govt. has to ensure that no funding for the same project from any other Central or State Govt. organization has been availed. A certificate to this effect may be submitted by State Govt. before start of execution.

j) All possible efforts may be made to involve Public-Private-Partnership in O&M of drains and other components of project.

k) No change in the scope of project shall be effected without prior approval of CPHEEO

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD (Water Supply)

Proposal	:	Lucknow water supply Phase-1,Part-2
Name of District, State	:	Lucknow, Uttar Pradesh
Name of City	:	Lucknow
Objectives	:	To provide continuous, qualitative Water Supply to Lucknow City in equitable manner as per CPHEEO/ JNNURM Norms
Whether CDP is prepared	:	Yes
Background	:	Lucknow, the capital town of State of Uttar Pradesh with 2001 census population of 2185927 is growing at a faster pace and is a major town of commercial and institutional activities and administrative seat of State of U.P. Lucknow is situated between $26^0$36' and $27^0$10' North latitude and 80^0 30' and 81^0 13' East longitude and is spread over 41360 Hectare area . The U.P. Jal Nigam has prepared the present proposal to augment and strengthen the Water Supply of City of Lucknow .
Present Status	:	As per the Master Plan of Water Supply for Lucknow City-1976, the city has been divided into five water supply districts which has been further divided into 32 zones. Based on the system of water supply, developments and topographical conditions, the salient features are detailed below:-

S. No.	District	Areas	No. of Zones	Source of Drinking Water
A.	City Service(A)	Old city on Right of Gomti, Chowk, Hazratganj, Narhi etc.	16	1. River Gomati is the basic source of water supply. Two water works mainly Aishbagh & Balaganj are situated in this district. 2. Out of 16 zones, 2 zone viz. Zone-M, N are bereft of any piped drinking water scheme till date.
B	North Service(B)	Area on Left of Gomti and Right of Kukrail Nala, Maha	6	Tube wells are the basic source. However, few areas are fed with surface water as well.

		Nagar, Nirala Nagar, Aliganj, Vikas Nagar, Jankipuram, Kalyanpur, Kursi Road, Sahara City, IIM Road & a no. of private housing societies.		
C	East Service(C)	Area on Left of Gomti and Kukrail Nala, Indira Nagar and Gomti Nagar, No. of private housing societies, high rise residential & commercial towers, growth of private housing colonies on Chinhat & Deva Road.	2	Till now tubewells are the basic source but area has witnessed tremendous growth in the recent years, unreliability of ground water sources requires dependence on alternative surface water source. To overcome this problem a project proposal has already been sanctioned under JNNURM at estimated cost of Rs. 388.61 crore on 7-9-2007 which is under implementation.
D	South Service(D)	Alambagh, Adarsh Nagar, Chandra Nagar, Shringar Nagar, Krishna Nagar, Kharika Ward, Bangla Bazar, South City, Vrindavan Yojna, Telibagh, SGPGI, Kanpur Road Yojna & a No. of private housing societies.	8	Tubewells are the basic source.
E.	Cantonment(E)*	Cantonment		Water supply of Cantonment is not maintained by Lucknow Jal Sansthan.
	TOTAL		**32**	

*Out of the above Five Water Supply Districts, District-E, has not been considered in the proposal as the same is being looked after by Cantonment Board.

Water availability : (Existing water supply details)

- Total production(MLD) : 457.73 (River : 203.86, Tubewells : 253.87)
- Water supplied at consumers point (mld) 320.41
- Per capita (lpcd) : 114.25

	• UFW	:	30% (assessed)				
	Population	-	Total	**A**	**B**	**C**	**D**
	- As per 2001 Census	:	2185927	-	-	-	-
	- Base year – 2010	:	2803000	1159707	696698	478910	467685
	- Intermediate year -2025	:	4243000	1495795	1111911	737155	898139
	- Design year – 2040	:	6422000	1879750	1745287	1085451	1711512
	Water Demand (Mld)	-					
	i. Base year – 2010	:	500.518	217.05	120.18	82.61	80.68
	ii. Intermediate year-2025	:	748.918	275.02	191.80	126.16	154.93
	iii. Design year – 2040	:	1124.795	341.26	301.06	187.24	295.22

10a	**Population proposed to be benefited(in lacs)**		To be benefited under Phase-I, Part-I(Already sanctioned under JNNURM on 7.9.2007)	To be benefited under Phase-I, Part-II (Present proposal)
		2010	17.08 (294.63 mld)	2.52 (43.54 mld)
		2025	23.43 (404.17 mld)	4.21 (72.71 mld)
		2040	31.03 (535.27 mld)	6.27 (108.28 mld)

Need of the Project :

Over the past about 10-15 years, major systematic reorganization of the water supply system could not be undertaken mainly due to paucity of funds, even though, emergent measures have been implemented through limited scope schemes. Still, there remains lot of work to be done, in a planned and phased manner through detailed engineering projects, for improvement in the Lucknow water supply system as mentioned above.

Presently, against a requirement of 500.518 mld of water for the year 2010 for population of about 28.03 lacs, the total water production in the city is about 457.73 mld, from the two water works and about 416 nos. tubewells. Thus, water production is inadequate for the present demand as per the CPHEEO norms i.e. 150 lpcd +15% UFW.

The present project is necessary because of following:

- Excessive ground water exploitation and increasing reduction of open land due to rapid construction activities, has resulted in drop in water table every year rendering ground water sources

unreliable in certain pockets.

- Utilization and proper distribution of water generated out of execution of the works of Phase-I, Part-1 of the project already sanctioned will lessen the dependence upon ground water and provide more coverage with water supply.

- Need for extensive reorganization of the distribution network and its extension to the newly developed localities within Municipal limit.

- Need for providing adequate storage in different zones.

- Shifting of dependence to surface water sources from ground water sources.

- Up bringing of water supply schemes afresh for pockets within the limits of Nagar Nigam which could not be covered till date by pipe water supply.

- Need for utilization for permanent defunct tubewells by making them functional after re-boring.

- Replacement of old and worn out machinery of old Ist and IInd WTP necessary for proper functioning and full utilization of existing infrastructure.

- Replacement of old RGF media system with improved direct retention under drainage system of both existing WTP for maximum output and reduced O&M costs.

- Providing new Intake for Balaganj (IInd)WTP due to decrease in water level of Gomti River in all seasons and for maintaining minimum no. of stand by pumping capacity.

- Supplementing much needed River Gomti lean weather flows by 100 cusecs from Sarda Canal Atariya and Mahdohiya escape.

- Increase in impounding for IIIrd WTP for canal closure period i.e source of raw water to WTP so that complete storage for mid design population is met with for which additional lake area has been made available by Govt. of UP and Deptt. of

Fisheries.

Proposed Scheme - The present proposal, mainly utilization and distribution of water produced by the implementation of works sanctioned under Lucknow Water Supply Scheme, Phase-I, Part-1 by construction of 3rd water works at Gomti Nagar and capacity enhancement of 2nd water works, Balaganj have been mainly taken up. Districts "C" is newly developed area and its part, which has no water supply system till now, have been considered. Some part of District "A" also which has been deprived of piped water supply system till now has been considered for providing water supply systems since the source augmentation has already been considered under Ist part of scheme. Necessary storage and distribution network has also been proposed. The schemes under other two districts namely "B" and "D" which have mainly the tubewells as source have also been taken in this part of the project. The area proposed to be covered under this Part is facing acute water supply problem.

The project components includes civil constructions like overhead tanks (18 nos), service reservoirs (6 nos) laying of feeder mains, rising mains and distribution system (571 km) along with electro-mechanical components like pumping plants, tube wells (21 nos). The details of main components proposed District-wise are as under:

DISTRICT A

Components of Work Proposed

- Reorganisation of water supply scheme in Sadatganj ward of Municipal Corporation.
- Reorganisation of water supply scheme in Kanhaiya Madhopur ward of Municipal Corporation.
- Reorganisation of water supply scheme in Mallahi Tola ward-II of Municipal Corporation.
- Remaining works of repair & renovation of 100 year old Aishbagh Water Works

➢ Renovation of Existing Paterson RGF 1st & 2nd (27.5 mld), Candy Filter (34 mld) and Bird Filter (45 mld) by V-wire screen & direct retention under

drain system to increase rate of filtration & efficiency of very old filters.

- Renovation and replacement of plant & machinery of flash mixer.

- Construction of Poly Aluminum Chloride Storage Tank

- 2nd Water Works, Balaganj

- Renovation of Existing RGF (2x50 mld) by V-wire screen with direct retention under drain system to increase efficiency & rate of filtration of existing old filter beds.

- Construction of Drains upto Nagariya Nala.

- Construction of 60 mld intake/pumping station to be used during seasons of low flows in River Gomti and to provide sufficient stand by raw water Pumping Plant

- Augmentation of 100 cusecs flow in river Gomti by Atariya Escape on Kheri Branch & Mahdohiya Escape on Lucknow Branch, so that supply of sufficient raw water to WTPs is ensured in all seasons.

DISTRICT B

<u>Components of Work Proposed</u> :-

- New Water supply scheme of Aadil Nagar area.

DISTRICT C

<u>Components of Work Proposed</u> :-

- New Water Supply Scheme of Sanjay Gandhipuram area.
- New Water Supply Scheme of Faridi Nagar area.
- New Water Supply Scheme of Takrohi area.
- New Water Supply Scheme of Ismailganj area.
- New Water Supply Scheme of Patel Nagar area.
- New Water Supply Scheme of Kamta area.
- Above works are proposed to utilize the water produced by IIIrd Water Works, Gomti Nagar

proposed under Phase-I, Part-I.

- Lining of Bharwara Lake (35.38 Acre).

DISTRICT D

- **<u>Components of Work Proposed</u> :-**
- Reorganisation of Water Supply System in Krishna Nagar area.
- Reorganisation of Water Supply System in Nehru Park Ambedkar Nagar area.
- Reorganisation of Water Supply System in Sector-J, Manas Nagar area.
- New Water Supply Scheme of Kila Mohammadi Nagar.
- New Water Supply Scheme of Aurangabad Jagir.
- New Water Supply Scheme of Behsa.
- New Water Supply Scheme of Rahimabad.

In addition to above schemes, reconstruction of 43 Nos. permanent defunct tube wells have also been proposed in water supply districts having tubewells as main source of water supply.

Proposed Source

The source proposed for District A is river Gomti and for District C - Sharda Sahayak Feeder Canal along with scattered tubewells. For District B and D proposals are based on ground water sources.

Cost proposed by state

Rs. 203.14 crores

Cost recommended for consideration of approval

Rs. 146.565 crores

Sharing pattern

	Share	Rs. in lacs
GOI	50 %	7328.25
State Govt.	20 %	2931.30
LNN	30 %	4396.95

Financial Phasing

GOI Share	**Rs7328.25**	
Year 2008-2009	25 %	1832.06

	Year 2009-2010	50 %	3664.13
	Year 2010-2011	25 %	1832.06
	State Share	**Rs. 2931.30**	
	Year 2008-2009	25 %	732.82
	Year 2009-2010	50 %	1465.65
	Year 2010-2011	25%	732.83
	LNN Share	**Rs 4396.95**	
	Year 2008-2009	25 %	1099.24
	Year 2009-2010	50 %	2198.47
	Year 2010-2011	25 %	1099.24

Period of Implementation : 24 months (February 2009 to Jan 2011)

Implementing Agency : U.P JAL NIGAM

Agency Responsible for O&M : Lucknow Jal Sansthan

Annual O&M Expenditure

- **Existing (year 2006)** **5387.38**
- **Proposed (year 2010**)
- Phase I Part 1 1323.56 lacs
- Phase I Part 2 187.45 lacs

Total **6898.39 lacs**

- Energy & Power charges 3076.45
- Chemicals like Alum, Bleaching Powder etc. 172.69
- Maintenance and repair 840.82
- Wages of operating staff 2808.43

Proposed Tariff (2010)

Percentage consumption in slab	**Slab**	**Qty. of water supply (in KL)**	**Proposed rate for water supply (Rs per KL)**	**Proposed Revenue from water supply (Rs in Lakhs**
10.5	0-3 KL	43620	2.50	398.04
42.5	3-5 KL	176560	4.00	2577.81

25.5	5-10 KL	105940	6.00	2320.02
9.5	>10 KL	39470	10.00	1444.54
3.0	Industrial	12460	12.00	545.89
9.0	Commercial	37390	14.00	1910.61
	MES	10000	12.00	438.00
Total		425440		9630.91

Proposed Revenue Generation 9630.91 lakhs

Existing revenue generation (2005-06) 3580.00 lakhs

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Water Supply for Lucknow city may be accorded technical clearance at an estimated cost of Rs. 146.565 Crores as per following break-up:

S. No.	Components of Works	Amount (Rs. In Lacs)
1	Mallahi Tola Ward Re-organization (Sub zone L-1, Zone-L) W/S Scheme	451.25
2	Saadat Ganj Ward Re-organization (Sub zone J, Zone-N) W/S Scheme	791.20
3	Kanhaiya Madhopur Ward Re-organization (Zone-M & M-1) W/S Scheme	788.80
4	Sanjay Gandhipuram W/S Scheme (District-C, Zone C-1)	149.10
5	Faridi Nagar W/S Scheme (District-C, Zone C-2, Sub-zone J)	193.80
6	Takrohi W/S Scheme (District-C, Zone C-2, Sub zone-P)	389.77
7	Ismail Ganj W/S Scheme (District-C, Zone C-2, Sub zone-O)	316.60
8	Patel Nagar W/S Scheme (District-C, Zone C-2, Sub zone-M)	127.90
9	Kamta W/S Scheme (District-C, Zone C-2, Sub zone-N)	133.27
10	Krishna Nagar, Chitra Gupta Nagar Ward Re-organization (District-D, Zone-B) W/S Scheme	246.97
11	Nehru Park, Ambedkar Nagar, Chitra Gupta Nagar Ward Re-organization (District-D, Zone-B) W/S Scheme	360.30
12	Sector-J park Manas Nagar, Chitra Gupta Nagar Ward Re-organization (District-D Zone-B) W/S Scheme	475.13

13	Raja Bijli Pasi Ward Qila Mohammadi W/S Scheme (District-D, Zone-Part C-2, D & M)	175.79
14	Raja Bijli Pasi Ward Aurangabad Jagir W/S Scheme (District-D, Zone-Part C-2, D & M)	186.25
15	Raja Bijli Pasi Ward Behsa W/S scheme (District-D, Zone-Part-C2, D&M)	149.14
16	Raja Bijli Pasi Ward Rahimabad W/S scheme (District-D, Zone-Part-C2, D&M)	221.44
17	Adil Nagar water supply scheme (District-B, Zone G-1)	536.61
18	Reconstruction of 20 nos. defunct tubewells (restricted to 20 number tubewells out of 43 number proposed)	500.80
19	Lining of Bharwara lake at IIIrd Water Works at Gomti Nagar	849.83
A	**NEW INTAKE AND MAIN FOR 60 mld**	
20	Intake well and approach channel	211.02
21	Raw water main	67.70
22	Transmission line and electrification	52.50
23	Transformer 750 KVA at Gaughat	97.00
24	S S screen at approach channel	5.00
25	MS Sceen at entrance of sump	1.85
26	MS cover screen on channel	4.88
B	**Repair and renovation of Balaganj WW**	
27	Renovation of existing RGF 100 mld	579.15
28	Drain inside campus	7.45
29	Drain upto Nagariya nala	25.00
C	**Repair and renovation of Aishbagh WW**	
30	Renovation of existing PatersonRGF 1&2	390.39
31	Renovation of existing CandyRGF	355.05
32	Renovation of existing Bird RGF	273.25
33	Renovation of Flash mixer	4.50
34	PAC storage OHT	23.25
D	**Augmentation of Flow in Gomti River**	1945.47
	Sub-Total	**11087.41**
	Contingencies@2%	221.746
	Total	**11309.156**
	Less 5% Nigam Proficiency	(-) 315.90
E	**Total**	**10993.26**
	Works without cent age charges:	
	a) Power connection / transmission line	351.23
	b) Hiring of Godown	9.72
	c) Permanent reinstatement of Road	3229.86
F	**Total (a + b + c)**	**3590.81**
	Total(E+F)	**14584.07**

	- Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost.	72.43
	G.Total	**14656.50**
		Say Rs. 146.565 Crore

- The water supply project for Lucknow city under JNNURM is to be implemented in phases and parts, Phase-I, Part-1 of the proposal has already been approved and is under execution. Under the project, mainly source augumentation was considered such as construction of 3rd water works (based on surface source from Sharada Sahayak Feeder Canal), capacity enhancement of existing 2nd water works and renovation of Aish Bagh Water Works.

- Under Phase-I, Part-2 of the project, schemes have been prepared for utilization and distribution of augumented quantity of water as proposed in Part-1, covering water supply districts “A” & “C”. Few schemes based on ground water (Tubewells) source in water supply districts “B” & “D” have also been proposed. In these two districts there is no surface source available at present. Apart from above, other works like augmenting River Gomati from Sharda canal and remaining augmentation renovation works are considered

State Government / Lucknow Nagar Nigam should insure compliance of comments during project implementation:

Comments:

1) Engineer-in-charge for project implementation should ensure that people do not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

2) During the project implementation, land for all the units may be acquired well in advance so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

3) No expenditure shall incur on project without administrative approval of Government of Uttar Pradesh.

4) During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the LNN / State Government from their own resources.

5) The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

6) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

7) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented while commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

8) It is suggested that LNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

9) The LNN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

10) Air valves and scour valves may be provided at strategic locations in the transmission mains.

11) After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

12) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

13) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

14) The material and equipment to be procured should conform to BIS specifications.

15) Uninterrupted electric power supply must be ensured by LNN for trouble free operation and maintenance of the scheme.

16) LNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

17) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

18) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

19) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD (Water Supply)

1.	Proposal		DPR of Water Supply Works for City of Lucknow Under JNNURM
2.	Name of District / State		Lucknow, Uttar Pradesh
3.	Name of city		Lucknow
4.	Objectives		To augment and strengthen water supply system of City of Lucknow as per CPHEEO/JNNURM norms .
5.	Whether CDP is prepared		Yes
6.	Background	:	Lucknow, the capital town of State of Uttar Pradesh with 2001 census population of 2185927 is growing at a faster pace and is a major town of commercial and institutional activities and administrative seat of State of U.P. Lucknow is situated between $26^0$36' and $27^0$10' North latitude and 80^0 30' and 81^0 13' East longitude and is spread over 41360 Hectare area . The U.P. Jal Nigam has prepared a proposal to augment and stregthen the Water Supply of City of Lucknow .
7.	Present Status	:	As per the Master Plan of Water Supply For Lucknow City-1976, the city has been divided into five water supply districts which has been further divided into 32 zones. Based on the system of water supply, developments and topographical conditions, the salient features are detailed below:-

S. No.	District	Areas	No. of Zones	Source of Drinking Water
A.	City Service(A)	Old city on Right of Gomti, Chowk, Hazratganj, Narhi etc.	16	1. River Gomati is the basic source. Two water works mainly Aishbagh & Balaganj are situated in this district. 2. Out of 16 zones, 3 zone viz. Zone-M, N & P are bereft of any piped drinking water scheme till

				date.
B	North Service(B)	Area on Left of Gomti and Right of Kukrail Nala, Maha Nagar, Nirala Nagar, Aliganj, Vikas Nagar, Jankipuram, Kalyanpur, Kursi Road, Sahara City, IIM Road & a no. of private housing societies.	6	Tube wells are the basic source. However, few areas are fed with surface water as well.
C	East Service(C)	Area on Left of Gomti and Kukrail Nala, Indira Nagar and Gomti Nagar, No. of private housing societies, high rise residential & commercial towers, growth of private housing colonies on Chinhat & Deva Road.	2	Until now tubewells are the basic source but area has witnessed tremendous growth in the recent years, unreliability of ground water sources requires dependence on alternative surface water source.
D	South Service(D)	Alambagh, Adarsh Nagar, Chandra Nagar, Shringar Nagar, Krishna Nagar, Kharika Ward, Bangla Bazar, South City, Vrindavan Yojna, Telibagh, SGPGI, Kanpur Road Yojna & a No. of private housing societies.	8	Tubewell are the basic source.
E.	Cantonment(E)	Cantonment		Water supply of Cantonment is not maintained by Lucknow Jal Sansthan.
	TOTAL		**32**	

8.	**Water availability**	:	(Existing water supply details)
	o Total production(MLD)	:	457.73 (River : 203.86, Tubewells : 253.87)
	• Water supplied at consumers point (mld)		320.41
	o Per capita (lpcd)	:	114.25
	o UFW	:	30%
9.	**Population**	-	
	- As per 2001 Census	:	2185927
	- Base year – 2010	:	2803000
	- Intermediate year -2025	:	4243000
	- Design year – 2040	:	6422000
10.	**Water Demand (Mld)**	-	
	i. Base year – 2010	:	500.518
	II. Intermediate year-2025	:	748.918
	ii. Design year – 2040	:	1124.795
11.	**Need of the Project**	:	It is stated that over the past about 10-15 years, major systematic reorganization of the water supply system could not be under taken mainly due to paucity of funds, even though, emergent measures have been implemented through limited scope schemes, there remains lot of work to be done, in a planned and phased manner through detailed engineering projects, for improvement in the Lucknow water supply system. Presently, against a requirement of 500.518 mld of water for the year 2010 for population of about 28.03 lacs, the total water production in the city is about 457.73 mld, from the two water works and about 416 nos. tubewells. Thus, water production is inadequate for the present demand as per the CPHEEO norms i.e. 150 lpcd +15% UFW considering 30% losses in the system. Excessive ground water exploitation and increasing reduction of open land due to rapid construction activities, has resulted in drop in water table every year rendering ground water

sources unreliable in certain pockets.

Need for extensive reorganization of the distribution network and its extension to the newly developed localities.

Need for isolation of the feeder mains / rising mains from the distribution lines.

Need for renovation of Zonal pumping station and segregation of zones to ensure equitable distribution of water and to ensure operation of the zonal pumping stations at desired efficiency.

Need for loss and leakage prevention to reduce the quantum of un-accounted for water and replacement of old and out lived pipe lines which, at certain places, are even responsible for contaminated water supply.

Need for augmentation of storage capacity in different zones.

- Necessity of spot sources (tube wells) in specific scarcity pockets.

Shifting dependence to surface water sources from ground water sources because of depletion in ground water table and consequent deterioration in water quality. Thus, requiring upbringing of IIIrd Water Works for Gomti Nagar and adjoining areas which has been identifie.

12. **Proposed Scheme** - The base year (2010) population including master plan area is 2803000. The expected designed population for the year 2040 is estimated as 6422000 souls. The city of Lucknow has seen very rapid growth in the last decade and an influx of population from adjoining rural areas and smaller towns has caused acute shortage of Water Supply in the city.

The total requirement of water in the year 2010 is 500.52 mld against available 457.73 mld water (203.86 mld from two no. W/W and 253.87 mld from 416 nos. tube wells). The intermediate stage designed requirement considering 15 year period

i.e., upto 2025 is 748.91 mld which means additional requirement of 291.18 mld.

The first part of DPR for Water Supply Works for the city of Lucknow has been prepared by considering the following factors.

Considering falling water table especially in water supply district 'C' it has been proposed to construct 80 mld W/W at Gomti Nagar and renovate 1st W/W at Aishbagh & augment 2nd W/W at Balaganj (From 100 to 200 mld). It has been also proposed to develop 40 nos. new ground water sources(tube wells) in the water scarcity pockets.

Reorganisation of old schemes of select pockets in different water supply districts which suffer most from crisis of water supply.

The proposals also include installation of domestic water meters for better and consumption based recovery of revenue, bulk water meters for water budgeting including carrying out leak detection survey which is very necessary as old and worn out pipe lines are held responsible for contaminated water supply in the old area of Lucknow city.

Providing new water supply schemes in the two select pockets where no piped water supply scheme exist.

Project Components : The project components includes civil constructions like intake, head works, water treatment plant, service reservoirs, laying of feeder mains, rising mains and distribution mains along with electro-mechanical components like pumping plants, SCADA for existing and proposed tube wells and treatment works

13. **Proposed Source** — The source proposed for District A is river Gomti and for District C - Sharda Sahayak Canal along with scattered tubewells. For District B and D proposals are based on ground water sources.

14. Estimated cost (Proposed) (Rs. in lakhs) : Rs. 37614.52 lakhs

OHT/CWR / Treatment works	3505.96
Pipeline works	7447.60
New Tubewells	1043.60
Reconstruction of Old tubewells	1076.72
Domestic water meters	2391.40
Bulk Water meters	87.00
Leak detection survey	64.35
Pumping plant/power connection	8924.58
Building works	3816.26
Miscellaneous works	6207.78
SCADA	1954.00
Total	36518.95
Work contingencies @ 3%	1095.57
Grand Total	37614.52

15. Cost for Consideration and approval — **Total Project Cost Rs. 37614.52 lakhs**

PER CAPITA COST OF THE PROJECT

	Year2010	Year2025	Year2040
Per capita cost(in Rs)	1323.50	874.36	577.69

16.	Sharing Pattern		Share	Rs. In Lacs
		GOI	50 %	18807.26
		State Govt.	20 %	7522.90
		LNN	30 %	11284.36
17.	Financial Phasing	**GOI Share**	**Rs. 18807.26**	
		Year 2007-2008	30 %	5642.18
		Year 2008-2009	40 %	7522.90
		Year 2009-2010	30 %	5642.18
		State Share	**Rs. 7522.90**	
		Year 2007-2008	30 %	2256.87
		Year 2008-2009	40 %	3009.16
		Year 2009-2010	30 %	2256.87
		LNN Share	**Rs 11284.36 lacs**	
		Year 2007-2008	30 %	3385.31
		Year 2008-2009	40 %	4513.74
		Year 2009-2010	30 %	3385.31

18. Period of Implementation : 36 months
19. Implementing Agency : U.P JAL NIGAM
20. Annual O&M Expenditure :
    - Existing (year 2006) : 5387.38
    - Proposed (year 2010) : 6741.89
        - Energy & Power charges : 2985.28
        - Chemicals like Alum, Bleaching Powder etc. : 169.18
        - Maintenance and repair : 779.00
        - Wages of operating staff : 2808.43
21. Agency Responsible for O&M : Lucknow Jal Sansthan

22. Proposed Tariff (Rs./kl) :

%consumption in slab	Slab	Qty. of water supply (in KL)	Proposed rate for water supply(Rs per KL)	Proposed Revenue from water supply (Rs in Lakh)	
10	0-3 KL	68235	3.5	871.70	
50	3-5 KL	341175	6.00	7471.73	
30	5-10 KL	204705	8.00	5977.39	
10	>10 KL	68235	10.00	2490.58	
Total		682350		16811.40	

3 Proposed Tarrif & Revenue Generation 6823.50 lakhs

23. Existing Tariff and Revenue(2005-06) 3580.00 lakhs

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Water Supply for Lucknow city may be accorded technical clearance at an estimated cost of Rs. 376.14 Crore as per following break-up:

S.No.	Component	Cost as per proposed DPR	As recommended by CPHEEO
1	Construction of IIIrd Water Works at Gomti Nagar	15877.17	15582.30
2	Renovation of 100 years old Aishbagh water works	4114.01	4114.01
3	Upgradation of IInd Water Works from 100 mld to 200 mld	4537.14	4337.01
4	Strengthening of clear water feeder main from Aishbagh	829.67	829.67
5	Garhi Kannaura water supply re-organization	946.02	940.92
6	Bharatnagar water supply scheme	411.17	411.17

7	Reorganization of Shiv Nagar Khadra water supply, District B	364.47	364.47
8	Reorganization of Kurmanchal Nagar-Liberty colony (District C)	385.32	385.32
9	Kharika ward water supply scheme District D	564.91	564.91
10	Construction of 40 nos. tubewells in different water supply districts with pump house and rising main	2915.60	2915.60
11	Reconstruction of 43 nos. tubewells in place of old and failed tube wells	1076.72	1076.72
12	Provision for SCADA	1954.00	1954.00
13	Provision for Bulk water meter for water budgetting	87.00	87.00
14	Provision for domestic water meter	2391.40	2391.40
15	Provision for leak detection survey	64.35	64.35
	Total	36518.95	36018.85
	Work contingencies 3%	1095.57	1080.57
	Total work cost	37614.52	37099.42
	Training capacity building,IEC@5%	940.36	-
	Administrative expences@5%	940.36	-
	Supervision Charges@12.5%	4701.81	-
	Grand Total	**44197.06**	**37099.42**
	Say	**441.97 Crore**	**370.99 Crore**

Comments:

State Government should ensure the following during the project implementation.

1) State Government (Department of Urban Development) should ensure the availability of 245 mld raw water in the proposed Sharada Sahayak Feeder Canal for proposed Lucknow Water Supply Scheme till design year 2040 as committed vide Urban Development Letter No. 709/9-5-2007-15S/2007 dated 20.3.2007.

2) Regarding exploring the future water supply sources for Lucknow city, Rorkee university in its report dated 28.4.2001 has analyzed in detail the various possible sources that can augment the water supply in the city of Lucknow. In the report it has been mentioned that requisite storage for at least 3 weeks is required for a scheme based on Sharda Sahayak Feeder canal. However, the storage available at Chinhat lake near IIIrd Water Works along with existing 55 mld water production from ground water sources may be able to meet the requirement upto mid-design year upto 2025. Subsequently, it has been opined that after completion of Gomti pollution works by tapping 26 nallahs

upstream of Gomti barrage would improve the water quality upstream of the barrage that can be used as raw water source after 2025. Thus, the making provision for storage of raw water for ultimate design year 2040, entirely based on Sharda Sahayak Canal would require another 150 acre of land, and would not be a economical proposition. Accordingly, State Government need to ensure the adequate storage of water beyond mid-design year so as to serve the population covered with the population upto design year.

3) Based on the discussion with UP Jal Nigam officials, it has been concluded to keep the city water supply based on surface as well as ground water source rather than entirely switching over to the surface based system which would be a costly proposition in terms of acquiring more than 150 acres of land and its construction for storage of raw water for canal closure period. However, once the system is based on ground water as well as surface water system, the reliability of the system would increase and would be a feasible solution rather than acquiring fertile and costly land around Lucknow city and entirely switching over to surface based system.

4) Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

5) During the project implementation, land for all the units may be acquired well in advance so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

6) During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the LNN / State Government from their own resources. The officials of State Government (UP Jal Nigam) have agreed for the same.

7) The design of feeder network may also be re-checked on UNDP branch software and in case any change in the design is observed the same may be intimated to CPHEEO.

8) The rates adopted in the estimation of DPR, is of year 2005 with inclusion of 20% enhancement @ 10% per year with due approval of competent authority of the project.

9) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

10) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

11) It is suggested that LNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

12) The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR.

13) The LNN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

14) Air valves and scour valves may be provided at strategic locations in the transmission mains.

15) After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

16) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

17) The raw water quality test report for Sharda Sahayak Canal needs to be submitted to CPHEEO immediately and also the routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

18) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

19) The material and equipment to be procured should conform to BIS specifications.

20) Uninterrupted electric power supply must be ensured by LNN for trouble free operation and maintenance of the scheme.

21) LNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

22) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

23) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

24) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/O Urban Development (Solid Waste Management)

Proposal	Municipal Solid Waste Management in Mathura City
Name of District / State	Mathura, Uttar Pradesh
Name of City	Mathura
Objectives	To make an efficient Solid Waste Management System in Mathura in compliance with MSW Rules 2000
Whether CDP is prepared	Yes
Background	Mathura Nagar Palika Parishad (MNPP) has appointed RCUES, Lukhnow for making a Detailed project Report for formulating an Integrated Management System for Municipal Solid Waste Disposal in Mathura as per the requirement of MSW Rules 2000.
Present Status	• People dump Solid Waste on the Road Side in heaps (Primary Collection System) • Primary Solid Waste Storage System does not exist. • 38 Open Dump Sites exist in the city from where MNPP vehicles collect MSW. • The Secondary Collection Fleet/Transport Equipments consists of **:** - Tractor Trolleys – 6 Nos - Big Trucks – 2 Nos - JCBs- 2 Nos - Loader/Tipper-1 No • Processing System does not exist. • Dump Sites To dump sites exist. They are **:** - Behind Chameli Devi Khandelwal Girls Inter College - Near Sewage Treatment Farm, Baldev Road
Need of the Project	The need of the project is to introduce Scientific Approach for managing Solid Waste in compliance with MSW Rules 2000 and to protect the Environs from Pollution.
Population (Nos)	In the area under purview of MNPP

AS per 2001 Census As on Base Year (2006) As on Design Year (2011)	302770 Nos 358415 Nos 530295 Nos
Solid Waste Generation Base Year (2006) Design Year (2011)	 177 TPD as per Survey 204 TPD
Project Components	The requirement of the total Waste generation has been worked out after a detailed survey of waste generating areas. The Capital Requirement of the equipment for collection, storage and transportation of Solid Waste is as under **:** - Collection : Rs 143.9 lacs - Storage : Rs 133.1 lacs - Transportation : Rs 136.6 lacs Estimation of the Cost for (1) Waste to Compost and (2) Development of an Engineered Landfill for Waste Disposal has been evaluated as under **:** - Vermi – Compost Plant (50 TPD) **:** Rs 130.0 Lacs - Landfill Site (5 years Usage) **:** Rs 419.1 Lacs Provisions for IEC have been made and Areas that can be brought under PPP have been suggested.
Estimated Total Cost	Rs 1060.8 Lacs
Period of Implementation	Ending on march 31,2008
Funding Pattern	Grant Funds from GOI, State Government, MNPP as per ratio to be decided by the Competent Authority
Financial Phasing	In one Phase ending on March 31,2008
Implementing Agency	Mathura Nagar Parishad
Annual O&M Expenditure Existing	MNPP incurs an expenditure of about Rs 589.2 Lakhs annually on MSWM. The expenditure on this activity is financed from the funds received from the State Finance Commission.
Proposed (year 2008-09)	Would be continued to be met by MNPP as per present O&M expenses. This would get reduced when Household collection is brought under PPP over a period of time. The Annual Cost of Transportation of waste is estimated to be Rs 58.8 lacs (Rs 90/ton). The Annual Cost of O&M for the Landfill is estimated to be Rs 19.4 lacs(Rs 95/ton).

Agency Responsible for O&M	MNPP under PPP for its sub components
Charges for Solid Waste Management Existing Proposed (year 2008-09)	 Nil Rs 15 to Rs 50 for Household collection of waste Tipping fee can be levied by MNPP to recover the O&M costs indicated above.
Revenue Generation Existing Proposed	Nil Most of the areas are not likely to generate Revenue in the initial period except for Compost Plant. The Compost Plant is likely to generate a Revenue of Rs 1500/ton
Estimated Cost for Consideration & Approval • Capital Costs • Incentive costs @5 % • Costs for Evaluation & Monitoring @ 5 % Total	 Rs 991.6 Lacs Rs 49.6 Lacs Rs 49.6 Lacs Rs 1090.8 Lacs

CPHEEO's Comments

1. **This Scheme has been designed in line with MSW Rules 2000 teking in to consideration of the existing infrastructure in the City.**

2. **While Designing, the Norms laid down in the Manual on Solid Waste Management have been followed.**

3. **Design of all the components of the Scheme have been furnished with the Proposal. However jobs like Compost plant would be the turnkey & would be with Public Private Partnership (ppp).**

4. **Provisions have been made for segregated house to house Collection of Waste.**

5. **O & M costs have been worked out & ULB need to impose relevant taxes to recover at least the O & M Cost from the Consumer. ULB should issue resolution in this regard to recover the SWM Costs.**

6. **The Scheme is approved from a technical angle at a Total Capital Cost of Rs.991.6 Lacs as against the Proposed Total Cost of Rs 1090.8**

7. **The Incentive to the tune of 5 % i.e. Rs 49.6 Lacs & 5 % i.e. Rs 49.6 Lacs towards Monitoring & Evaluation Charges have not been included in the aforesaid recommended Cost as per Para 6.**

8. **The land for the Integrated Landfill Facility like Compost Plant & Landfill Site is yet to be acquired by MNPP. Therefore the Design Criteria for Landfill Development has been included in the DPR & Hydrological Investigation need to be carried out after the Land is made available.**

9. **The Scheme is fit for approval under JNNURM. However funds for execution of the scheme should be released to MNPP by the Nodal Agency only after receipt of Papers for Land acquisition by MNPP for integrated treatment facility & after having a MoU with the entrepreneur of Compost Plant & Sanitary Landfill.**

Abstract of Approved Cost
Solid Waste Management in Mathura

	Particulars	Total Estimated Cost (Rs in lacs)	Total Approved Cost (Rs in Lacs)	Remarks
A	Collection/Storage/Transportation			
	Collection	143.9		
	Storage	133.1		
	Transportation to site/plant	136.6		
	Sub Total	413.6	413.6	
B	Vermi – Compost Plant from Waste (50 TPD)	130.0	130.0	
C	Landfill Site (for use during the first 5 years):	419.1	419.1	
D	Contingencies @ 3% on A to C	28.0	28.9	
E	**Total Capital Cost (A+B+C+D)**	**991.6**	**991.6**	
F	Preparation of Detailed Project Report@1.5 % of E above	14.9		
G	Capacity Building, IEC @ 1.5 5 of E above	14.9		
H	Efficiency @ 1% of E above	9.9		
I	Innovative Approach @ 1 % Of E above	9.9		
J	**Incentives (F+G+H+I+J)**	**49.6**		
K	**Third Party Project Monitoring and Evaluation**	**49.6**		
L	**Total (E+J+K)**	**1090.8**	**991.6**	

Note : (1) The Scheme has been Technically Examines and Approved for **Rs.991.6 Lacs**.
(2) The Recommended Cost does not include 5 % Execution Charge as per guidelines.
(3) It does not include 5 % for Monitoring & Evaluation for which otherwise nodal agency may be eligible.

Technically Recommended for **Rs. 991.6 Lacs**

Appraisal Note for Central Sanctioning & Monitoring Committee, Ministry of Urban Development,
for consideration of Projects under JNNURM.

Proposal	**Sewerage works in sewerage Zone – II of Mathura City (Trans Yamuna Zone).**
Name of State	**Uttar Pradesh**
Name of City	**Mathura**
Objective	1. To provide sewerage facilities in Mathura city in a comprehensive and planned manner. 2. To collect, convey, treat and dispose off the sewage as per PCB standard. 3. To prevent the flow of waste water into river Yamuna. 4. To improve the environment hygiene in the pilgrim's city.
Whether CDP is proposed	Yes

Background

- Mathura city is situated at Agra-Delhi National highway No. 2 at a distance of145 km. from Delhi. Mathura is the City with many temples of National & International fame like temple of Lord Krishna- Krishna Janmbhumi & popular International tourist destination in India. The population of city as per 2001 census is 3.02 lacs. At present the Mathura Urban Agglomeration (MUA) is covering an area of 23.91 sq. km. and having population of 3.52 lacs. The town is situated on the right bank of River Yamuna. The city lies between the 77^0 35' East longitude and 27^0 30' North latitude. The city has two major natural existing drains viz. Masani & Ambakhar drains.

- The Mathura town is functioning as a center of religion, trade & commerce services and educational facilities in the regional context.

- Mathura is an important pilgrimage centre and centre of higher technical education.

- The general slope of the city is from Northwest to South East towards River Yamuna. The difference in the lowest and highest level is more than 20m. Average elevation of Mathura

city is 175m above MSL. Sub-soil water is available generally at a depth of about 14m to 18m below ground level.

- It is well connected with rail and road network. The nearest air port is Delhi.

Present Status

Existing sewerage facility (Mathura city):

- **Sewer network:** At present, only 18.63 Km branch sewer lines exist in the Nagar Palika Perishad Area. Present sewerage system exists only in very limited area of old city and is being maintained by Mathura Nagar Palika Parishad.

- The present coverage of city with sewerage system is approx. 12% of total municipal area and population-wise only 10% of total population.

- **Sewage Pumping Stations :** 5 No I.P.S. & 3 No. M.P.S. were constructed earlier in different parts of the city under Yamuna Action Plan –I (YAP-I).

- **Sewage treatment plants:** At present two nos. sewage treatment plants of 13.6 (WSP) & 14.5 (WSP) MLD capacity in zone I & II exist, which were constructed under YAP-1.

- Due to non availability of sewerage network in the city mostly raw sewage is being discharged directly into the open drains which reaches pumping stations by interception & diversion works & ultimately pumped to existing S.T.Ps. The excess discharge finds its way into the river Yamuna.

Existing sewerage facility (project area – Zone-II):

- **Sewer network:** At present, only 12.40 Km branch sewer lines exist in this zone

- **Sewage Pumping Stations :** 3 No I.P.S. & 2 No. M.P.S. were constructed earlier in different parts of the city under Yamuna Action Plan –I (YAP-I).

- **Sewage treatment plants:** At present only one sewage treatment plants of 14.5 (WSP) MLD capacity is existing in zone-II, which were constructed under YAP-1.

Need of the Project

- In the existing sewerage system, sewage is being discharged into nallas without any treatment creating unhealthy environment. These nallas carry the sewage to the pumping stations and excess sewage is directly discharged into River

Yamuna. To improve the hygienic condition of city and its surroundings, proper sewerage system and treatment is necessary.

- City has only **12%** of municipal limit area sewered, therefore, planned sewerage system is needed in the city.

- There are two nos. of existing S.T.Ps. having total capacity of 28.1 MLD against the total requirement of 48 MLD in year of 2010. The requirement of STP in 2025 is 70 MLD and that in year 2040 is 82 MLD.

- The STP requirement in zone-II **(DPR Project Area)** in year 2025 & 2040 is 27mld & 30mld respectively. While the existing STP capacity in this zone is 14.5mld (WSP).

- Clean and hygienic environment leads to good health and well being of the people. The poor and economically weaker sections are mostly affected due to lack of sanitation. Thus, for better environment and uplift of the people, to sustain the economy of the area in particular and country in general, it is imperative to provide clean environment facilities to the surroundings of the people.

- It is essential to reduce the pollution load flowing into the River Yamuna from the city to preserve water body and also comply with PCB standards.

- A lot of pilgrims visit every day to this holy city and take bath in the river Yamuna, necessitating bathing water quality at these Ghats situated in the project Zone.

Area of City

The city has been divided into four sewerage zones. The total area of the city as per original DPR covering all four zones, based on Sewerage Master Planning, is 58.85 Sq. Km which includes Municipal area of 2455.75 Ha.

The proposal in this DPR for Trans Yamuna zone-II (Project Area) is 11.51 Sq. Km.

Zones wise break up of Master Plan area/ sewered area is as under.

Sl.No.	Name of Zone	Total Area (in ha)	Area Covered by Existing Sewers (in ha)	Area to be covered under this DPR (within municipal limit) (in ha)	Remaining area to be covered (in ha)
1	Zone-I	702.51	90.0 (4%)	-	612.51
2	**Zone-II**	**1151.26**	**190.0(8%)**	**961.26(40%)**	**-**
3	Zone-III	1743.08	-	-	1743.08
4	Zone-IV	2288.23	-	-	2288.23
	Total	**5885.08***	**280.0 (12%)**	**961.26 (40%)**	**4643.82**

- * Municipal area in Mathura city is 2455.75 Ha only.
- Zone-II has been considered under this DPR which falls under municipal area only.

POPULATION

The 2001 census population of the city is 3,02,770.

The Zone-wise population projection in different years for master Plan area is as under:

Sl. No.	**No. of Zone**	**2010**	**2025**	**2040**
1	I	76051	99381	118085
2*	**II**	**199965**	**254258**	**275931**
3	III	50229	121232	146437
4	IV	122747	178504	212716
	Total	448992	653375	753169

Population wise coverage of city with Sewerage network

Sl. No.	Name of Zone	Total Population (2010)	Population Covered under Existing Sewerage network	Population being Covered under present DPR (within municipal boundary)	Remaining Population to be covered
1	Zone-I	76051	9000	-	67051
2	**Zone-II**	**199965**	**25000 (7%)**	**174965 (50 %)**	**-**
3	Zone-III	50229	-	-	50229
4	Zone-IV	122747	-	-	122747
	Total	448992	34000 (10 %)	174965(50 %)	240027

Water Supply Status : The Present water supply status of the city is 135 lpcd which is as per norms. However, a scheme for augmentation of water supply works to cover left over areas with distribution network has been submitted for consideration under JNNURM Programme. After

implementation, it will raise water supply to required level 135 lpcd through out the city

Sewage Contribution	80% of water consumption.

Zone Wise Sewage Generation in different years (MLD):

Sl. No.	Zone	2010	2025	2040
1	I	8	11	13
2	**II**	**22**	**27**	**30**
3	III	5	13	16
4	IV	13	19	23
	Total	48	70	82

STP requirement for Trans Yamuna Zone-II under this DPR (Mld)

Sl. No.	Details	Year 2010	Year 2025	Year 2040
1	Total STP capacity required	**22**	**27**	**30**
2	Existing Capacity	14.5	14.5	14.5
3	Balance STP capacity requirement	7.5	12.5 Say 12	15.5 Say 16

Note: The difference in requirement for year 2025 & 2040 is very small. Moreover, through out year there are a no. of religious functions in the city where a large no. of pilgrims participate. Considering above, based on the request of state government STP for year 2040 has been allowed in the DPR.

Works Proposed in this DPR:

1.	Sewer Network	-	66.84 km
2.	Intermediate Pumping stations	-	Nil
3.	Main Pumping stations	-	1 No.
4.	Rising main	-	0.050 km
5.	Sewage Treatment Plant based on UASB technology.	-	16 MLD

FUNDING PATTERN

Cost proposed by State Government (including 12.5% centage)	Rs. 7978.18 lacs			
Cost Recommended by CPHEEO, for Zone -II	Rs. 6035.77 lacs			
	GoI	GoUP	MNN	Total
	80%	10%	10%	100%
As proposed	4500.00	973.27	562.50	6035.77

(Fund sharing is calculated considering additional allocation of Rs. 45.00 crore for project sanction under JNNURM. Accordingly, GOI & ULB Share has been considered out of Rs. 5625.00 lakhs & balance amount Rs. (6035.77 – 5625 = 410.77) is added in state Government Share.

PHASING

Year wise fund requirement is tabulated below:

(Rs. in lakhs)

Financial Phasing				
Year	GoI	GoUP	MNN	Total
2009-10 (25%)	1125.00	243.32	140.62	1508.94
2010-11 (50%)	2250.00	486.63	281.25	3017.88
2011-12 (25%)	1125.00	243.32	140.63	1508.95
G.Total	**4500.00**	**973.27**	**562.50**	**6035.77**
Ownership of Project :			Nagar Palika Parishad Mathura	
Implementing Agency			U.P.Jal Nigam	
Agency Responsible for O&M			Nagar Palika Parishad Mathura	
Implementation period			28 months (December 2009 t0 March 2012)	

Annual O&M Expenditure Existing

Revenue/Income & expenditure data of Mathura Nagar Palika Parishad for last three years is tabulated below:

(Amount in Rs. Lakh)

Sl. No.	Year	Net Revenue Receipt	Expenditure	(+) Surplus (-) Deficit
1.	2000-01	1540.91	1465.41	+75.50
2.	2001-02	1422.86	1233.62	+89.24
3.	2002-03	2091.09	1818.88	+272.21
4.	2003-04	1351.80	1277.53	+74.27
5.	2004-05	1079.58	1001.11	+78.47
6.	2005-06	1212.48	1173.44	+39.04
7.	2006-07	1720.59	1428.97	+231.62
8.	2007-08	2313.95	1750.18	+563.77

Existing Water Tariff :

Existing water tariff is based on Government of UP Gazette Notification No. 541/9-2-2000/25-7-2000 dated 01-04-2000. The existing water tariff is on flat rate basis based on area of the property (annual rental value (ARV)) which is as below.

(A) Annual water charges on the basis of ARV of houses

Annual Rental Values of Houses	Minimum Annual water charges		
	15mm dia connection	20mm dia connection	25mm dia connection
1	2	3	4
Upto Rs. 360.00	548.00	822.00	1279.00
Rs 361.00 to 2000.00	731.00	1096.00	1644.00
Rs 2001.00 to 3500.00	1096.00	1644.00	255.00
Rs 3501.00 to 5000.00	1462.00	2101.00	3106.00
Rs About to 5000.00	1827.00	2740.00	3654.00

Beside above, a flat rate water charge is applied @ 12.5% of the annual rental values of the houses and minimum of the two is levied.

(B) Annual Water Charges for non- ARV houses –

	15mm Dia connection	20mm Dia connection
1. Up to 13 m^2 plot area houses –	Rs. 731.00	Rs. 2940.00
2. Above 13 m^2 plot area houses –	Rs. 914.00	Rs. 3654.00

Proposed Tariff category-wise based on Volumetric Consumption as proposed in DPR.

S.N.	INCOME GROUP	% Population	Population	No. of House 5 person/ house	Per capita monthly consumption	Cess charge per KL of W/S	Avg. per house monthly consum. Kl	Per house monthly charge in Rs	Total annual Revenue for W/S in Rs Lacs	50% of water tariff as sewage cess
For year 2012 Total Population -				**207204**						
1	Lower	25	50800	10160	0-3 KL	3.20	15.00	48.00	58.52	29.26
2	Middle	42	87025	17405	3-5 KL	5.00	22.50	112.50	234.97	117.48
3	U/Middle	20	41440	8288	5-10KL	7.00	37.50	262.50	261.07	130.50
4	Higher	13	27939	5588	10KL	9.00	50.00	450.00	301.75	158.87
	Total		207204	41441					**856.31**	**428.16**
For year 2025 Total Population -				254258						
1	Lower	25	63565	12713	0-3 KL	3.20	15.00	48.00	73.23	36.61
2	Middle	42	106790	21358	3-5 KL	5.00	22.50	112.50	288.33	144.16
3	U/Middle	20	50850	10170	5-10 KL	7.00	37.50	262.50	320.35	160.17
4	Higher	13	33053	6611	10KL	9.00	50.00	450.00	356.99	178.50
	TOTAL		**254258**	**50852**					**1038.90**	**519.45**

For year 2040 Total Population -				275931						
1	Lower	25	68983	13797	0-3 KL	3.20	15.00	48.00	79.47	39.73
2	Middle	42	115890	23178	3-5 KL	5.00	22.50	112.50	312.90	156.45
3	U/Middle	20	55185	11037	5-10 KL	7.00	37.50	262.50	347.66	173.83
4	Higher	13	35873	7175	10KL	9.00	50.00	450.00	387.45	193.73
	TOTAL		275931	55187					**1127.48**	**563.74**

SUMMARY OF INCOME AND EXPENDITURE

(Rupees in lacs)

Year	Expenditure on maintenance	Income	Surplus / loss
2012	246.04	428.16	182.12
2025	344.40	519.45	175.05
2040	482.00	563.74	81.74

On the above proposed tariff, the scheme will be self sustainable

The approach of State Government towards Standardized Service Level Benchmarking and Total Sanitation is placed at Annexure-I. Mathura Nagar Palika Parishad undertakes that during course of execution of project, the implementation agency envisages to achieve the proposed benchmarks.

Minority population in the project area is 13000 and the population of urban poor is 29500. Linkage of sewer network with slums is also shown in Annexure-I.

CPHEEO Recommendations:

As the DPR for providing sewage system in Mathura has been framed as per the Manual on Sewerage & Sewage Treatment taking into account the technical comments of CPHEEO, we may accord technical approval to the same at an estimated cost of Rs. 60.36 crore as detailed below in the table. The State Government and Mathura Nagar Palika Parishad shall ensure compliance to the comments for project during its implementation as mentioned below:-

Rs. (In Lacs)

SL.	Proposed Component of DPR		As per the proposed DPR (Cost Recommended by State Govt. for zone –II)	Cost Recommended by CPHEEO for zone -II
1	**2**		**4**	**5**
A	**Civil Works**			
1	Sewer & appurtenance		4240.82	4240.82
2	Rising Main		6.29	6.29
3	Sewage Pumping Station		209.91	209.91
4	Effluent Channel		22.50	22.50
5	Boundary Wall, Approach Road and Gate		56.00	56.00
6	Staff Quarters		17.14	17.14
8	Sewage Treatment Plant.		664.07	639.07
9	Rehabilitation of Old Sewer		8.78	8.78
10	Special T&P (0.5% of above items)		-	-
B	**E & M Works**		**631.15**	**631.15**
	SUB TOTAL		**5856.66**	**5831.66**
11	Contingencies	3%	175.70	**174.95**
12	Add 0.5% administrative charges		-	29.16
	SUB TOTAL Rs.			**6035.77**

14	Price Escalation		
I)	For Year 2010-11 @ 10%	240.00	-
II)	For Year 2011-12 @ 21%	480.00	-
	Total	**720.00**	-
15	O&M for one year	246.04	-
16	Training & Capability building @ 1.5%	104.98	-
17	Centage on account of Departmental Supervision @ 12.5%	874.80	-
	Grand Total Rs. (in Lacs)	**7978.18**	**6035.77**
	Say Rs.		**Rs. 60.36 crore**

**The provision of 12.5% made in cost estimate towards the Departmental centage is not eligible for funding under JNNURM. However, State Government may allow the same from its state budget to compensate the cost incurred towards implementation of project by State Agency viz. UP Jal Nigam.*

CPHEEO's Comments on DPR :

1. The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution

2. All efforts should be made to connect sewerage system with individual houses so as to collect sewage right from its generation point and any connection with drain / nallah to tap waste water / sullage water need to be discontinued after commissioning of the project.

3. The efforts have also been made to provide linkage to urban poor/slums in the proposed sewerage network at the identified sewer stretches/manholes.

4. The Population projection method adopted for water supply scheme has been followed for the forecast of population for planning Sewerage system for Mathura city. Accordingly, population in base year 2010, mid year 2025 and design year 2040 by various methods is given in technical statement of the DPR. The projected population has been distributed in the proposed project area in the wards/ zones and accordingly, the design of sewer network has

been carried out based on density pattern & population contributing to the sewer nodal points.

5. The water supply availability in the project area will be 135 lpcd as stated by MNPP / UP Jal Nigam, which is the required for efficient functioning of sewage facility as per Manual. Project for water supply based on Gokul barrage has already been commissioned. A separate project to complete left over work of Gokul barrage based water supply scheme is under consideration.

6. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be designed. A copy of same may be forwarded to Ministry before start of work.

7. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

8. MNPP will ensure recycling/ reuse of at least 20% of treated waste water so as to recover part of O&M of scheme.

9. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guidelines value of the Manual. The design maximum velocity is kept below 3.0 MPS.

10. The pipe diameter is selected by considering the bore utilization up to 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

11. MNPP should ensure that industrial waste water is not allowed to mix in municipal sewage. Wherever possible industrial waste water should be collected and brought to common effluent treatment plant for treatment before its disposal.

12. MNPP should also ensure that storm water is not allowed to mix in municipal sewage. Storm/drain water should be collected separately and suitably disposed of without mixing with sewage.

13. Treatment efficiency of UASB is sensitive to the characteristics of raw sewage. As such, before start of execution, detail analysis of raw sewage need to be undertaken to ensure proper design of UASB. In the present DPR, BOD of raw sewage has been adopted as 250 mg/l for design of STP.

14. To reduce the dependence on power, provision has been made for power generation out of gas generated in the Sewage treatment Plant.

15. Sewer cleaning machines should be used to clean sewers rather than engaging manual labours.

16. Provision of recycle and reuse of treated waste water effluent has been made in the DPR for agricultural farming.

17. The sewer system for Mathura has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

18. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered up to 7.50 meters in open areas in small stretches of trunk main alignment. The average depth of cutting of Trunk sewer is kept as 3 to 6 m.

19. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 pipes as per BIS Standards have been proposed.

20. It has also been mentioned that MNPP will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

21. The BAR Chart and implementation Schedule have also been enclosed.

22. The cost estimate has been prepared based on SOR of 2008-09 prevailing in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by MNPP / Govt. of Uttar Pradesh.

General Comments for Project Implementation:

I. Before commencing the project, minimum per-capita rate of water supply as envisaged in DPR should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked along with design of sewer network, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network to the extent possible.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as

per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified, if necessary, on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by MNPP for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. MNPP should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by MNPP to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. Though the cost for STP has been considered as per UASB technology. However, while inviting tenders, UP Jal Nigam shall explore the possibility of seeking various technologies considering land availability, cost of treatment and O & M cost etc. and least cost technology may be adopted.

XVIII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XIX. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XX. No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal note for Consideration of Central Sanctioning & Monitoring Committee, Ministry of Urban Development (under JNNURM)

(Storm Water Drainage)

1	Proposal	Storm water drainage work for Mathura Town
2	Name of State	Uttar Pradesh
3	Name of City	Mathura
4	Objective	1. To provide drainage facility in Mathura Town (Mathura Urban Agglomeration Area) in a comprehensive manner to avoid water logging problem. 2. Development of new drainage system (separate from sewerage system) in integration with the old drainage system in a holistic manner.
5	Whether CDP is proposed	Yes, at priority No. 3
6	Background	• **<u>Mathura Town :</u>** – Mathura is the popular International tourist destination in India. The population of city as per 2001 census is 3.02 lacs. At present the Mathura Urban Agglomeration (MUA) is covering an area of 23.91 sq.km. and having population of 3.52 lacs. The town is situated on the right bank of river Yamuna. The highest flood level of River Yamuna is 168 meters (1978) above MSL. The City lies between the 77^0 35' East longitude and 27^0 30' North latitude. The city has two major natural existing drains viz. Masani & Ambakhar drains. – Average annual rainfall is 664 mm and average no. of rainy days per annum is 54. – Presently Storm water of Mathura Town is being drained off through very old & incomplete or in sufficient Kachcha / Pucca open drainage system. With the passage of time, most of the existing drains have been encroached upon or got damaged. – The Mathura Town is functioning as a centre of religion, trade & commerce services and educational facilities in the regional context. – It is well connected with rail & road network.
7	Present Status	**<u>Drainage Network</u> :** **At present there is no separate storm water drainage system for the town. Under the Yamuna Action Plan Phase-I, some nalas were tapped for dry weather flow and taken to sewage pumping stations. The waste water coming to these nalas is pumped to STP_s, for treatment and the storm water**

		goes to river as overflow. There are 6 drainage zones in city as described in CDP consisting of 21 drains within the city limits, in which all the storm water as well as waste water of the existing city flows. There are many areas, where the problem during monsoon becomes acute due to water logging e.g. Bhooteswar under the railway bridge and near new and old bus stand, Holigate, Bhains Bahora and Badhpura Sadar. At present the man made storm water drainage system in Mathura is grossly inadequate. The city mainly depends upon some existing drains like Masani Nala, Bengali Ghat Nala, Ambakhar Nala etc. Of the above drains Masani zone drains and Ambakhar zone drains carries storm water of about 80 % of municipal area. Due to improper slope, inadequate and improper size of drains including damaged pucca drains at various locations there is problem of water logging at various locations in the city. Slope wise Town lies in the catchment area of river Yamuna.
8	Need of the Project	(a) To avoid water logging problem specially during rainy season from July to October. (b) Due to water logging, roads & streets are badly damaged for which huge amount is being spent every year by Mathura Nagar Palika Parishad and P.W.D for repairs & maintenance. (c) Slum areas viz. Ambedkar colony, which gets water logged during monsoon will be directly benefited with this drainage system. (d) There are large number of Ponds & Kunds of religious significance in the town which used to help in dampening the storm water during heavy rains. Due to expansion & development of the town, the natural course of Ponds were disturbed. After development of proposed SWD system and draining off the excess storm water, the water logging problems would be solved. (e) The need for storm water drainage system has important social aspect in as much as some of the urban poor population is residing in low lying areas such as Deeg gate, Holi gate, Bhains bahora, Sadar, New and Old Bus Stand railway under bridge and Chandrapuri colony and would be directly benefited.
9	Area of Town	2391 hectare
10	Proposed drainage system	Zoning of town for storm water drainage system is done as proposed in CDP. The whole town is divided in six zones. Of these six zones, four zones namely Masani zone, Bengali ghat zone, Ambakhar zone and Trans Yamuna zone lies within the municipal area and Dairy farm zone and Trans highway zone lies outside the municipal area. Therefore, both of these zones

		have not been included in this project. As there is no self recording rain gauge station in Mathura, rainfall data of Delhi is adopted to work out the discharge of catchments. However, those areas lying outside the city but draining off toward the city area have been considered in the proposal. Strengthening of existing drainage system along with road side drains and other major drains are considered in the project for entire town within municipal limit. **Storm Water Pumping Station :** Three storm water pumping station have been proposed in different low lying areas of the city. Two under railway bridge near New and Old Bus Stand and one in Chandrapuri colony where storm water cannot be drained off under gravity.

11. PROJECT COST

Cost as per DPR	Rs.125.39 Crore
Cost recommended by CPHEEO	Rs. 87.20 Crore

Period of implementation	30 months (January 2009 - June 2011)

				(Rs. in Crores)
Funding pattern GoI: GoUP: ULB	GoI	GoUP	Mathura Nagar Palika Parishad	Total
	80%	10%	10%	100%
As proposed	69.76	8.72	8.72	87.20

Financial Phasing (Rs. in Crores)				
Year	GoI	GoUP	MNNP	**Total**
2008-09 (20%)	13.95	1.74	1.74	**17.43**
2009-10 (50%)	34.88	4.36	4.36	**43.60**
2010-11 (30%)	20.93	2.62	2.62	**26.17**
TOTAL	**69.76**	**8.72**	**8.72**	**87.20**

Ownership of Project :	Nagar Palika Parishad, Mathura.
Implementing Agency	U.P. Jal Nigam
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 0.35 Crores
Agency Responsible for O&M	Nagar Palika Parishad, Mathura.

TARIFF MODEL

Existing Tariff:
Presently no direct tax, fees or cess is being levied by the Nagar Palika Parishad, Mathura, or any other parastatal body in respect of Storm Water Drainage for System in the City. Expenditure reported on maintenance of drains is approximately Rs. 18.24 lacs in year 2005-06 and that in year 2006-07 is Rs. 1.15 lacs

Proposed Tariff:
It has been proposed to levy 3% drainage tax on the annual rental value of the house.

PROPOSED TARIFF STRUCTURE

Particulars	General
Annual Drainage Tax	3% of the annual rental value

Comparison of O & M and Revenue generation

(Rs.in Lacs)

Year	Expenditure on maintenance	Income	Profit/ loss
2010	35.43	42.32	6.88
2025	53.15	63.28	10.13
2040	70.71	84.01	13.30

On the above proposed tariff the scheme will be self sustainable

CPHEEO's Comments on DPR :

1. Efforts need be made to totally separate out sewerage and storm water drainage networks in the city so as to prevent storm water from entering into sewers. Sewerage system for Mathura, which is reported to be under preparation of DPR need to be implemented simultaneously.

2. Before start of execution, State Government should re-check the design of Storm Water Drainage in respect of actual field spot levels / slope of drainage area and inlet time of each drainage section including its overall feasibility and effective operation during design period.

3. Overall planning of storm water drainage in Mathura Town in integrated manner, may be ensured by State Government/MNP, so that full benefit of project execution reaches to the people and efficient functioning of storm water drainage system may be ensured including its disposal in nearby water body.

4. The structural design of the drains may be rechecked before start of implementation of the project in the light of actual ground conditions including soil pressure bearing capacity and over turning moment.

5. The State Govt./Implementing Agency may ensure that there is no encroachment on the alignment, if so, it should be removed so as to avoid time over run and cost over run of the scheme and to facilitate smooth execution of the project.

6. It has also been mentioned that MNP will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

7. The BAR Chart and implementation Schedule have also been enclosed.

8. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current schedule of rates for 2008. For non-SOR items, market rates have been considered.

9. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by MNP/ Govt of Uttar Pradesh.

10. No expenditure shall be incurred without Administrative approval of the U.P. Government / Expenditure Finance Committee. The DPR need to be got appraised by Expenditure Finance Committee before start of execution. No central grant can be utilized for the purchase of land, vehicle tools and plants etc., since they are not allowed under the existing programme.

As the DPR for providing storm water drainage system in Mathura has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 87.20 crore as detailed below in the table. The State Government and Mathura Nagar Palika shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

COST ESTIMATE

(Rs in lacs)

Sl.No.	**Description of work**	**Cost approved by SLNA**	**Cost Recommended by CPHEEO**
(A)	Civil Work		
1-	Construction of new drains	10499.57	8180.94*
2-	Repair of existing drains	461.92	520.70
3-	Storm Water Pumping station (Civil & E&M Works)	169.11	169.11
4-	Rising main	24.22	49.37**
5-	Other Works (Railway crossing and Ground water recharge	36.88	15.00
	Sub-Total	**11191.70**	**8935.12**
	Work contingencies @ 2%of Rs.	223.83	178.70
	- Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost		44.67
	Sub-Total	**11415.53**	**9158.49**
	Deduct 5%	570.78	457.92
	Sub-Total	**10844.76**	**8700.57**
	Centage @ 12.5%	1355.59	Nil
	Sub-Total	**12200.35**	**8700.57**
	Training and Capacity Building @ 1.5 %	162.67	Nil
	Sub-Total	**12363.02**	**8700.57**
	UPPCL Power Connection	20.29	20.29

	Works to be done by Irrigation Deptt.		
	Rall Drain	54.64	Nil
	Mathura Escape	101.17	Nil
	Total Cost of Estimate	**12539.12**	**8720.86**
	Say	**125.39 Crore**	**87.21 Crore**

**** Cost reduction is because of design consideration as per Manual norms.***
***** Increase in cost is due to addition of drain diversion during construction of drains***

General Comments for Project Implementation:

a) Ground levels for the project area may be rechecked along with design of storm water drainage network before start of the execution so as to ensure 'self-cleansing velocity' in each and every section of the network.

b) Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

c) The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by MNP to this Ministry regularly for perusal and record.

d) The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

e) Suitable Storm Water Cess / tariff and storm water connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest. It should be ensured at household level that waste water and storm water are not allowed to mix.

f) All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

g) The State Govt./Implementing Agency must take prior permission of Railway/State Environment & Forests Deptt./Transport Deptt., if necessary before execution of the works.

h) Before start of execution the State Govt. has to ensure that no funding for the same project from any other Central or State Govt. organization has been availed. A certificate to this effect may be submitted by State Govt. before start of execution.

i) All possible efforts may be made to involve Public-Private-Partnership in O&M of drains and other components of project.

j) No change in the scope of project shall be effected without prior approval of CPHEEO

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Appraisal Note for Central Sanctioning & Monitoring Committee, Ministry of Urban Development,
for consideration of Projects under JNNURM.

Proposal	**Sewerage works in sewerage Zone – 5 & 7 of Meerut City.**
Name of State	**Uttar Pradesh**
Name of City	**Meerut**
Objective	1. To provide sewerage facility in Meerut City in a comprehensive and planned manner. 2. To collect, convey, treat and dispose the sewage as per PCB standard.
Whether CDP is proposed	Yes

Background	**MEERUT CITY** • Meerut city situated at 70 Km Delhi, it is one of the important towns in NCR located at 77 ^{0} 45' 3" East longitude and 29^{0} 0' 91" North latitude. Near-by cities are Ghaziabad, Muzaffar Nagar, New Delhi, Roorkee, Dehradoon, Aligarh, Noida etc. • There are about 23,471 industrial units in the Meerut city area that include 15,510 small scale units and 7922 cottage industries. Main industrial activities of concern are textile, fertilizer, Chemicals, Sport Goods and Autoparts etc. Small scale industries cover re-rolling, casting, painting, varnishing. Musical Instruments, publication and Printing, Gold Jwellery etc. • Meerut is an important pilgrimage centre and centre of higher technical education. • The general slope of the city is from Northwest to Southwest. The central portion of the city is about 5.0m higher than that of surrounding areas around, which is relatively flat. Generally height of Meerut city above MSL is 224m. Sub-soil water is available generally at a depth of about 12m to 14m below ground level. • It is well connected with rail and road net work. The nearest air port is Delhi.

	• HFL of the Kali Nadi Meerut city is 118.5 m**.**
Present Status	**SEWER NET WORK :** • As per actual survey conducted at present only 460 Km branch sewer is existing in the Nagar Nigam Area. Present Sewerage System exists only in very limited area of old city and colonies developed by MDA and Avas Vikas. In old city sewers were laid in year 1975, having 6 Intermediate Pumping Stations and one main Pumping Station. Whereas sewer pipes laid in colonies developed by Meerut Development and Avas – Vikas Parisad are approximately 13 – 14 years old. Sewered areas of colonies are shown on map with their disposal point into nala. Existing sewer in part of core city area is quite old, chocked and in deteriorating condition. • Out of total existing length of 460 Kms Nagar Nigam Meerut is maintaining 209 Kms of sewer line. Rest of the sewer lines are being maintained by MDA / Awas Vikas Parishad & private colonizers. **The present coverage of city with sewerage system is approx. 12% of total area and population-wise its 25% of total population.** • **Sewage Pumping Stations :** 6 Nos. sewage pumping stations have been constructed earlier in different areas of the city. • **Sewage treatment plants :** There is only one sewage treatment plant of 5 MLD capacity recently constructed & commissioned by Meerut Development authority in zone -9 based on ASP technology. • Raw sewage is being discharged directly into major Storm Water Drains without any treatment which ultimately finds its way into Kali Nadi passing through the city and ultimately discharging into river Ganges.
Need of the Project	• In the existing system sewage is being discharged into nalla without any treatment creating unhealthy environment. These nallas carry the sewage flow and ultimately discharge into Kali Nadi which is also getting polluted. To improve the hygienic condition of city and its surroundings proper sewerage system and treatment is necessary. • City has only 12% of sewered area, therefore, providing planned sewerage system is most needed in city like Meerut.

	• Sewer network laid by Avas Vikas Parishad, Meerut Development Authority and by private developers have been connected into nearby nalas. There is only one 5 MLD sewage treatment plant in the city against the requirement of 184 MLD. This has necessitated the planned and proper sewerage system in the city. • Clean environment is a basic need for the life. Clean and hygienic environment leads to good health and well being of the people. The poor and economically weaker sections are affected the most. Thus, for better environment and uplift of the people, to sustain the economy of the area in particular and country in general, it is imperative to provide clean environment facilities to the surroundings of the people on the top priority basis, where they are living. • It is essential to reduce the pollution load of Strom Water drains in the city & Kali Nadi where sewage falls from city which ultimately joins river Ganga.
Area of City	15,182 hectare excluding Cantt area .Total Meerut area has been divided into 9 zones for implementation of sewerage system. Project area considered in DPR (Zone 5 & 7) is 3162 Hectare. Details of zones along with area, area covered by existing sewers, area covered under present DPR and remaining area to be covered by sewer network are as under:

Zone Wise Break Up of the Project Area

Sl.No.	Name of Zone	Total Area	Area Covered by Existing Sewers (in hact.)	Area to be covered under this DPR	Remaining area to be covered
1	Zone-1	1893.81	52.60	-	1841.21
2	Zone-2	3095.56	50.00	-	3045.56
3	Zone-3	2961.13	80.15	-	2880.98
4	Zone-4	794.81	147.31	-	647.50
5	**Zone-5**	**1119.11**	**209.70**	**909.41**	**-**
6	Zone-6	1293.97	691.86	-	602.11
7	**Zone-7**	**2042.87**	**283.74**	**1759.13**	**-**
8	Zone-8	783.17	61.37	-	721.80
9	Zone-9	1198.46	151.53	-	1046.93
Total Area in Hact.		**15182.88**	**1728.26**	**2668.54**	**10786.08**

Zone wise projected population for Meerut City					
Sl. No.	**No. of Zone**	**POPULATION IN VARIOUS YEAR**			
		2001	**2012**	**2027**	**2042**
1	1	96416	142375	224753	361202
2	2	78901	138106	243690	427843
3	3	49036	99146	146093	248193
4	4	164761	216876	302959	387418
5	**5**	**109544**	**154413**	**260541**	**377041**
6	6	341168	428518	542180	679501
7	**7**	**156045**	**233182**	**337183**	**486278**
8	8	26658	44717	74600	135462
9	9	46242	74060	121070	216341
	Total	**1068772**	**1531393**	**2253070**	**3319279**

Population wise coverage of city with Sewerage network in 2012

Sl. No.	Name of Zone	Total Population	Population Covered under Existing Sewer network	Population to be Covered under present DPR	Remaining Population
1	Zone-1	142375	3954	-	138421
2	Zone-2	138106	2231	-	135875
3	Zone-3	99146	2684	-	96462
4	Zone-4	216876	40196	-	176680
5	**Zone-5**	**154413**	**28934**	**154413**	**-**
6	Zone-6	428518	229121	-	199397
7	**Zone-7**	**233182**	**32387**	**233182**	**-**
8	Zone-8	44717	3504	-	41213
9	Zone-9	74060	9364	-	64696
	Total	1531393	352375	387595	852745

Water Supply Status: Water supply schemes for Meerut city has already been sanctioned under JNNURM which is under implementation and is likely to raise water supply level to 150 lpcd till design year 2040. Thus, by the time the sewerage

system would be implemented, the desired level of water supply would be in place for efficient functioning of sewerage system.	
Sewage Contribution Rate	120 lpcd

Zone Wise Sewage Generation (MLD):

Sl. No.	Zone	2012	2027	2042
1	1	17.09	26.98	43.35
2	2	16.58	29.25	51.35
3	3	11.90	17.54	29.79
4	4	26.03	36.36	46.50
5	**5**	**18.53**	**31.27**	**45.25**
6	6	51.43	65.07	81.55
7	**7**	**27.99**	**40.47**	**58.36**
8	8	5.37	8.96	16.26
9	9	8.89	14.53	25.97
	Total	**183.81**	**270.43**	**398.38**

Present Proposal: In the present DPR, for zone 5 & 7 following works have been proposed.

1. Laying of sewers & appurtenances - 246.8 km
2. Intermediate Pumping stations - 4 nos.
3. Main Pumping stations - 2 nos.
4. Rising main - 3.32 km
5. Sewage Treatment Plant based on UASB followed by extended aeration - 72 MLD

Estimated cost of DPR submitted by State Government for Zone- 5 & 7 (Zone 6 presently taken out based on discussion with state officials to bring down cost	Rs. 281.74 crore

within available funds limit)				
Recommended cost by CPHEEO, for Zone 5 & 7	Rs. 185.89 crore			
Funding pattern GoI: GoUP: ULB	GoI	GoUP	MNN	Total
	50%	20%	30%	100%
As proposed	90.00*	40.13	55.76	185.89

* GOI share restricted to available fund of Rs.90 crore

Financial Phasing				
Year	GoI	GoUP	MNN	Total
2009-10 (25%)	22.50	10.03	13.94	46.47
2010-11 (50%)	45.00	20.07	27.88	92.95
2011-12 (25%)	22.50	10.03	13.94	46.47
G.Total	90.00	40.13	55.76	185.89

Ownership of Project :	Nagar Nigam, Meerut
Implementing Agency	Uttar Pradesh Jal Nigam
Annual O&M Expenditure (Rs. crores) in year 2012	Rs. 365.11 lakhs.
Agency Responsible for O&M	Meerut Nagar Nigam

The approach of State Government towards Standardized Service Level Benchmarking and Total Sanitation is placed at Annexure-I. Meerut Nagar Nigam undertakes that during course of execution of project, the implementation agency envisages to achieve the proposed benchmarks.

O & M and Revenue Generation

Year	Expenditure on maintenance	Income	Surplus / loss
2012	365.11	373.27	8.16
2027	483.33	720.20	236.87
2042	570.21	1147.07	576.86

Details of revenue generation

(Rs. In lacs)

Sl.No.	Item	2012	2027	2042
i	Domestic sewer tax	331.34	657.36	1055.02
ii	Non-domestic sewer tax	16.80	24.00	36.00
iii	Sewage farming	25.13	38.84	55.95
Total		**373.27**	**720.20**	**1147.07**

Percentage Consumption in Slab(2012)	Slab	MLD	Applicable water Rate (Rs/kl)	Revenue Generated per annum for water supply (Rs In Lacs)	Revenue from sewerage @ 70% of water charges
36.12	0-2 KL	21.00	1.00	76.65	53.65
18.54	2-5 KL	10.76	2.00	78.54	54.98
20.88	5-10 KL	12.12	2.50	110.59	77.41
24.45	> 10 KL	14.19	4.00	207.17	145.10
Total Revenue Generated		**58.07**		**472.95**	**331.14**
Percentage Consumption in Slab(2027)	**Slab**	**MLD**	**Applicable water Rate (Rs/kl)**	**Revenue Generated per annum for water supply (Rs In Lacs)**	**Revenue from sewerage @ 60% of water charges**
36.12	0-2 KL	32.39	1.50	177.34	106.40
18.54	2-5 KL	16.62	3.00	181.99	109.19
20.88	5-10 KL	18.72	3.75	256.23	153.74
24.45	> 10 KL	21.92	6.00	480.05	288.03
Total Revenue Generated		**89.67**		**1095.61**	**657.36**
Percentage Consumption in Slab(2042)	**Slab**	**MLD**	**Applicable water Rate (Rs/kl)**	**Revenue Generated per annum for water supply (Rs In Lacs)**	**Revenue from sewerage @ 50% of water charges**
36.12	0-2 KL	46.78	2.00	341.46	170.73
18.54	2-5 KL	24.01	4.00	350.34	175.27
20.88	5-10 KL	27.04	5.00	493.47	246.74
24.45	> 10 KL	31.67	8.00	924.55	462.28
Total Revenue Generated		**129.50**		**2109.82**	**1055.02**

On the above proposed tariff, the scheme will be self sustainable

Existing Sewage Cess

At present sewerage tax is being charged @ Rs.1.00 / seat / month within Meerut Nager Nigam area.

CPHEEO Recommendations:

As the DPR for providing sewage system in Meerut has been framed as per the Manual on Sewerage & Sewage Treatment taking into account the technical comments of CPHEEO, we may accord technical approval to the same at an estimated cost of Rs.185.89 crore as detailed below in the table. The State Government and Meerut Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned below:-

Rs. (In Lacs)

SL.	Proposed Component of DPR	As per the proposed DPR (Cost Recommended by State Govt. for zone 5,&7	Cost Recommended by CPHEEO for zone 5 & 7
1	**2**	**4**	**5**
A	**Civil Works**		
1	Estimate Of Sewer & appurtenance	12397.46	10546.42
2	Estimate of Rising Main	473.60	624.58
3	Estimate of Sewage Pumping Station	955.00	749.42
4	Estimate of Effluent Channel	12.00	12.00
5	Estimate of Boundary Wall, Approach Road and Gate	27.13	29.80
6	Estimate of Staff Quarters	7.64	19.80
7	Estimate of Hiring Of Godown	7.20	Nil
8	Estimate of Sewage Treatment Plant.	5366.50	4190.34
9	Estimate of Rehabilitation of Old Sewer	138.69	466.60
10	Estimate of Special T & P (0.5% of above items)	70.03	Nil
B	**E & M Works**	2030.71	1321.85

	SUB TOTAL		**21485.97**	**17960.81**
11	Contingencies	3%	**583.65**	**538.82**
12	Add 0.5% administrative charges		Nil	**89.82**
	SUB TOTAL Rs.		**22069.62**	**18589.43**
14	Price Escalation			
I)	For Year 2010-11 @ 10%		859.44	Nil
II)	For Year 2011-12 @ 21%		1804.82	Nil
	Total		**24733.88**	**18589.43**
15	Preparation of DPR @ 1.5%		368.59	Nil
16	Training & Capability building @ 1.5%		368.59	Nil
17	Centage on account of Departmental Supervision @ 11%		2702.98	Nil
	Grand Total Rs. (in Lacs)		**28174.04**	**18589.43**
	Say Rs.		**281.74 Crore**	**185.89 Crore**

CPHEEO's Comments on DPR :

A

1. The design of sewer network needs to be rechecked with objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line. If required, the scheme may be redesigned and got approved from the Competent Authority not below the rank of Chief Engineer before start of execution and copy of the same need to be forwarded to Ministry before start of execution

2. All efforts should be made to connect sewerage system with individual houses so as to collect sewage right from its generation point and any connection with drain / nallah to tap waste water / sullage water need to be discontinued after commissioning of the project.

3. The efforts have also been made to provide linkage to urban poor/slums in the proposed sewerage network at the identified sewer stretches/manholes.

URBAN POOR POPULATION AND ITS PROBABLE LINKAGE WITH SEWERAGE NETWORK

Name of Urban Poor Colony	Ward No.	Line No.	Manhole No.	Ground Level	Invert Level	Population
Zone - 5						
Lakhi pura	75	4005 - 4001	4005	222.51	217.98	3814
Jakir Husain Colony	76	3918 - 3917	3918	222.68	220.79	4570
Shyam nagar	72	3051 - 3046	3051	222.85	214.82	3000
Kazipur	23	6130 - 6128	6130	223.3	218.92	3200
Ghosipur	23	5970 - 5972	5970	222.03	216.16	3000
Jahidpur	23	5955 - 5961	5955	222.92	216.55	600
			5961	223.10	216.52	700
Zone - 7						
Ambedkar Nagar	34	136 - 134	134	223.635	221.30	6700

4. The Population projection method adopted for water supply scheme has been followed for the forecast of population for planning Sewerage system for Meerut city. Accordingly, population in the base year 2012, mid year 2027and design year 2042 by various methods is given in technical statement of the DPR. The projected population has been distributed in the proposed project area in the wards/ zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

5. The water supply availability in the project area will be 150 lpcd as stated by MNN / UP Jal Nigam **(project sanctioned under JNNURM is under execution)**, which is the required for efficient functioning of sewage facility as per Manual.

6. Soil investigation may be carried out by trial pit method at suitable intervals of 1 Km or so and based on soil strata, bedding of sewers need to be decided. A copy of same may be forwarded to Ministry before start of work.

7. The condition of existing sewers need to be ascertained forehand and based on its capacity / condition, suitable integration may be ensured while executing the project. Wherever needed damaged pipes may be replaced with new ones.

8. Meerut Nagar Nigam will ensure recycling/ reuse of at least 20% of treated waste water so as to recover part of O&M of scheme.

9. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines of the Manual published by this Ministry. The sewerage system has been designed for the minimum velocity of 0.6 MPS for present peak flow, which is as per the guidelines value of the Manual. The design maximum velocity is kept below 3.0 MPS.

10. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewerage depth, thus, ensuring reduced cost.

11. MNN should ensure that industrial waste water is not allowed to mix in municipal sewage. Wherever possible industrial waste water should be collected and brought to common effluent treatment plant for treatment before its disposal.

12. Treatment efficiency of UASB is sensitive to the characteristics of raw sewage. As such, before start of execution, detail analysis of raw sewage need to be undertaken to ensure proper design of UASB. In the present DPR, BOD of raw sewage has been adopted as 250 mg/l for design of STP.

13. To reduce the dependence on power, provision has been made for power generation out of gas generated in the Sewage treatment Plant.

14. Sewer cleaning machines should be used to clean sewers rather than engaging manual labours.

15. Provision of recycle and reuse of treated waste water effluent has been made in the DPR for agricultural farming.

16. The sewer system for Meerut has been designed considering the minimum size of sewer as 150 mm, which is as per the norms indicated in the Manual.

17. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been considered upto 9.00 meters in open areas in small stretches of alignment. The average depth of cutting of Trunk sewer is kept as 5 to 8 m.

18. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 pipes as per BIS Standards have been proposed.

19. It has also been mentioned that MNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

20. The BAR Chart and implementation Schedule have also been enclosed.

21. The cost estimate has been prepared based on SOR of 2008-09 prevailing in the state. For non-SOR items, market rates have been considered. No cost escalation shall be admissible during the project implementation period. If at all there is any cost escalation due to any reason, the same shall met by MNN / Govt. of Uttar Pradesh.

General Comments for Project Implementation:

I. Before commencing the project, minimum per-capita rate of water supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, flushing system be provided for flushing the sewer lines at regular intervals.

II. Ground levels for the project area may be rechecked along with design of sewer network, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network to the extent possible.

III. While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

IV. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified, if necessary, on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by MNN for record.

V. Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

VI. While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

VII. All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

VIII. The characteristics of the waste water may be analyzed by taking composite sample on hourly basis for 24 hours and accordingly the design of the sewage treatment plant may be decided for minimum capital and recurring expenditure based on techno-economic considerations. The quality of treated effluent shall meet the statutory requirements of State Pollution Control Board / CPCB depending upon the mode of final disposal.

IX. MNN should ensure that the treated sewage conforms to the standards prescribed by the State Pollution Control Board/competent authority depending upon the mode of final disposal.

X. Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

XI. A suitable laboratory may be set up for analyzing raw and treated sewage samples regularly to meet the standards.

XII. The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by MNN to this Ministry regularly for perusal and record.

XIII. A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

XIV. Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

XV. All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

XVI. An Action Plan for using the treated sewage for horticulture, irrigation, industrial and other non potable use also may be chalked out and incorporated while implementing the project so as to conserve the fresh water.

XVII. The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

XVIII. All possible efforts may be made to involve Public-Private-Partnership in O&M of components of project.

XIX. No change in the scope of project shall be effected without prior approval of CPHEEO.

CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/O Urban Development (Solid Waste Management)

➢ Proposal	Municipal Solid Waste Management in Meerut City
➢ Name of District / State	Meerut, Uttar Pradesh
➢ Name of City	Meerut
➢ Objectives	To make a efficient solid waste management system in Meerut in compliance with MSW Rules 2000
➢ Whether CDP is prepared	Yes
➢ Background	Meerut Nagar Nigam (MNN) has appointed RCUES to make a Detailed Project Report for formulation an integrated management system for municipal solid waste in Meerut meeting the requirement of MSW rules 2000.
➢ Present Status	Meerut has a population of 11.8 lakhs. It is spread in an area of 142 square kilometers. The length of roads is about 1000 kilometers. There are 44 open dumps and 160 secondary collection points for waste spread all over the city. MNN has about 2200 safai karamcharis and a fleet of 107 vehicles of different type /age to carry out MSWM activity. The waste in the city is being dumped at 2 unauthorized sites a few kilometers away from the city. The present Municipal Solid Waste Management in Meerut is not meeting the MSW Rules 2000. It lacks proper door to door collection system, does not have closed dhallaos/dustbins for waste disposal, improper/in sufficient transport vehicles/mechanism and unscientific disposal of waste at unauthorized dumpsites. The present status is reflected by the disposal of garbage on road sides and open dumps seen in Meerut, clogged nallahs and storm water drains.
➢ Need of the Project	The deteriorating situation of solid waste management reflects clearly in the streets/roads of Meerut. This along with the requirement as per law to have a system in compliance with MSW rules 2000 into place at the earliest has necessitated this activity.

➢ Population	In area under purview of MNN
• as per 2001 census	10,68,772
• base year (2006)	11,83,770
• design year (2011)	13,49,170
•	
➢ Solid Waste Generation	
• base year	554 TPD As per Survey (per capita waste generation = 0.468 kg/person/day)
• design year (2011)	663.6 TPD
•	
➢ Project Components	The requirement of the total waste generation has been worked out after a detailed survey of waste generating areas and the requirement of the equipment for its collection, storage and transportation has been worked out. • Collection: Rs 324.7 lacs • Storage: Rs 307.4 lacs • Transportation: Rs 334.6 lacs Estimation of the cost of the waste to compost and development of an engineered landfill for waste disposal has been evaluated. • Compost Plant (200 TPD): Rs 496.7 lacs • Landfill site (for use for 5 years): Rs 730 lacs The land for the integrated complex for solid waste treatment and disposal is earmarked in the master plan of Meerut 2021. It has to be acquired. Provisions for IEC have been made and areas that can be brought under PPP have been suggested.
➢ Estimated Cost (Proposed)	Rs 2485.4 lacs
➢ Period of Implementation	Ending on March 31,2008
➢ Funding Pattern	Grant Funds from GOI, State Government, MNN as per ratio to be decided by the Competent Authority
➢ Financial Phasing	In one phase ending on March 31d,2008
➢ Implementing Agency	Meerut Nagar Nigam
➢ Annual O&M Expenditure	

- existing
- proposed (year 2008-09)

MNN incurs an expenditure of about Rs 1d8 crores annually on MSWM. The expenditure on this activity is financed from the funds it received from the State Finance Commission.
Would be continued to be met by MNN as per present O&M expenses. This would get reduced when Household collection is brought under PPP over a period of time.

The annual cost of transportation of waste is estimated at Rs 356 lacs (Rs 176/ton). The annual cost of O&M at landfill is estimated at Rs 27.9 lacs (Rs 50/ton). The O&M cost for compost is estimated at about Rs 0.94 paisa/kg.

- Agency Responsible for O&M — MNN under PPP for its sub components

- Charge for Solid Waste Management
  - existing — Nil
  - proposed (year 2008-09) — Rs 15 to Rs 40 for household collection of waste
    Tipping fee can be levied by / from MNN to recover the O&M costs indicated above.

- Revenue Generation (Rs lacs)
  - existing — Nil
  - proposed — Most of the areas are not likely to generate revenue in the initial period except for compost plant. Compost plant is likely to generate a revenue of Rs 1500/ton

- Estimated Cost for Consideration & Approval
  - Capital Costs — Rs 2259.4 Lacs
  - Incentive Costs @ 5 % — Rs 113.0 Lacs
  - Costs for Evaluation & Monitoring @ 5 % — Rs 113.0 Lacs

  Total — Rs 2485.4 Lacs

CPHEEO's Comments

1. **This Scheme has been designed in line with MSW Rules 2000 taking into consideration of the existing infrastructure in the City.**

2. **While Designing, the Norms laid down in the Manual on Solid Waste Management have been followed.**

3. **Design of all the components of the Scheme have been furnished with the proposal. However jobs like Compost plant would be the turnkey & would be with Public Private Partnership (PPP).**

4. **Provisional have been made for segregated house Collection of Waste.**

5. **O & M costs have been made worked out & ULB needs to impose relevant taxes to recover at least the O & M Cost from the Consumer. ULB should issue resolution in this regard to recover the SWM Costs.**

6. **The Scheme is approved from a technical angle at a Total Capital Cost of Rs 2259.4 Lacs as against the Proposed Total Cost of Rs 2485.4**

7. **The Incentive to the tune of 5 % i.e. Rs 113 Lacs & 5 % i.e. Rs 113 Lacs towards Monitoring & Evaluation Charges have not been included in the aforesaid recommended Cost as per Para 6.**

8. **The land for the Integrated Landfill Facility like Compost Plant & Landfill Site is yet to be acquired by MNN. Therefore the Design Criteria for Landfill Development has been included in the DPR & Hydrological Investigation need to be carried out after the Land is made available.**

9. **The Scheme is fit for approval under JNNURM. However funds for execution of the scheme should be released to MNN by the Nodal Agency only after receipt of Papers for Land acquisition by MNN for integrated treatment facility & after having a MoU with entrepreneur of Compost Plant & Sanitary Landfill.**

Abstract of Approved Cost

Solid Waste Management in Meerut

	Particulars	Total Estimated Cost (Rs in lacs)	Total Approved Cost (Rs in Lacs)	Remarks
A.	Collection/Storage/Transportation			
	Collection	324.7		
	Storage	307.4		
	Transportation to site/plant	334.6		
	Sub Total	966.7	966.7	
B.	Compost Plant from Waste (200 TPD)	496.7	496.7	
C.	Landfill Site (for use during the first 5 years):	730.2	730.2	
D.	Contingencies @ 3% on A to C	65.8	65.8	
E.	**Total Capital Cost (A+B+C+D)**	**2259.4**	**2259.4**	
F	Preparation of Detailed Project Report @ 1.5 % of E above	33.9		
G.	Capacity Building, IEC @ 1.5 % of E above	33.9		
H.	Efficiency @ 1 % of E above	22.6		
I.	Innovative Approach @ 1 5 of E above	22.6		
J.	**Incentives (F+G+H+I+J)**	**113**		
K.	**Third Party Projects Monitoring and Evaluation @ 5 % of E above**	**113**		
L.	**Total (E+J+K)**	**2485.4**	**2259.4**	

Note: (1) The Scheme has been Technically Examined and Approved for Rs.2259.4 lacs.
(2) The Recommended Cost does not include 5 % Execution Charge as per guidelines.
(3) It does not include 5 % for Monitoring & Evaluation for which otherwise nodal agency may be eligible.

Recommended from Technical Angle for **Rs.2259.4 Lacs**

CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o UD

(Water Supply)

1.	Proposal		DPR of Water Supply Works for City of Meerut Under JNNURM
2.	Name of District / State		Meerut, Uttar Pradesh
3.	Name of city		Meerut
4.	Objectives		To augment and strengthen water supply system of City of Meerut as per CPHEEO/JNNURM norms .
5.	Whether CDP is prepared		Yes
6.	Background	:	Meerut city is the 24th largest city in India (population wise) and the 4th largest city in Uttar Pradesh after Kanpur, Lucknow and Agra. The total population of Meerut as per the Census 2001 is 1161716. It is spread over an area of 149 sq kms with natural drainage towards river Kali (from north to south) and all the natural nalas draining out in river Kali. Due to rapid urbanization of Meerut city and consequent growing needs of the city in respect of water supply, the Water Supply System needs to be augmented and reorganized to cater the water demand of population for next 30 years. The proposal has been submitted for consideration under JNNURM for sanction to meet the above objectives.
7.	Present Status	:	The existing water supply system of Meerut is based on ground water and water is supplied to the public through a series of tubewells, OHT and CWR in isolated locations. Because of old system of water supply in the city based on number of tubewells, it incurs huge recurring expenses for operating the water supply system. Moreover, the system is grossly insufficient to fulfill the increased demands of the city since no major renovation/ augmentation of water supply system has been undertaken since last 30 years in the walled city area. For some of the other areas in the city, the system is designed to cater to the need of localized pockets only. The existing water supply system was implemented mostly in early 70's which requires replacement of most of the system which had got corroded and outlived its economic design life. The service storage available is also inadequate, as per the norms. Water quality tests have been conducted on groundwater samples collected from across the city.

The results for various samples suggest that water is deteriorating in the areas where concentration of tube wells are more especially inner core area. In some of the water test reports of tube wells, presence of fluoride has been observed which is near the limit prescribed for rejection of source. But these pockets are mostly limited in core area of city only. At the peripheral areas of city, the tube wells are having good yield and water quality is also good. The same has been proposed as source of supply for these outer areas.

Following are the salient features of existing water supply system

- Water is supplied from spot sources (102 Tube wells) through de-centralized system
- Groundwater depletion is reported to be 1-2 m every year around urban centes.
- Presence of fluoride above the recommended limits are found in some of the groundwater samples
- Water supply is intermittent (Appx. Four hours, twice a day)
- Present service storage is inadequate
- 11 out of 80 wards do not have any piped water supply
- Distribution system is more than 30 years old, in walled city area, and outlived its useful life.
- Because of old and worn out system, the leakages are very high in the system and are of the order of approx. 40%.

8. Water availability :
   - o Total (MLD) : 167.5 MLD
   - 0 Sources : 167.5 mld - production through tubewells (102) /surface source (through tubewells -165 mld and through surface water source - 2.5 mld)
   - o Per capita (lpcd) : 102, less than National Norms which states a minimum requirement of 150 lpcd in large cities.
   - o UFW : 40 %
9. Need of the Project :
   - Meerut is a growing city where decadal growth rate is over 36%; more than the National average.
   - The deficiency of adequate drinking water supply in Meerut City.
   - Current domestic water demand of about 227 MLD against which water supplied is about 167.5 MLD by MNN. Thus a present shortfall of around 60 mld.
   - Presently, supply is intermittent for approx. 8 hours in a day in two shifts of 4 hours each.

- Ground water is reported to be depleting coupled with deterioration in quality of water.

10. Population -
    - As per 2001 Census : 1161716
    - Base year – 2010 : 1455397
    - Intermediate year -2025 : 2139856
    - Design year – 2040 : 3152955
11. Water Demand (Mld) -
    i. Base year – 2010 : 260
    II. Intermediate year-2025 : 380
    ii. Design year – 2040 : 560
12. Proposed Scheme - The proposed scheme comprises of setting up a 100 MLD WTP to meet the mid design water demand of city along with ground water. However, even after mid design year the same capacity of WTP would be maintained and the balance increased water demand may be availed from ground water sources as the same has potential to supply water to the city. The provision of 100 mld WTP only has been made especially to reduce the pressure on ground water sources in the densely populated areas of the city..

    It is proposed to lay around 22 Kms of conveyance main for supplying water to zonal reservoirs and 1168 kms of distribution system for supplying water to consumer end in Meerut city. While designing the distribution system the areas under the Meerut Nagar Nigam have only been considered including the 11 wards which do not have piped water supply at all. The internal distribution system of MDA/Pvt Developers area and cantonment area have not been considered as these areas has already been covered with distribution network.

13. Proposed Source To ease the pressure on ground water aquifer in inner core area of city, a provision of 100 mld has been made based on surface source from the Upper Ganga canal and balance of 80 mld only has to be extracted from Ground water sources against present withdrawal of 165 mld. This would be sufficient to meet the mid year demand of 2025.

    Further, while augmenting the water supply system consideration has also been made to ensure that water supply system is based on surface as well as ground water source side by side so as to reduce the cost of conveyance of surface water at the same time avoid undue pressure on ground water resources in the city. This would also be helpful in

ensuring the dependability of system.

The Upper Ganga Canal is a perennial source, which flows within 8 km from the city. Ganga Water from Upper Ganga Canal at Bhola Ki Jhal has been considered as the source of water supply to Meerut city.

The Municipal Commissioner, Meerut Nagar Nigam has committed to make necessary provisions for storage of canal water during canal closure period including acquisition of land and storage facility for raw water from state Government / ULB funds.

However, the situation has been analyzed considering worst case where raw water of 100 mld may not be available for 20 days or so. In such situation due to conjunctive use of ground as well as surface water for inner core area, a minimum level of water supply can still be maintained with help of ground water sources through increased hours of pumping as good ground water aquifers are existing in and around the city as per CGWB study.

The components along with its cost estimate is as under:

14. Estimated cost (Proposed) (Rs.lakh) :

Intake Structure, Pump House and Raw Water Rising Mains	127.00
Raw Water Pumping Machinery	112.25
Water Treatment Plant	1450.00
Clear Water Storage Tank and Pump House	309.30
Clear Water Pumping Machinery	258.95
Staff Quarters	63.78
Clear Water Rising Mains	1998.77
Zonal Reservoirs	413.25
Pumping Machinery at Zonal Reservoirs	748.51
Pumping Mains from Zonal Reservoir to OHT	1383.72
Over Head Tanks	571.70
Distribution System	17883.36
Tube well	955.92
Pumping main from TW to OHT	229.70
Total Cost	26506.21

	Contingencies @ 3 %		795.18
	Capital Cost		**27301.39**
	Charges for DPR Preparation, IEC and establishment charges to be claimed for reimbursement as per JNNURM Norms separately		**2730.13**

15. Cost for Consideration and approval — Total Project Cost Rs. 45305.93 lakhs

16. Sharing Pattern

	Share	Rs. In Lacs
GOI	50 %	13650.69
State Govt.	20 %	5460.28
MNN	30 %	8190.42

17. Financial Phasing

GOI Share	**Rs. 13650.69 lacs**	
Year 2007-2008	30 %	4095.21
Year 2008-2009	50 %	6825.34
Year 2009-2010	20 %	4550.23
State Share	**Rs. 5460.28 lacs**	
Year 2007-2008	30 %	1638.08
Year 2008-2009	50 %	2730.14
Year 2009-2010	20 %	1092.05
MNN Share	**Rs. 8190.42 lacs**	
Year 2007-2008	30 %	2457.13
Year 2008-2009	50 %	4095.21
Year 2009-2010	20 %	1638.08

18. Period of Implementation : Three Years
19. Funding Pattern : GoI:State:ULB::50:20:30
20. Implementing Agency : Meerut Nagar Nigam
21. Annual O&M Expenditure : (Rs.lakh)
    - Existing (year 2006) : 800
    - Proposed (year 2010) : 2027.03
        - Energy & Power charges : 638.11
        - Chemicals like Alum, Bleaching Powder etc. : 102.96
        - Incurred by MNN for : 800.00

providing ground water

- Maintenance and repair : 241.05
- Wages of operating staff : 244.92

22. Agency Responsible for O&M : Meerut Nagar Nigam
23. Existing Tariff (Rs./kl) :

Domestic		Non Domestic	
Area of house (yards)	Charges per Month	Type of Establishment	Charges per Month
Up to 50	30	Shop	100
50-100	40	Meat Shop	200
101-200	50	Clinic	250
201-300	70	Dairy	250
301-500	130	Nursing Home up to 5 beds	500
>501	200	Sweet Shops	500
		Movie Halls, Big Nursing Home	1000
		Hotels, Service Station, Construction	1500

24. Existing Revenue Generation (year 2004-2005) : 257.00 Lakhs

25. Proposed Tarrif &
Revenue Generation

Percentage Consumption in Slab	Slab	MLD	Applicable Rate(Rs/ kl)	Revenue Generated per annum(Rs In Lacs)
36.12	0-2 KL	97.52	1.00	355.95
18.54	2-5 KL	50.06	2.00	365.44
20.88	5-10 KL	56.38	2.50	514.47
24.45	> 10 KL	66.02	4.00	963.89
Total Revenue Generated				**2199.75**

Rate in Increase of water tariff per annum	10	%
Revenue required for upto 2025	2,262.97	(Rs. in lakhs)

Year	0 -2 KL	2 - 5 KL	5 - 10 KL	> 10 KL	Revenue Generation in Rs(In Lacs) per Annum	Status of MNN(Rs In Lacs)
2010	1.00	2.00	2.50	4.00	2,196.64	-66.33
2011	1.10	2.20	2.75	4.40	2,419.60	156.63
2012	1.21	2.42	3.03	4.84	2,661.56	398.59

DPR has been perused and CPHEEO's comments are as under:

As the DPR for Meerut Water Supply has been framed as per the Manual on Water Supply & Treatment, we may accord technical approval to the same at an estimated cost of Rs. 273.01 crore against the proposed cost of Rs.641.82 crore.

The reduction in cost is basically because of proposing mixed system of water supply based on surface as well as ground water sources which in original proposal was based entirely on surface water source only. Further, reduction in cost is due to optimization of designs and disallowing lump sum items that were made in the estimates without justification.

The State Government and Meerut Nagar Nigam shall ensure compliance to the comments for project implementation given below :-

COMMENTS

1) State Government has to ensure the acquisition of requisite land near Bhola ka Jhal along with storage facility for the canal closure period for 20-25 days from its own resources so as to meet the water requirement for the town during the canal closure period during the project implementation period so as to ensure that the same is available at the time of commissioning of the scheme.

2) During the project implementation, land for all other units may be acquired so that during the course of implementation, the possibility of delay because of non-availability of land may be avoided.

3) During the project implementation, the detailed design of each and every component in the project may be carried out based on precise survey and prevailing ground situation and only after approval of design by competent authority not less than the level of Chief Engineer, the execution of the project should be started.

4) The Meerut Nagar Nigam should ensure that the tube wells envisaged in the proposed water supply scheme should be put to use for controlled hours, as envisaged in the DPR, to avoid over exploitation of groundwater.

5) The rates adopted in the estimation of DPR, is based on current schedule of rates and no escalation in the cost during the implementation is admissible. However, any increase in the cost over the sanctioned cost due to any reason has to be borne by State Government /ULB.

6) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR should be implemented after commissioning of the scheme.

7) After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

8) A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

9) All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

10) It is suggested that MNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

11) The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR.

12) The MNN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

13) Air valves and scour valves may be provided at strategic locations in the transmission mains.

14) After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

15) During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

16) The material and equipment to be procured should conform to BIS specifications.

17) Uninterrupted electric power supply must be ensured by MNN for trouble free operation and maintenance of the scheme.

18) MNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

19) To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

20) Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

21) The raw water should be analyzed for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

22) Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

23) No change in the scope of scheme is allowed without prior approval from CPHEEO.

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Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o. Urban Development (Solid Waste Management)

Proposal	**Municipal Solid Waste Management Improvement in Varanasi City**
Name of District/State	Varanasi, Uttar Pradesh
Name of City	**Varanasi City**
Objectives	To establish the Integrated Solid Waste Management System in Varanasi city in compliance with MSW Rules 2000.
Whether CDP is approved	Yes
Background	Nagar Nigam Varanasi has appointed Regional Centre for Urban & Environmental Studies (RCUES) to prepare a Detailed Project Report for establishing an Integrated Municipal Solid Waste Management system for Varanasi meeting the requirements of MSW Rules 2000.
Present Status of MSW	The area falling under Varanasi Nagar Nigam is 79.79 Sq. Km Varanasi has a population of 1202443 as per 2001 census and current population is 1434271 (2007). Total current (2007) waste generation is 600MT/Day and the average quantity of waste collected and disposed at present is 480 MT/day. The quantity of waste generation is projected to reach 735 MT/Day by 2011. Secondary waste storage system is insufficient and majority of waste storage depots are open and unhygienic. Only 20 masonry "dhalos", 27 open waste storage sites and 65 containers have been provided for secondary storage. The depots are not in synchronization with the primary collection system and multiple handling of waste is practiced. Transportation of 75% of waste is done on a day to day basis. 90% of the vehicles used for transportation of waste are not covered. The situation of treatment and disposal of waste is extremely poor. Municipal Corporation does not do any treatment or scientific disposal of waste. The entire waste generated at present, which is over 600 MT a day is disposed of haphazardly at various places in the city. Waste is being dumped on private lands. e.g. all open dumps in Sigra ward are

on private land. Few dumps in Nagwa ward, Jaitpura ward, Sicrol ward and Sarnath ward are also on private land. These dumps are 35 in number.

At some places in Aadampur, Sicrol ward and Sarnath ward, waste is being dumped having large dimensions. The total number of such dumps is 20 in number. At Nagva ward, Jaitpura, Adampur, Sicrol, places are covered with large amount of waste along the small bridges. On the banks of the river Ganga, especially on Naya ghat, Pralhad ghat, Sakka ghat and Telliyanala ghat waste is being dumped. The waste is neither spread nor covered. It is allowed to decay on site.

Varanasi has several problems very specific to the city. The city has as many as 85 ghats which are frequented by a large number of pilgrims and tourists. Several types of religious ceremonies are performed at these ghats and these ceremonies generate variety of solid wastes which are traditionally immersed in the holy river flowing adjacent to ghats. Flowers form a major component of such waste; they keep floating and pollute the river. The Municipal Corporation makes special efforts to remove these flowers through boats.

Whether CDP is prepared

Yes

Need of the Project

Municipal Solid Waste Management is deficient in all components i.e. source segregation is nil, primary collection is very low leading to littering of waste in the street and corners, street sweeping lacks appropriate tools and equipments, secondary storage is in inefficient due to insufficient numbers of waste storage depots and majority of them open and unhygienic, transportation of waste taking place through open vehicles. Municipal Corporation does not do any treatment or scientific disposal of waste. City has no system of treatment and disposal of waste, the entire waste which is over 600 MT a day is disposed of haphazardly at various places in the city i.e. private lands, bank of canals/river, etc.

The existing Solid Waste Management system lacks adequate infrastructure facilities to meet the norms stipulated in the MSW rules 2000. Varanasi city needs to immediately augment municipal solid waste management systems in the city to comply to the Rules Municipal Solid Waste (Management and Handling) Rules 2000. The project has been prepared with a view to augment existing Solid Waste Management system by adopting integrated approach.

Proposed Municipal Solid Waste Management Systems for Varanasi

1. The waste shall be segregated at source and kept separately at household level. Ban shall be imposed for littering of waste on the streets, making segregation of waste source mandatory for all waste generators.
2. Door to door primary collection shall be implemented with the participation from NGOs/RWAs and private parties on user recovery basis.
3. Informal rag pickers will be made part of the system of door to door waste collection and this sector will be formalized through NGOs/ CBOs. They will also be allowed to sell the recyclables.
4. Waste collectors, through NGOs shall be provided with the containerized handcarts/tricycles and would collect and transfer the domestic waste directly in to green containers that are proposed to be placed at short distances in the entire city. This would ensure that organic matter gets collected separately and taken to the treatment plant.
5. The street sweepings are proposed to be collected separately and directly transferred into black containers kept along side the green containers.
6. Twin bin litter bins are proposed to be installed at public places like market places, parks, institutional areas and public places.
7. The transportation of waste is planned through covered hydraulic vehicles in such a way that the green containers are lifted daily and the black containers every once a week when they are about to be full and directly taken to the transfer stations.
8. It is proposed to set up two transfer stations where waste could be directly tipped into a large hauling vehicles taken to the waste treatment plant.
9. The entire system is well synchronized avoiding multiple and manual handling of waste.
10. Microbial composting of 375 MT organic matter scientifically at the proposed composting plant.
11. Scientific disposal of inerts and rejects from the waste treatment plant at an engineered landfill is proposed. Besides, all existing open dumpsite are proposed to be closed scientifically.

Population

(as per DPR on Water

2001 (as per census 2001)	**2010 (Design Year)**	**2025**	**2040**
1202443	**1666100**	**2473700**	**3317900**

Supply approved by CSMC)

Solid Waste Generation (Total)

Current Waste Generation = 600 MT/Day (As per Survey)

Biodegradable	Recyclable	Other Waste
51.25%	**15.30%**	**33.45%**

Composition of recyclable waste					
Paper	**Polythene**	**Plastics**	**Glass**	**Metals**	**Miscellaneous**
32.8	25.6	7.3	5.7	5.8	22.8

Per Capita Waste Generation = 410gms/capita/day (as per survey)

Projected Waste Generation

Waste generation in the Design Year (2011) of this DPR will be 735 MT/Day.

Project Components

The various components of Integrated Solid Waste Management systems have been worked out in the DPR after detailed assessment of the existing deficiencies and mandatory requirement as per MSW Rules 2000.

- Equipments, vehicles, tools, etc. to augment primary collection, street sweeping.
- Secondary storage containers to augments to secondary storage, and direct transfer of waste
- Covered hydraulic vehicles to improve the transportation of waste through covered containers to ensure direct transfer stations/treatment plants
- Construction of transfer stations Construction of computerized weigh bridge with office at transfer stations
- Construction of 375 MT capacity composting plant with all necessary tools and equipments
- Development of Engineered Sanitary Landfills for ensuring safe disposal of rejects.
- IEC and capacity building programmes.
- PPP in door to door collection
- PPP to construct and operate the transfer station, treatment & disposal facilities.

Estimated Cost (Proposed)

Sr. No.	Particulars	Total Outlay (in Rs. Lakhs)
A	Primary Collection and Street Sweeping	238.98
B	**Secondary Storage**	**294.56**

C	**Transportation of waste materials**	**928.25**
D	**Transfer Station**	**304.18**
E	**Composting Plants**	1366.00
F	**Sanitary landfills**	1362.98
G	**Closure of Existing dumps**	207.49
	Capital Costs	**4702.44**
	Contingencies @3% on Capital Costs	141.07
	Total Capital Costs	**4843.52**
	Cost for establishing project implementation mechanism and for consultancy charges towards project preparation at 0.5% project cost	24.22
	Total Project Cost	**4867.73**

Period of Implementation

2007-2009 (1st November 2007 to 31st October 2009).

Implementing Agency

Varanasi Nagar Nigam

Funding Pattern

As the City of Varanasi is a one million plus town covered under JnNURM scheme, it is entitled to get 50% grants from Government of India, 20% grant from the state and remaining 30% to be borne by ULB.

Sharing pattern (as per JNNURM guidelines)

Agency	Share	Rs. (in Lakhs)
Govt. of India	**50%**	2433.87
State Govt.	**20%**	973.58
ULB	**30%**	1460.32

Financial Phasing

Financial Yr.	Central Govt.	State Govt.	ULB
2007-08	486.77	194.71	292.06
2008-09	973.55	389.42	584.13
2009-10	973.55	389.42	584.13

Annual O&M Expenditure

- **Existing** The expenditure on SWM activity (including street sweeping) is financed from the funds it receives from the State Finance Commission. The details of the Rs. 2393.43 spent on SWM and street sweeping during 2006-07 is as follows:-

Head of expenditure	**Budgetary provision (figures in lakhs)**	**Actual expenditure (figures in lakhs)**
Salaries of sanitation workers	1900	1909
Salaries of contract labour	180	130
Uniforms, etc.	20	18.44
Salaries of transport staff	90	91
Repairs and maintenance	65	59
Tools and equipment	45	44.99
Diesel	150	141
	2450	**2393.43**

- **Proposed Expenditure and revenue generation**

S. No	Year	2009-10	2010-11	2011-12	2012-13	2013-14
A	Surplus with VNN from H/H	212.00	265.00	318.00	381.60	457.92
B	Surplus from Compost plant	24.75	27.23	29.95	32.94	36.24
C	50% share of property Taxes& Municipal Revenue	921.40	1151.75	1439.69	1799.62	2249.52
D= A+ B+ C	**Total Surplus**	**1158.15**	**1443.98**	**1787.64**	**2214.16**	**2743.68**
E	Repair & Maintenance	0	0	123.65	123.65	123.65
F	Replacement after	0	0		316.65	316.65

	Useful life					
G	Fuel Cost	225	247.5	272.25	299.48	329.42
H	Salary	1909	1622.65	1379.25	1172.36	996.51
I= F+ G+ H+ H	**Total Expenditure**	**2134**	**1870.15**	**1775.15**	**1912.14**	**1766.23**
J= D-I	**Dependency on SFC Funds***	**-975.85**	**-426.17**	**+12.49**	**+302.02**	**+977.44**

***At present VNN gets support from State Finance Commission to the tune to Rs. 4101 lacs which would be drastically reduced after implementation of project and after 2011-12 onwards the project would not be dependent on SFC grants.**

Charges for SWM

Existing

1. Nil charges collected from households, shops and establishments.

Proposed

Low income group households	Rs. 20/month
Households other than low income group	Rs. 30/month
Normal Shops and establishments	Rs. 75 to 200/month
Hotels, large commercial complexes, large institutional buildings	Rate to be levied looking to the quantity of waste generated. (average 300/month)

Agency Responsible for O&M

Varanasi Nagar Nigam

Funds already received for SWM, if any

Corporation received Rs. 807.63 lakh as funds from the 12th Finance commission out of which Rs.180.17 lakh has been utilized. The balance amount of Rs. 627.46 is available with the municipality, which may be used as share of municipal corporation and also during initial phase of implementation to meet O & M Charges due to weak financial health.

Proposed Project Cost

Rs. 4867.73 Lakhs

DPR has been perused and CPHEEO's comments are as under:

The proposed DPR for Solid Waste Management for Varanasi city may be accorded technical clearance at an estimated cost of Rs. 4867.73 Lakhs at 2007-08 price level as per following break-up:

Sr. No.	Item of Expenditure	Quantity Required	Cost as per proposed DPR	Rs. In Lakhs as approved by CPHEEO
1	Containerized Tricycle for door to door collection of waste with 6 LDPE Containers	800	120.00	84.00
2	Pushcarts with 6 bins for door to door collection of waste from narrow lanes (MS Steel frame with LDPE Containers)	300	42.00	23.63
3	Containerized Tricycles for collecting street sweepings with LDPE Containers	888	90.00	93.24
4	Pushcarts with 6 bins for collecting street sweepings from narrow lanes	484	42.00	38.12
5	Seamless handcarts for drain cleaning	400	0.00	0.00
6	Litter bins (40Litre Capacity)	500	11.00	7.00
7	7Cubic metre green containers	150	199.50	85.50
8	3.5Cubic metre green containers	189	137.50	43.40
9	3.5Cubic metre black containers for street sweeping	239		83.65
10	Dumper Placer Vehicles (10Ton GVW) having twin bin lifting device with hydraulic cylinders and high pressure	15	325.00	165.00
11	Dumper Placer Vehicles	28		308.00

Sr. No.	Item of Expenditure	Quantity Required	Cost as per proposed DPR	Rs. In Lakhs as approved by CPHEEO
	with hydraulic cylinders and high pressure for larger bins			
12	4.5Cubic metre skip containers for storing and transporting construction debris	30	18.00	12.00
13	Skip Lifters Machines	3	36.00	31.50
14	Hopper/Small Pickup Vans	20	0.00	0.00
15	Large Hauling Vehicles for Transfer Station (27Cubic Metre)	19	442.00	386.75
16	Hotel waste collection vans	6	0.00	0.00
17	Garden waste collection vans	5	0.00	0.00
18	Asphalting of flooring under the containers	577	86.55	75.01
19	Construction of Simple Ramp Model Transfer stations with weighing bridge, compactors and washing facility	2	540.00	304.18
20	Flower composter machine	4	60.00	60.00
21	Compost Plant of 375MT/Day Capacity with Equipments	1	1878.90	1306.00
22	Upgradation of Maintenance Workshop for repair and maintenance of Vehicles	1	25.00	25.00
23	Closure of existing open waste dumps	1	218.26	207.49
24	Cost of Landfill Construction including Landfill Equipments	1	2623.39	1362.98
25	Exhaust Emission Testing Machine to detect pollution caused	1	5.00	0.00

Sr. No.	Item of Expenditure	Quantity Required	Cost as per proposed DPR	Rs. In Lakhs as approved by CPHEEO
	by vehicles			
	Capital Costs		**6900.10**	**4702.44**
26	**Contingencies @3% on Capital Costs**		207.00	141.07
	Total Capital Costs		**7107.10**	**4843.52**
27	**IEC, Training and Capacity Building, Exposure visits**		103.00	**-**
28	**Cost of Preparation of Detailed Project Report (1.5% of Capital Costs in DPR)**		103.50	**-**
29	**Monitoring, Supervision, Project Management Costs (5% of capital costs in DPR)**		345.01	**-**
30	**Cost for establishing project implementation mechanism and for consultancy charges towards project preparation at 0.5% project cost**		-	24.22
	Total Project Cost		**7658.61**	**4867.73**

The State Government should ensure the compliance of following during project implementation and thereafter:

1. The DPR has been prepared as per the guidelines laid down in the manual on solid waste management.

2. Against the land requirement of 125 Acre for next 20 to 25 years the land available with the municipal corporation of Varanasi is 48.13 acres only. The balance land is to be acquired in future by Municipal Corporation of Varanasi.

3. For treatment and disposal for flower waste collected near temples/ghats/river, 4 mechanical waste converters have been proposed in the estimate.

4. The design of sanitary landfill has been done for 5 years (2009 to 2014). Sanitary landfill facility beyond 5 years shall have to be created by the Varanasi Nagar Nigam with their own funds including the sustainability of project.

5. To ensure efficient operations of SWM system, a provision of 10% spare has been made in the estimate. However the same in case of large hauling vehicles for carrying waste from transfer stations to waste treatment facility has been kept 25% (2 spare in number).

6. The scheme should be implemented as per the municipal solid waste Rules 2000 taking into consideration of the existing infrastructure in the city and in accordance with the guidelines of the Manual on Municipal Solid Waste Management (May, 2000) published by the Ministry.

7. Before implementing the project, Varanasi Nagar Nigam should obtain the requisite technical and administrative sanctions from the competent authorities.

8. The implementing agencies should make applications to the State Pollution Control Board (SPCB) for setting up the municipal solid waste treatment plants (compost plants) and sanitary land fill facility and obtain the necessary authorizations from the SPCB.

9. The project is designed for segregation of municipal solid waste into the categories of organic decomposable waste and inorganic or non-biodegradable waste. Accordingly all the households should be advised/ educated through media, etc for the segregation of two types of waste and Varanasi Nagar Nigam shall ensure that the segregated waste is collected at household level. The sanitary workers should be properly trained and sensitized to collect the segregated waste into the two different bins and not to mix the waste.

10. Varanasi Nagar Nigam should ensure that there should not be littering in the street/open spaces by the residents for which if required the bylaws may be amended to enforce penal action against the polluters.

11. O&M costs have been worked out & Varanasi Nagar Nigam needs to impose relevant taxes to recover at least the O&M cost from the consumer. Municipal Corporation should issue resolution in this regard

to recover the Solid Waste Management costs to ensure the sustainability of the project.

12. Before implementing the project for Solid Waste Management in Varanasi Nagar Nigam area, corporation should take up IEC (Information, Education and Communication Campaigns) in association with NGOs/CBOs involved in the Sector for effective implementation and success of the project. The beneficiary of urban population should be well informed of the advantages of segregation of waste in the households / places of generation so that they may follow it scrupulously.

13. The corporation workers should be educated on the matters of personal protection while dealing with municipal solid waste. Informal arrangements may also be made for extending facilities for regular health checkups, preventive immunization etc. to the upgraded rag pickers engaged as primary collectors of municipal solid waste.

14. The proposal has considered the placement of adequate number of storage containers in high waste generation areas such as vegetable markets, fish/meat markets, business centres, street markets and places where eateries are concentrated. It has also envisaged the specific requirements to cater to narrow lanes and slum areas.

15. The corporation should explore the possibility of PSP (Private Sector Participation)/Public Private Partnership arrangements for setting up and maintenance of compost plants and sanitary landfill facilities with adequate safeguards built in to ensure compliance with the municipal solid waste Rules 2000.

16. The Corporation should ensure the proper maintenance of the freight of the secondary transport of municipal solid waste in order to keep the vehicles in fit condition at all times as per the guidelines of the Manual.

17. The Corporation should ensure that all the municipal solid waste reaching the compost plant / sanitary land fill facilities is properly documented with necessary details such as weight, place from which lifted, time of receipt etc.

18. The compost plant should have the enough platform area which can accommodate / receive the higher volumes of municipal solid waste on days of special importance.

19. The compost plant and sanitary landfill facilities should have all the infrastructural facilities such as weigh bridges, operational area, operational buildings with amenities, laboratory for sample analysis, simple vehicle maintenance facilities such as puncture shops, illumination, internal roads, fencing, security etc. as per the municipal solid waste Rules, 2000 and the Manual on Municipal Solid Waste Management published by the Ministry.

20. The corporation should explore the possibility for bulk marketing of the compost by tying up with Agricultural Stations/Institutions and associations of Agriculturists in order to ensure marketability of the compost which will help in the sustainability of the project.

21. The setting up and operation of the municipal solid waste treatment plant and sanitary land fill facility shall be in accordance with the municipal solid waste Rules 2000 and the norms of SPCB. The sanitary land fill facility shall also be subject to the post-closure operational requirements as laid down in the said rules / SPCB.

22. The corporation should ensure that user charges are levied and collected from all the generators of municipal solid waste in order to meet the O&M expenses of the primary & secondary collection & transport and also for its treatment & land filling. The corporation should also generate adequate user charges for establishing an asset replacement fund as municipal solid waste management equipment has a short life span of 3-8 years only.

23. No change in the scope/design/nature of the project shall be effected without prior approval from CPHEEO.

24. The equipment and machineries should be in accordance with BIS and as specified in the DPR.

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CPHEEO

Appraisal note for Consideration of Central Sanctioning & Monitoring Committee CS&MC, Ministry of Urban Development (under JNNURM)

(Sewerage)

1.	Proposal	Sewerage work for Varanasi Trans Varuna Area
2.	Name of State	Uttar Pradesh
3.	Name of City	Varanasi
4.	Objective	To provide sewerage facility in Trans Varuna area of Varanasi City (Sewerage District 2B & 2C of Sewerage Master Plan).
5.	Whether CDP is proposed	Yes
6.	Background	• **Varanasi City** – Varanasi city is located along the western bank of the river Ganga. Its population as per 2001 census is 12.02 lacs and present population is 15.16 lacs. The population of project area at present is around Rs. 4.5 lakhs. Its name has been derived from the two existing streams flowing in the North and South of the old city namely Varuna and Assi rivers. It is said to be the most ancient city in the world. Since time immemorial, it is a famous pilgrim centre and a seat of learning. At present it is one of the most important tourist centres in the world. Thousands of pilgrims/ foreigners visit the city every year to see the beautiful scene of the crescent shape Ghats along the river Ganga. Besides, ancient Budha stupa at Sarnath and the Golden Temple of Lord Vishwanath is also very popular among tourists. It is situated on the left bank of river Ganga at 71.0 m. above MSL and at 82^0 57' E longitude and 25^0 20' N latitude. It is a plain terrain with ground level varying between 71.0m and 80.0m above MSL. – Main industrial activities of concern are Banarasi Sarees, Diesel Locomotive works. Small scale industries cover rerolling, casting, painting and varnishing. – It is well connected with rail, road and air network.

<table>
<tr><td></td><td></td><td>– HFL of the river Ganga at Varanasi city is 73.90m.</td></tr>
<tr><td>7.</td><td>Present Status</td><td>• Sewer Net Work : The length of existing sewers / trunk sewers of Varanasi town is around 400 km. In the project area no sewer network is available.

• Sewage Pumping Stations :
• Seven sewage pumping stations have been constructed earlier in different areas of the Ghats of city.

• Sewage treatment plants
Three sewage treatment plants (101.8 mld) have been constructed under Ganga action plan
• 9.8 MLD (Activated Sludge Process) at Bhagwanpur.
• 80 MLD ASP (Based on Activated Sludge Process) at Denapur.
• 12 MLD ASP (treat industrial waste with domestic waste) at DLW.

At present, except rainy season, treated waste water is used for irrigation purposes.</td></tr>
<tr><td>8.</td><td>Overall population/Trans varuna area population and estimation of sewage</td><td></td></tr>
<tr><td></td><td colspan="2"><table>
<tr><td>S.No.</td><td>Year</td><td colspan="2">Population</td><td colspan="2">Waste Water Generation (in MLD)</td></tr>
<tr><td></td><td></td><td>Total City area</td><td>Trans Varuna area (Project area)</td><td>Total</td><td>Trans Varuna area</td></tr>
<tr><td>1</td><td>2001</td><td>1202443</td><td>231904</td><td></td><td></td></tr>
<tr><td>2</td><td>2010</td><td>1716100</td><td>527400</td><td>205.904</td><td>63.264</td></tr>
<tr><td>3</td><td>2025</td><td>2523700</td><td>998700</td><td>302.444</td><td>119.844</td></tr>
<tr><td>4</td><td>2040</td><td>3367900</td><td>1520400</td><td>404.148</td><td>182.448</td></tr>
</table></td></tr>
<tr><td>9.</td><td>Need of the Project</td><td>Presently about 35% population of Varanasi city is sewered. Considering the JBIC master plan and works proposed in Feasibility study report, it is necessary to improve sanitary condition in the city. Geographically, City is divided in two parts, Cis Varuna Area and Trans Varuna Area. For sewerage master planning, City is divided in four sewerage districts. The project area (The Trans Varuna</td></tr>
</table>

		Area) is covered under sewerage district 2B & 2C of sewerage master plan. A comprehensive sewerage network in trans Varuna area including pumping station and STP has been proposed in the DPR.		
10.	Area of City	10058 hectare (Master Plan)		
11.	District	Total city Area (ha)	Sewered area (ha)	Unsewered area (ha)
	District I –Central City	1022	1022	-
	District I / 2A	1451	508	943
	District II /2B	686	-	686
	District II –/2C	997	-	997
	FSA –I	149	-	149
	NSA-1	1321	-	1321
	NSA-2	471	-	471
	District III	1382	105	1277
	FSA-4	1044	-	1044
	District IV	1535	-	1535
	Total Area of City	10058	1635	8423

11	**<u>Water supply</u> <u>status</u>**: As reported, in the DPR, a water supply scheme for the same project area is under preparation for consideration under JNNURM raising water supply level to 150 lpcd till design year 2040. Thus, water supply availability is likely to be ensured till design year for efficient functioning of the sewerage system. **Proposed Sewerage Component in District 2B & 2C (Trans Varuna Area)**	
	Works Proposed in JNNURM	
	Sewerage Network	142.58 Km – Dia 150-2400 mm
	Rising Main	-1.6 Km - Dia 450 mm - 100m - Dia 1400 mm
	SPS	1 No – Sathawa (MPS) 1 No – Narokhar (IPS)
	STP	120 MLD (for year 2025) at Sathawa village
12	Sewage Contribution (Rate)	120 lpcd
13	Cost as per DPR	Rs. 409.46 crore
14	Cost recommended by CPHEEO	Rs. 309.12 crore

Period of implementation	36 months (January 2009-December 2011)

	(Rs. in Crores)

Funding pattern GoI: GoUP: ULB	GoI	GoUP	Varanasi Nagar Nigam (VNN)	Total
	50%	20%	30%	100%
As proposed	154.56	61.82	92.74	309.12

Financial Phasing (Rs. in Crores)

Year	GoI	GoUP	VNN	Total
2008-09 (20%)	30.91	12.36	18.55	61.82
2009-10 (40%)	61.82	24.73	37.09	123.65
2010-11 (30%)	46.37	18.55	27.82	92.74
2011-12 (10%)	15.46	6.18	9.27	30.91
	154.56	61.82	92.74	309.12

Ownership of Project :	Nagar Nigam, Varanasi
Implementing Agency	Uttar Pradesh Jal Nigam
Annual O&M Expenditure (Rs. lakhs) in year 2010	Rs. 857.00 lakhs
Agency Responsible for O&M	Varanasi Nagar Nigam

S.N.	INCOME GROUP	% Population	Population	No. of House 5 person/ house	Per capita monthly consumption	Cess charge per KL of W/S	Avg. per house monthly consum. Kl	Per house monthly charge in Rs	Total annual Revenue for W/S in Rs Lacs	Income from Sewerage @ 35% of Water charges
For year 2010 Total Population -			**527200**							
Commercial		3	15816	3163	12.50	12.00			284.796	99.68
1	Lower	25	131800	26360	0-3 KL	3.20	15.00	48.00	151.834	53.14
2	Middle	42	221424	44285	3-5 KL	5.00	22.50	112.50	597.848	209.25
3	U/Middle	20	105440	21088	5-10 KL	7.00	37.50	262.50	664.272	232.50
4	Higher	10	52720	10544	10KL	9.00	50.00	450.00	569.376	199.28
	TOTAL								**2268.125**	**793.84**
For year 2025 Total Population -998700										
Commercial		3	29960		12.50	12.00			808.920	283.12
1	Lower	25	249700	49940	0-3 KL	4.50	15.00	67.50	404.514	141.58
2	Middle	42	419450	83890	3-5 KL	6.50	22.50	146.25	1472.270	515.29
3	U/Middle	20	199700	39940	5-10 KL	9.50	37.50	356.25	1707.435	597.60
4	Higher	10	99870	19974	10KL	15.00	50.00	750.00	1797.660	629.18
	TOTAL								**6190.799**	**2166.78**
For year 2040 Total Population -1520400										
Commercial		3	45610		12.50	24.00			1641.000	574.35
1	Lower	25	380100	76020	0-3 KL	6.50	15.00	97.50	889.434	311.30
2	Middle	42	638568	127713.6	3-5 KL	10.00	22.50	225.00	3448.267	1206.89
3	U/Middle	20	304080	60816	5-10 KL	15.00	37.50	562.50	4105.080	1436.78
4	Higher	10	152040	30408	10KL	25.00	50.00	1250.00	4561.200	1596.42

	TOTAL								**14644.98**	**5125.74**

Comparison of O & M and Revenue generation

(Rs. In lakhs)

Year	Expenditure on maintenance	Income	Profit/ loss
2010	857.00	793.84	-63.16
2025	1499.75	2166.78	667.03
2040	2142.50	5125.74	2983.24

Revenue Generation (Rs. In Lakh)		
Existing (Year 2006-07)	Sewer cess Sewer Charges Total	: Rs. 109.76 Lakh : Rs. 120.96 Lakh : Rs. 303.98 Lakh

CPHEEO's Comments on DPR :

1. The proposal sanctioned under JICA assistance, which includes part of this project area also needs to be suitably revised in consultation with NRCD and JBIC. The proposal sanctioned under JICA assistance is reported to be based on interception and diversion of nalas. The same needs to be redesigned consisting of proper sewer network, pumping stations and STPs etc. as per need for remaining part of the city area. State Government must ensure above activities at earliest.

2. Land for STP is proposed near Sathawa village which is yet to be acquired. This may lead to substantial delay in project execution and escalation in cost, if immediate steps are not taken to acquire land. State Government need to commit in this regard.

3. The ongoing sewrage scheme under State sector in Central jail area needs to be suitably dove-tailed with proposed sewerage network for Trans-Varuna area. The IPS proposed for this area needs to be omitted and executed network need to be connected with proposed one by gravity.

4. State Government must ensure to utilize treated waste water for irrigation and other non-portable uses. However during no demand period the same may be discharged to the river through existing irrigation canal/Ukathi Drain. Necessary steps may be taken to renovate the existing irrigation canal/drain to accommodate the discharge out of treated waste water effluent and that along with its own discharge. Any work pertaining to irrigation department including renovation/remodeling of canal has to be carried out by State Government from its own resources.

5. The water supply availability in the project area will be 150 LPCD as stated by VNN (water supply project for the same area has been prepared for consideration under JNNURM to raise water supply level upto 150 lpcd)

which is the required rate of water supply for providing sewerage facilities as per the Manual on Sewerage and sewage treatment.

6. The design of sewer network needs to be rechecked and got approved by the competent authority with the objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing the pipe line, which is often not easy to carry out in the field.

7. The projected population has been distributed in the proposed project area in the wards / zones and accordingly, the design of sewer network has been carried out based on density pattern & population contributing to the sewer nodal points.

8. The pipe dia is selected by considering the bore utilization upto 80% as per Manual. The flattest slope possible is provided so as to achieve the required minimum self cleaning velocity with an aim to minimize the sewer depth, thus, ensuring reduced cost.

9. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been allowed upto 9.0 meters in a small stretch near STP.

10. Considering the capital cost, the durability and availability of the pipes, RCC NP-2, NP-3 & NP-4 pipes as per BIS Standards have been proposed.

11. Before laying deep sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be forwarded by VNN to CPHEEO for records.

12. The sewerage system proposed in this project has proper dove-tailing / linking arrangements with the existing and proposed sewerage system created under State Plan funds so that there is no replication of work/components.

13. It has also been mentioned that VNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

14. The BAR Chart and implementation Schedule have also been enclosed.

15. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current SOR of 2008. For non-SOR items, market rates have been considered.

16. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by VNN / Govt of Uttar Pradesh.

17. **As the DPR for providing sewerage system in Varanasi has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 309.12 crore as detailed below in the table. The State Government**

and Varanasi Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

(Rs in lacs)

S.N.	ITEMS	As per proposed D.P.R.	As recommended by CPHEEO
1	**2**		**3**
1	Cost of laying of sewer and appurtenant works	17831.65	17439.37
2	Cost of pumping station at Jail Road	94.10	deleted*
3	Cost of E/M Works at Jail Road Pumping Station	283.50	deleted*
4	Cost of P.S. at Narokhar	91.90	91.90
5	Cost of E/M Works at Narokhar Pumping Station	280.66	114.74
6	Cost of Building work at Jail Road	54.29	deleted*
7	Cost of Building work at Narokhar	55.95	47.00
8	Cost of Screen Channal at Jail Road	18.53	deleted*
9	Cost of Screen Channal at Narokhar	24.96	24.96
10	Cost of Gully pit at Jail Road & Narokhar	0.60	0.30
11	Cost of Rising main from Jail Road to U.P. Collage	175.32	deleted*
12	Cost of Rising main from Narokhar PS	383.87	140.00
13	Cost of Sathwa STP (Civil Works)	9462.13	5677.28**
14	Cost of Sathwa STP & MPS (E/M Works)	2781.61	1112.75
15	Cost of Sathwa MPS (civil Works)	1069.36	1028.76
	Sub Total A	**32608.43**	**25677.06**
16	Cost of Road reinstatement	5611.82	5636.75
17	Cost for power connection	151.38	97.20
18	Cost of Remodeling of Irrigation Canal	1759.31	-
	Sub Total B	**7522.51**	**5733.95**
	TOTAL	**40130.94**	**31411.01**
	Add contingency @ 2%	**652.17**	**628.22**
	- Cost for establishing project implementation mechanism and for consultancy charges towards project preparation (as per CSMC approval in the 25th meeting on 5.3.2007) at 0.5% of Project cost	**163.04**	**157.06**
		40946.15	**32196.29**
	Less 5 % for proficiency of Jal Nigam (on amount Rs. 25677.06 Lacs)		**-1283.85**

GRAND TOTAL	**30912.43**
	SAY Rs 309.12 Crore

* The sewerage net work design has been revised to gravitate the jail road area sewage, thus eliminating the need of pumping station at Jail road

** Reduction in cost is due to reduction in capacity of STP from 200MLD (for the year 2040) to 120 MLD as per norms.

General Comments for Project Implementation:

a) Before commencing the project, minimum water supply and per-capita rate of supply as envisaged should be ensured so as to generate self-cleansing velocity in sewers. Wherever it is not possible to generate self-cleansing velocity, regular flushing system be provided for flushing the sewer lines at regular intervals.

b) Ground levels for the project area may be rechecked and design of sewer network should also be rechecked, before starting the execution of sewer network to ensure 'self-cleansing velocity' in each and every section of the network.

c) While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

d) Flushing tanks, ventilating shafts and inspection chambers may be provided at suitable locations along the alignment of main and trunk sewers to ensure minimum flow in the sewers and escape of foul gases and proper inspection for O&M, if necessary.

e) While laying sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed.

f) All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

g) Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

h) The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by VNN to this Ministry regularly for perusal and record.

i) The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

j) A plan of action for giving sewer connections during the implementation period of the work be prepared and a suitable provision be made in the bye-laws to enforce compulsory sewer charges on the beneficiaries. Sewer connections should be made compulsory by amending the existing bye-laws if necessary.

k) Suitable Sewage Cess / tariff and sewer connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest.

l) All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored.

m) No change in the scope of project shall be effected without prior approval of CPHEEO.

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CPHEEO

Appraisal note for Consideration of Central Sanctioning & Monitoring Committee, Ministry of Urban Development (under JNNURM)

(Storm Water Drainage)

1	Proposal	Storm water drainage work for Varanasi city
2	Name of State	Uttar Pradesh
3	Name of City	Varanasi
4	Objective	1. To provide drainage facility in Varanasi city (Varanasi Urban Agglomeration Area) in a comprehensive manner to avoid water logging problem. 2. To recharge the underground water. 3. Development of new drainage system (separate from sewerage system) in integration with the old drainage system in a holistic manner.
5	Whether CDP is proposed	Yes, at priority No. 4
6	Background	• **VARANASI CITY** – Varanasi city is the most popular International tourist destination in India. The population of city as per 2001 census is 12.04 lacs. At present the Varanasi Urban Agglomeration (VUA) is covering an area of 118.89 sq.km. and having population of 14.85 lacs and a decadal growth rate of 32%. The town is situated in the bank of river Ganga & river Varuna. The highest flood level of River Ganga & Varuna is 73.90 meters (1978). The City lies between the 83^0 01' East longitude and 25^0 22' North latitude. The city has two major natural existing drains viz. Assi & narokhar. – Presently Storm water of Varanasi City is being drained off through very old & incomplete underground and Kachcha open drainage system. With the passage of time , most of the drains have been connected to branch sewers and as such are carrying sewerage with storm water into the sewer line increasing the load on the sewage pumps leading to failure of STPs and Ganga Action Plan especially during rainy seasons. – The Varanasi City is functioning as a centre of religion, trade & commerce services and educational facilities in the regional context. – It is well connected with rail, road and air network.
7	Present Status	• **Drainage Network :** At present the man made storm water drainage system in Varanasi is grossly inadequate. The city mainly depends upon some natural existing drains like Assi drain, Narokhar drain & Lalpur drain. Slope wise some parts of the city lies in

		the catchment area of River Ganga & River Varuna. • **Storm Water Pumping Stations :** • Nine storm water pumping stations have been constructed in different areas of the city. • At present, pumps are installed by Nagar Nigam in areas prone to water logging and efforts are made to minimize the problem only on a temporary basis. After implementation of this project only one pumping station of Moti Jheel area will be required. The storm water run-off of other areas would be taken care by the present drainage system.
8	Need of the Project	(a) To avoid water logging problem specially in rainy season. (b) Due to water logging, roads & streets are badly damaged for which huge amount is being spent every year by Varanasi Nagar Nigam for repairs & maintenance. In last 30 years huge amount has been wasted in raising of plinth level & land filling because of water logging problem. (c) Most of the drains of Varanasi City have been connected to branch sewers and as such are carrying sewage with storm water into the sewer line increasing the load on the sewage pumps and STPs and resulting in pollution of the water of River Ganga. (d) Many minority areas viz.Murgia Tola, Farukhi Nagar, Jalalipura , Alaipur, Bajardiha, Pathani Tola etc. are directly benefited with this drainage system. (e) Many slums areas like Maheshpur, Chhoti Maldahia, Suddhipur, Jaiprakash Nagar, Rupanpur, Jakkha, Saraiya etc. are situated in low lying areas and faces continuous water logging problem. This problem will be solved after implementation of proposed SWD system. (f) There are large number of Ponds & Kunds of religious significance in the City which used to help in dampening the storm water during heavy rains. Due to expansion & development of the City, the natural course of Ponds were disturbed which were well interconnected in past. After development of proposed SWD system and connecting it with Ponds & Kunds, not only the water logging problems would be solved but it would also help to recharge ground water. (g) The need for storm water drainage system has important social aspect in as much as most of the urban poor population is residing in low lying areas, spread over the entire city, which becomes a living hell, due to water logging, for almost four months in a year, resulting in most unhygienic living condition and spread of epidemics. Approximately 4.5 lacs urban poor population and 65 thousand of working population of urban poor are affected by water

		logging. (h) Proposed storm water drainage system has been designed with water conservation system. In some parts of Varanasi city water level have been depleting at a rate of 0.5 to 1 m/year since last 10 years. Safe recharging is more important which is ensured by combination of open channel & underground pipeline network connected with natural water bodies. (i) The capacity of STPs is too small to treat even half the effluent. The problem is further aggravated during rainy season as most of the rain water is mixed with sewage goes to Ganga river untreated. The infrastructure created under Ganga Action Plan is not able to meet its objectives due to non-existence of separate sewerage and drainage system.
9	Area of City	11889 hectare
10	Proposed drainage system	Strengthening of main natural drainage system along with road side drains and other major drains are considered in the project over entire city.

11	**Drainage System <u>status</u>**: There are total 28 existing drains in the City, out of which only 10 existing drains have minor rehabilitation works. Only one existing drain Chhorara Chaumuhani to Varuna river via Sakkar Talab & Slaughter house having major rehabilitation works. Rest of 17 existing drains are not in running condition. Narokhar Nala, Assi Nala & Lalpur Nala are existing natural drains and rest of the drains are man made.

12. PROJECT COST

Cost as per DPR	Rs.337.15 crore
Cost recommended by CPHEEO	Rs.191.62 crore

Period of implementation	28 months (December 2008-March 2011)

				(Rs. in Crores)
Funding pattern GoI: GoUP: ULB	GoI	GoUP	Varanasi Nagar Nigam	Total
	50%	20%	30%	100%
As proposed	95.81	38.32	57.49	191.62

Financial Phasing				
Year	GoI	GoUP	VNN	Total
2008-09 (20%)	19.16	7.66	11.50	38.32
2009-10 (50%)	47.91	19.16	28.75	95.82
2010-11	28.74	11.50	17.24	57.48

(30%)				
TOTAL	**95.81**	**38.32**	**57.49**	**191.62**

Ownership of Project :	Nagar Nigam, Varanasi
Implementing Agency	Nagar Nigam, Varanasi
Annual O&M Expenditure (Rs. crores) in year 2010	Rs. 330.00 lakhs
Agency Responsible for O&M	Varansi Nagar Nigam

TARIFF MODEL

Existing Tariff:
Presently no direct tax, fees or cess is being levied by the Municipal Corporation, Varanasi (MCV) or any other parastatal body in respect of Storm Water Drainage for System in the City.

Proposed Tariff:
The proposed revenue is to be collected by the MCV through its property tax in the form of One Time Drainage Charge and at the time of issuing No Objection Certificate of the building plans and through Annual water conservation cess.

PROPOSED TARIFF STRUCTURE

Particulars	**General**	**Commercial**	**Social & Urban Poor Sector**
One Time Drainage Charge	Rs. 10.00 per Sq. Mtr. of Plot Area	Rs. 15.00 per Sq. Mtr. of Plot Area	Rs. 5.00 per Sq. Mtr. of Plot Area
Annual Water Conservation Cess	Rs. 2.00 per Sq. Mtr. of Plot Area	Rs. 3.00 per Sq.Mtr. of Plot Area	Rs. 1.00 per Sq. Mtr. of Plot Area

Comparison of O & M and Revenue generation

Rs.in Lacs

Year	**Expenditure on maintenance**	**Income**	**Profit/ loss**
2010	363.00	1203.93	840.93
2025	1516.34	3396.77	1880.43
2040	6334.13	7061.64	727.51

On the above proposed tariff the scheme will be self sustainable

CPHEEO's Comments on DPR :

1. Efforts need be made to totally separate out sewerage and storm water drainage networks in the city so as to prevent storm water from entering into sewers.

2. Before start of execution, State Government should re-check the design of Storm Water Drainage in respect of actual field spot levels / slope of drainage area and inlet time of each drainage section including its overall feasibility and effective operation during design period.

3. Overall planning of storm water drainage in Varanasi city in integrated manner, may be ensured by State Government/VNN, so that full benefit of project execution reaches to the people and efficient functioning of storm water drainage system may be ensured including its disposal in nearby water body.

4. The structural design of the drains may be rechecked before start of implementation of the project in the light of actual ground conditions including soil pressure bearing capacity and over bearing movement.

5. The State Govt./Implementing Agency may ensure that there is no encroachment on the alignment, if so, it should be removed so as to avoid time over run and cost over run of the scheme and to facilitate smooth execution of the project.

6. The design of drainage network needs to be rechecked with the objective of ensuring self-cleansing velocity in maximum number of pipe networks, so as to minimize the option of flushing/cleaning the pipe line.

7. The flow in the pipes have been considered as 0.8 full at peak flows, which is as per guidelines values of the Manual published by this Ministry.

8. The minimum depth of cover has been kept as 1.0 meter through out the sewer alignment. The maximum depth of cutting has been allowed upto 7.5 meters in a small stretch of drainage network whose hume pipe is proposed.

9. Considering the capital cost, the durability and availability of pipes, RCC NP-3 pipes as per BIS Standards have been proposed.

10. It has also been mentioned that VNN will carry out O & M activities and O&M estimate for the project components has been furnished in the DPR.

11. The BAR Chart and implementation Schedule have also been enclosed.

12. The cost estimate has been prepared based on the detailed quantity survey and rates considered as per current PWD, Varanasi Region SOR of 2008. For non-SOR items, market rates have been considered.

13. No cost escalation shall be admissible during the implementation period. If at all there is any cost escalation during project implementation the same shall met by VNN / Govt of Uttar Pradesh.

14. No expenditure shall be incurred without Administrative approval of the U.P. Government / Expenditure Finance Committee. The DPR need to be got appraised by Expenditure Finance Committee before start of execution. No central grant can be utilized for the purchase of land, vehicle tools and plants etc., since they are not allowed under the existing programme.

As the DPR for providing storm water drainage system in Varanasi has been framed as per the Manual on Sewerage & Sewage Treatment, we may accord technical approval to the same at an estimated cost of Rs. 191.62 crore as detailed below in the table. The State Government and Varanasi Nagar Nigam shall ensure compliance to the comments for project during its implementation as mentioned with technical clearance.-

COST ESTIMATE

(Rs in lacs)

Project components of proposed DPR	**Cost as per DPR**	**Cost recommended by CPHEEO**
Road Side Drain-40300 m (24 no.)	3061.26	2207.46
Major Drains– 48300 m (15 no.)	12351.27	9189.17
Disposal Drains- 12000 m (2 no.)	12151.57	3842.58
Rehabilitation of Existing drains	291.05	97.86
Sub-total	**27855.15**	**15337.07**
Road reinstatement including utilities shifting	2666.64	*3507.78
*Training, Capacity building, IEC	50.00	-----
Administrative expenses (0.5%)	835.60	76.68
Supervision charges (5%)	1392.70	-----
Cost of survey,investigation & preparation of DPR(2%)	445.70	-----
Cost of Mechanical equipments	240.40	240.40
Other cost	229.40	-----
Grand Total	**33715.59**	**19161.93**
Say	**337.15 crore**	****191.62crore**

**** Increase in cost is due to addition of drain diversion during construction of drains.***
***** Cost reduction is because of design consideration as per Manual norms.***

General Comments for Project Implementation:

a) Ground levels for the project area may be rechecked along with design of storm water drainage network before start of the execution so as to ensure 'self-cleansing velocity' in each and every section of the network.

b) While laying RCC pipes, every precaution should be taken against the possible settlement of sewers. Design of storm sewer bedding should be done as per the guidelines suggested in the Manual on Sewerage and Sewage Treatment.

c) Before laying deep storm sewers, soil investigation and test bores should be done at suitable intervals along the alignment of the main and trunk sewers/drains so as to ascertain the type of soil at different depths, status and behavior of the ground water table and bearing capacity of the soil. The design may be modified if necessary on the basis of the actual ground conditions. The test reports of test bores and soil investigation may be preserved by VNN for record.

d) While laying storm sewers and during construction of man-holes, standard procedure as indicated in the Manual on Sewerage and Sewage Treatment / IS Codes should be followed

e) All electrical and mechanical equipment and machinery and other materials such as pipes, fittings and specials and M.H. cover should conform to BIS Specifications.

f) Structural design of various components of the scheme may be got approved from the competent authority before actual implementation of the scheme.

g) The implementation schedule /PERT chart with CPM may be formulated and should be strictly adhered to in order to avoid time over run and resultant cost over-runs. The Monitoring report may be furnished by VNN to this Ministry regularly for perusal and record.

h) The project shall be implemented duly meeting the specifications of relevant codes of practice published by the Bureau of Indian Standards (BIS) and in agreement with all the statutory requirements.

i) Suitable Storm Water Cess / tariff and storm water connection fee may be imposed on the beneficiaries to recover at least the O&M cost of the project to start with. However, full cost recovery should be achieved at the earliest . It should be ensured at house hold level that waste water and storm water are not allowed to mix.

j) All O&M personnel should be imparted with adequate training for smooth operation and maintenance of the scheme. Possibility of out sourcing the O&M activity through NGO /CBO also may be explored..

k) The State Govt./Implementing Agency must take prior permission of Railway/State Environment & Forests Deptt./Transport Deptt. , if necessary before execution of the works.

l) Before start of execution the State Govt. has to ensure that no funding for the same project from any other Central or State Govt. organization has been availed. A certificate to this effect may be submitted by State Govt. before start of execution.

m) All possible efforts may be made to involve Public-Private-Partnership in O&M of drains and other components of project.

n) No change in the scope of project shall be effected without prior approval of CPHEEO

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development (Water Supply Component- Part-II (Distribution network) for Cis-Varuna Area of Varanasi city)

Proposal	Water Supply Component (Part-II) of Varanasi City
Name of District/State	Varanasi, Uttar Pradesh
Name of City	Varanasi
Objectives	To supply continuous safe drinking water in equitable distribution to the city as per national norms .
Whether CDP is prepared	Yes (PRIORITY -I)
Background Existing water supply system	Varanasi, the holy city, said to be situated on Trinident of Lord Shiva is situated along the western bank of the river Ganga. It is the most ancient living city in the world. Its name is traceable in the ancient books like Vedas and Upanishads. Since time immemorial, it is a famous pilgrim centre and a seat of learning. Lakhs of foreigners and tourists visit the city every year especially to see beautiful scene of the crescent shaped ghats along the river Ganga. The ancient Buddha Stupa at Sarnath and the Golden Temple of Lord Vishwanath attracts millions of national and international tourists & devotees every year. The population of Varanasi as per 2001 census is 12.02 lacs and present population is 15.00 lacs (approx.). It is spread over an area of 79.79 sq km. Varuna river bifurcates the town into two parts. From water supply point of view, the entire city has been divided into two districts namely; Cis-Varuna and Trans-Varuna on either side of river Varuna. There are 91 wards divided into 15 water supply zones within the municipal boundary for the purpose of extending adequate and safe water supply facilities to the entire area of the city. Water supply system in Varanasi town was introduced in the year 1892. Presently 280 mld of water is produced out of which 125 mld of water from river Ganga, 155 mld is extracted from 122 deep tube wells, many of which are completing its useful life.

The raw water lifted from Ganga river at Bhadaini Intake Works gets treated at water treatment plants situated at Bhelupur Water Works. One water treatment plant with rapid gravity filter of 60 mld was constructed in the year 1954, the works of which were integrated with the another water treatment plant of 250 mld capacity which was constructed after year 1985 near the existing 60 mld plant in the same campus.

Treated water from these treatment plants is then stored in two underground sumps of 25 ML capacity each and one OHT of 1.2 ML at Bhelupur. Out of two sumps one is more than 50 years old and in dilapidated condition and is not economical to integrate. Water from sump is pumped/distributed to other storage tanks. In remaining area water supply is based on tube wells.

There are 16 over head tanks (OHTs) with total storage capacity of 16.8 ML along with 7 underground reservoirs (UGRs) with total storage capacity of about 37 ML. Total storage capacity including OHTs and UGRs is about 53.8 ML.

The total length of the distribution network as of now is 590 kms. Diameter of pipes varies from 90 to 750mm in different parts of the city and system consists CI and PVC pipes.

Population and water requirement

The projected population and future water demand of the city in different years is furnished in the following table.(Total Varanasi City)

Sl. No.	Year	Population	Water require-ment in mld	Water available			Deficit in mld
				from river	from TWs	Total	
1.	2010	1716100	275.41	125.00	95.00*	220.00	55.41
2.	2025	2523700	403.35	125.00	-	125.00	278.79
3.	2040	3367900	528.25	125.00	-	125.00	413.86

This project pertains to Cis-Varuna area for which water requirement in different years is as tabulated below:

Sl. No.	Year	Population	Water requirement in mld	Water available from river (mld)	Deficit (mld)
1	2	3	4	5	6
1.	2010	1188700	191.13	125.00*	Nil
2.	2025	1525000	243.77	125.00	118.77

	3.	2040	1847500	295.30	125.00	170.30

**out of 95mld, 70mld of Bore well water is being supplied to Cis Varuna area. Tube wells are proposed to be discontinued over the time and entire system would be based on surface water.*

Necessity of the Project	Most of the distribution line are more than 50 years old. Due to increase in population, the size of the existing pipe lines, are not adequate to cater the water demand with adequate terminal pressure and also causing heavy pipe line losses which is around 30% of water supply. Some of the lines are as old as 100 years, and are broken at several places. Moreover, these pipes are lying too deep due to raising of roads over the years and thus, are difficult to integrate in the present system. Further, the distribution mains in some parts of the city are in bad condition and are causing problems not only by increase in the UFW but are also responsible for contaminating the water supply which leads to the water borne diseases in the city. In the present DPR, based on survey and investigation, only those pipes have been integrated which are in good condition and other pipes, which are in bad condition or lying far below the ground, have been left out. Because of above, the replacement of old lines is urgently needed. Hence, it is necessary to reorganize the water supply (distribution) system of the Cis –Varuna area of Varanasi city.
Proposed Water Supply Scheme	An integrated approach has been adopted to develop a complete water supply system, which will be capable to fulfill the water requirement for 30 years. However, the works to be taken up have been proposed in phased manner. Considering the urgency and importance of potable water supply, the following works in Cis-Varuna area of Varanasi city (Part –I) have already been sanctioned under JNNURM and are under implementation; ➢ **Renovation of intake works and replacement of raw water pumps at Bhadaini.** ➢ **Installation of sub stations at Bhadaini Intake Woks and Bhelupur WTP.** ➢ **Laying of raw water transmission main.** ➢ **Rehabilitation / Renovation of Bhelupur WTP** ➢ **Replacement of old rising main.** ➢ **Construction of zonal CWRs/OHTs.**

<table>
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➢ **Necessary arrangement for leak detection to reduce pipe line losses and to conserve fresh water**

In the present proposal viz. Part-II of water supply scheme for Cis-Varuna Area, the distribution network for different water supply zones have been designed as most economical system from the computer software at EDP cell, UPJN, Lucknow. Necessary provisions have been made for fixing valves and fitting at suitable locations and their chambers. Type /Size and length of various pipes proposed are given below.

<table>
<tr><th>Size</th><th>Type</th><th>Length</th></tr>
<tr><td>110mm</td><td>PVC</td><td>367626m</td></tr>
<tr><td>140mm</td><td>PVC</td><td>17676m</td></tr>
<tr><td>160mm</td><td>PVC</td><td>10742m</td></tr>
<tr><td>200mm</td><td>AC</td><td>21087m</td></tr>
<tr><td>250mm</td><td>AC</td><td>16066m</td></tr>
<tr><td>300 mm</td><td>AC</td><td>10422m</td></tr>
<tr><td>350mm</td><td>AC</td><td>6358m</td></tr>
<tr><td>400 mm</td><td>AC</td><td>6798m</td></tr>
<tr><td>450mm</td><td>AC</td><td>5039m</td></tr>
<tr><td>500 mm</td><td>AC</td><td>3318m</td></tr>
<tr><td>600 mm</td><td>DI</td><td>1143m</td></tr>
<tr><td></td><td></td><td>----------</td></tr>
<tr><td></td><td></td><td>466275m</td></tr>
</table>

50 Nos. number of stand posts have been provided for pubic and religious places in Cis-Varuna area. The exact location of these stand posts will be decided at the time of execution by the executing authority in consultations with Nagar Nigam Varanasi.

Provision of 31000 Nos. water meters has only been made against the requirement of 2,37,000 households. Varanasi Municipal Corporation has committed to provide water meters to all consumers while commissioning the scheme.

</td></tr>
<tr><td>Period of Implementa-tion</td><td>24 months from the date of sanction (Dec. 2008 to Nov. 2010)</td></tr>
<tr><td>Implementing Agency</td><td>UP Jal Nigam on behalf of Nagar Nigam, Varanasi</td></tr>
</table>

Original cost of project	**Rs. 9069.55 Lakhs**
Project cost recommended by State appraisal Agency	**Rs. 6306.80 Lakhs**
Project cost recommended by CPHEEO	**Rs. 8610.45 Lakhs**

Funding Pattern

Cost Sharing Pattern (as per JNNURM guide lines)

	Share	Rs. in lacs
GoI	50%	4305.23
State Govt.	20%	1722.09
ULB	30%	2583.13

Financial Phasing

Year	GoI	GoUP	VNN	Total
2008-09 (20%)	861.05	344.41	516.63	1722.09
2009-10 (50%)	2152.61	861.05	1291.57	4305.23
2010-11 (30%)	1291.57	516.63	774.93	2583.13
G.Total	**4305.23**	**1722.09**	**2583.13**	**8610.45**

Annual O&M Expenditure Existing

Income & expenditure data of Varanasi Jal Sansthan for past six years is tabulated below:

Amount in Rs. lakh

Sl. No.	Year	Net Revenue Receipt	Expenditure	(+) Profit (-) Loss
1.	2000-2001	1540.91	1465.41	+75.50
2.	2001-2002	1422.86	1233.62	+89.24
3.	2002-2003	2091.09	1818.88	+272.21
4.	2003-2004	1351.80	1277.53	+74.27
5.	2004-2005	1079.58	1001.11	+78.47
6.	2005-2006	1212.48	1173.44	+39.04

Existing Water Tariff

Existing water tariff is based on Government of UP

<table>
<tr><td></td><td><u>Gazette Notification No. 541/9-2-2000/25-7-2000 dated 1.4.2000. The existing water tariff is on flat rate basis based on area of the property.</u></td></tr>
<tr><td>Proposed annual O&M Expenditure</td><td>O&M and Revenue Generation
<table>
<tr><th>Sl. No.</th><th>Particulars</th><th>Year 2010</th><th>Year 2030</th></tr>
<tr><td>1(i)</td><td>Annual O&M Expenditure (Rs. lacs)</td><td>3034.00</td><td>12911.00</td></tr>
<tr><td>(ii)</td><td>Annuity for repayment of loan</td><td>1226.00</td><td>1226.00</td></tr>
<tr><td></td><td>Total Expenditure</td><td>4260.00</td><td>14137.00</td></tr>
<tr><td>2.</td><td>Annual Income (Rs. lacs)</td><td>4729.00</td><td>15426.00</td></tr>
<tr><td>3.</td><td>Net Profit (Rs. lacs)</td><td>469.00</td><td>1289.00</td></tr>
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Proposed Tariff category-wise based on Volumetric Consumption

Sl.No.	**Category**	**Estimated %**	**Rates per KL**	
			2010	**2030**
1	**2**	**3**	**4**	**5**
1.	Commercial	3%	12.00	24.00
2.	Domestic			
(i)	(0-3 kld)	25%	3.20	6.40
(ii)	(3-5 kld)	42%	5.00	10.00
(iii)	5-10 kld)	20%	7.00	14.00
(iv)	(Above 10 kld	10%	9.00	18.00

The DPR has been examined and comments of CPHEEO are as under:

<u>Before considering the scheme for sanction, CSMC may like to consider the following ;</u>

1) At the time of commissioning of scheme, there would be approximately 2,37,000 houses in the project area which needs to be provided with metered house service connections. However, against above requirements in the DPR, there is only provision of 31000 meters. There is no resolution from elected ULB to implement volumetric based water tariff. Unless the volumetric based water tariff is implemented, there may not be enough revenue to O & M water supply scheme and UFW may remain more than the desirable limit. This may lead to non-sustainability of scheme and ultimately ULB may not be able to

operate & maintain the scheme to meet the desired objectives. However, Municipal Commissioner has committed to provide metered house connections to consumers while commissioning the scheme. But to ensure that the metered house service connections are provided on the commissioning of the scheme, as has been done in several other projects sanctioned under JNNURM, provision of metered house service connections has been allowed for 2,00,000 nos. and cost included in the DPR.

2) The cost towards road reinstatement has been worked out at rate of Rs. 1600/m^2 which seems on higher side. The same has been suitably reduced to Rs. 1345/m2. CSMC may like to direct State Government to examine this aspect and do the needful to reduce the cost of road reinstatement to the extent possible in the projects from state.

3) In the design of distribution network, at some pipe segments friction loss allowed is very high to the extent of 60 to 80m per Km resulting in less available pressure at various consumer points. Before start of implementation of the project State Government / VNN / UP Jal Nigam may like to get it re-designed and get it approved from competent authority not below the rank of Chief Engineer in the state.

4) The water supply project for Varanasi city under JNNURM for Cis-Varuna area is to be implemented in two parts. Part-I (the proposal already sanctioned under JNNURM) is designed to renovate the existing water supply units which are in dilapidated condition and after its renovation/ augmentation, the same would boost the water supply/transmission of water to the city.

Part-II of the water supply scheme for distribution system in Cis-Varuna area (Present proposal) is designed to cover the newly developed areas and other areas where water supply distribution network is inadequate / in dilapidated condition. State Government should ensure the timely completion of both parts of proposal so that benefit may reach to the people after completion of scheme.

5) Varanasi Nagar Nigam (VNN) / State Govt has provided Bar chart stating that the present scheme is expected to be completed in 24 months from the date of sanction.

Considering the above factors, if CSMC agrees, the project may be considered for sanction at an estimated cost of Rs. 86.10 crore against

the proposed cost of Rs. 63.07 Crore (Original cost of DPR – Rs. 90.70 crore) as per the following break up:

COST ABSTRACT

Sl. No.	COMPONENT-WISE PROJECT COST	Cost appraised by State Govt.	Recommended by CPHEEO Amount in Rs. lacs
1.	Supply of PVC /AC/DI pipes, specials including excavation carting of pipes from store to site.	1458.02	1458.02
2.	Dismantling of road B.O.E Bitumen surface	 62.16 387.86	 62.16 387.86
3.	Supply of CI fittings / values including its carting, laying and construction chambers.	89.64	25.12
4.	Reinstatement of road B.O.E. Bitumen surface	 310.79 3315.02	 310.79 2786.69
6.	Railway line crossing at three locations alongwith crossing under culvert and nala/drain	120.68	48.18
7.	Stand post	2.15	NIL
8.	Interconnection of pipe lines	37.40	37.40
9.	Supply and fitting of water meters (2,00,000 Nos.) along with provision of house service connections @ Rs.1800/- per connection.	230.33	3600.00*
	Total	**6014.05**	**8717.09**
	Contingencies (2%)	120.28	(+)174.34
	Less 5% for Nigam Proficiency (excluding road construction works Rs. 3097.48 lakhs)	**(-)125.42**	**(-)280.98**
	Total	**6008.91**	**8610.45**
	Centage Charges 12.5%	297.89	---
	Grand Total	**6306.80**	**8610.45**

* ***Increase in cost is due to inclusion of provision of water meters (2,00,000 Nos.) along with provision of house service connections in the DPR. In the original DPR, State Government has proposed only for 31,000 water meters.***

The State Government may like to ensure the following technical remarks during the project implementation.

Technical Remarks

I. During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the VNN / State Government from their own resources.

II. All efforts should be made by State Government/ULB to ensure the long term sustainability of the project and should commit to generate adequate revenue to O&M of the scheme at various stages during its design life.

III. Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

IV. The estimate has been prepared based on current schedule of rates / market rates. However, any increase in project cost above the sanctioned cost for any reason has to be borne by State Government / ULB from its own resources.

V. A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

VI. All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

VII. It is suggested that VNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

VIII. The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit.

IX. Air valves and scour valves may be provided at strategic locations in the transmission mains.

X. After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records / distribution network.

XI. During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

XII. The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

XIII. The material and equipment to be procured should conform to BIS specifications.

XIV. Uninterrupted electric power supply must be ensured by VNN for trouble free operation and maintenance of the scheme.

XV. VNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

XVI. To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

XVII. Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

XVIII. No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development
(Water Supply Component- Priority-II for Trans-Varuna Area of Varanasi city)

Proposal	Water Supply Component (Priority-II) for Trans-Varuna Area of Varanasi City
Name of District/State	Varanasi, Uttar Pradesh
Name of City	Varanasi
Objectives	In order to supply adequate portable water to the Varanasi City (Trans-Varuna Area) as per GOI norms.
Whether CDP is prepared	Yes
Background	Varanasi, the holy city, said to be situated on Trinident of Lord Shiva is situated along the western bank of the river Ganga. It is the most ancient living city in the world. Its name is traceable in the ancient books like Vedas and Upanishads. Since time immemorial, it is a famous pilgrim centre and a seat of learning. Lakhs of foreigners and tourists visit the city every year especially to see beautiful scene of the crescent shaped ghats along the river Ganga. The ancient Buddha Stupa at Sarnath and the Golden Temple of Lord Vishwanath attracts millions of national and international tourists & devotees every year. The population of Varanasi as per 2001 census is 12.02 lacs and present population is 15.00 lacs (approx.). It is spread over an area of 79.79 sq km. Varuna river bifurcates the town into two parts. From water supply point of view, the entire city has been divided into two districts namely; Cis-Varuna and Trans-Varuna on either side of river Varuna. There are 90 wards divided into 15 water supply zones within the municipal boundary for the purpose of extending adequate and safe water supply facilities to the entire area of the city, out of which, there are 16 municipal wards and 5 water supply zones in the Trans-Varuna Area spread over 35.66 sq.kms. Water supply system in Varanasi town was introduced in the year 1892. Source of Water supply in Cis-Varuna area is

surface source (river Ganga) as well as ground water source viz. 90 nos. deep tube wells. The source of water supply in Trans-Varuna Area is merely ground source that is 32 Nos. deep tube wells, out of which 12 Nos. Tube wells are reported to have already completed their lives.

Presently, 280 mld of water is produced in city out of which 125 mld of water is from river Ganga and remaining 155 mld is extracted from 122 deep tube wells. 34.88 mld water is extracted from 20 nos. deep Tube wells in Trans-Varuna area. The water is being chlorinated & supplied.

Clear Water from deep Tube wells is either stored in 06 nos Over Head Reservoirs of 6 ML capacity or pumped directly into the water supply mains in Trans-Varuna area.

The total length of the distribution network in Varanasi City as of now is 590 kms. The distribution network in Trans-Varuna area is approximately 215 kilometers of sizes vary from 90 mm to 600mm dia consisting of C.I., A.C.,and PVC pipes.

Population and water requirement

The projected population and future water demand of the city in different years is furnished in the following table.

Sl. No.	Year	Population	Water requirement in mld	Water available (mld)			Deficit in mld
				from river	from TWs	Total	
1.	2010	1716100	275.41	125.00	95.00*	220.00	55.41
2.	2025	2523700	403.35	125.00	-	125.00	278.79
3.	2040	3367900	528.25	125.00	-	125.00	413.86

* Out of 95mld existing water supply through tubewells, 34.88 mld is supplied in Trans-Varuna area (present project area) and remaining quantity supplied in Cis-Varua area.

This project pertains to Trans-Varuna area for which water requirement in different years is as tabulated below:

Sl. No.	Year	Population	Water requirement in mld	Water available from Tube wells in mld (including new proposed tube-wells)	Deficit In mld (To be drawn from new source viz. surface water)*
1	2	3	4	5	6
1.	2010	527400	84.28	60.00	24.28
2.	2025	998700	159.57	60.00	99.57

	3.	2040	1520400	242.95	60.00	182.95
	* At present, water supply in Trans-Varuna area is only through tube-wells (34.88 mld) and water supply through surface water source is NIL.					
Necessity of the Project	1. Water supply at present is 66 Lpcd (2010 population) against national norms of 150 Lpcd for metro cities. 2. Existing distribution mains are very old causing heavy pipe line losses (30%). 3. Due to increase in population, the size of existing water supply mains are not adequate to cater the water demand with adequate terminal pressure. 4. Trans-Varuna area W/S is totally based on ground water source. The ground water table is reported to be declining because of extraction of ground water. Hence, the project need to in corporate combination of ground water source and surface water source to meet the water supply demand and also to have a conjunctive use from both the sources. 5. Inadequate availability of over head reservoirs in the city causing irregular W/S with inadequate terminal pressure. 6. Municipal W/S is at present intermittent and supplied from 5.00 to 9.00 and 17.00 to 21.00 hours. In order to provide adequate, safe and equitable water supply to all the consumers, there is urgent need to take up the following works as Priority-II for Trans-Varuna area of Varanasi City. ➢ **Construction of intake well of 183 mld near Rampur Dhab (Chaubeypur) for Trans Varuna area.** ➢ **WTP of 100 MLD for 2025 at Saranath.** ➢ **Laying of Raw Water/Clear Water rising main.** ➢ **Strengthening /laying of distribution network including water meter and house service connections.** ➢ **Construction of additional storage reservoirs.** ➢ **Necessary arrangement for leak detection to reduce pipe line losses.**					

Proposed Water Supply Scheme for Varanasi city	An integrated approach has been adopted to develop a complete water supply system, which will be capable to fulfill the water requirement for next 30 years. However, the works to be taken up have been proposed in phased manner. Considering the urgency and importance of potable water supply, the following works in Cis-Varuna area of Varanasi city (Phase-I & II) have already been sanctioned under JNNURM and are under implementation. ➢ **Renovation of intake works and replacement of raw water pumps at Bhadaini.** ➢ **Installation of sub stations at Bhadaini Intake Woks and Bhelupur WTP.** ➢ **Laying of raw water transmission main.** ➢ **Rehabilitation / Renovation of Bhelupur WTP** ➢ **Replacement of old rising main.** ➢ **Construction of zonal CWRs/OHTs.** ➢ **Necessary arrangement for leak detection to reduce pipe line losses** ➢ **Strengthening /laying of distribution networks for different water supply zones of Cis-Varuna area. (Provision of water meter along with house service connections has already been made in earlier sanctioned project for the entire population of the city.** ➢ **Fixing of domestic water meters so as to minimize the wastage of portable water.** In addition to the above, to provide complete integrated infrastructure for water supply system in the entire Varanasi city for next 30 years, under the present proposal viz. Priority-II, the following works have been proposed to be taken up in Trans-Varuna area. 1. **Intake works at Rampur Dhab (Chaubeypur).** a. Intake Works (183 mld) b. Erection of 33 KV independent Transmission Line- 15 Km c. Erection of 2000 KVA, 33 KV/11KV Sub-Station, 33KV & 11 KV HT Panels. d. Raw Water Pumps - 37 KL/minute 50m head capacity – 3 Nos. 2. **Raw-water rising main 1200mm dia. PSC-14-16.30Km.** 3. **Water Treatment Plant at Sarnath.**

<table>
<tr><td></td><td>a. Water Treatment Plant (100 mld).
b. Erection of 33 Kv independent Transmission Line- 2.50 Km.
c. Erection of 1200 KVA, 33 KV/11KV Sub-Station, 33KV & 11 KV HT Panels.
d. Clear Water Pumps - 37 KL/minute 45m head capacity – 3 Nos.
e. Construction of building boundary wall & Road
4. Clear Water Feeder Main – 28.79 Km
5. Service Reservoir 26 Nos Total capacity 47.40 ML
a. CWRs at existing zonal water works site 6 Nos.
b. CWRs at proposed zonal water works- 24 Nos.
c. OHTs – 26 Nos. (Total Capacity 47. 40ML)
d. Booster Pumps – 60 Nos.
e. Rising main from existing & proposed Tubewells to CWRs- 6.68 Km.
f. New T.Ws. 10 Nos. & Rebore T.Ws., 4 Nos. with Pumping Plants & Chlorinating Plants.
6. Repair of existing Zonal Pumping Stations.
7. Distribution System (110mm dia to 600mm dia) PVC / DI pipes- 228.47 Km.</td></tr>
<tr><td>Period of Implementat-ion</td><td>30 months from the date of sanction.
October ,2009 - Starting date
March, 2012 -Completion date</td></tr>
<tr><td>Implementing Agency</td><td>UP Jal Nigam on behalf of Nagar Nigam, Varanasi</td></tr>
<tr><td>Project Cost recommended by State Government</td><td>Rs. 251.60 crore (263.24 as per original DPR)</td></tr>
<tr><td>Project Cost recommended by CPHEEO</td><td>Rs. 209.16 crore.</td></tr>
<tr><td>Funding Pattern</td><td>Cost Sharing Pattern (as per JNNURM guide lines(
(Rs. in crore)
<table>
<tr><td>GOI</td><td>50%</td><td>90.00*</td></tr>
<tr><td>State Government</td><td>20%</td><td>65.16</td></tr>
<tr><td>ULB</td><td>30%</td><td>54.00</td></tr>
</table>
*(Fund sharing is calculated considering additional allocation of Rs. 90.00 crore for project sanction under JNNURM. Accordingly, GOI & ULB Share has been considered out of Rs. 209.16 crore & balance amount Rs. (209.16-180.00 = 29.16 crore) is added in state Government Share.</td></tr>
</table>

Financial Phasing

Year	GoI	GoUP	VNN	Total
2009-2010 (25%)	22.50	16.29	13.50	52.29
2010-2011 (50%)	45.00	32.58	27.00	104.58
2011-2012 (25%)	22.50	16.29	13.50	52.29
G.Total	**90.00**	**65.16**	**54.00**	**209.16**

Annual O&M Expenditure Existing

Revenue/Income & expenditure data of Varanasi Jal Sansthan for last eight years is tabulated below:

(Amount in Rs. Lakh)

Sl. No.	Year	Net Revenue Receipt	Expenditure	(+) Surplus (-) Deficit
1.	2000-01	1540.91	1465.41	+75.50
2.	2001-02	1422.86	1233.62	+89.24
3.	2002-03	2091.09	1818.88	+272.21
4.	2003-04	1351.80	1277.53	+74.27
5.	2004-05	1079.58	1001.11	+78.47
6.	2005-06	1212.48	1173.44	+39.04
7.	2006-07	1720.59	1428.97	+231.62
8.	2007-08	2313.95	1750.18	+563.77

Existing Water Tariff :

Existing water tariff is based on Government of UP Gazette Notification No. 541/9-2-2000/25-7-2000 dated 01-04-2000. The existing water tariff is on flat rate basis based on area of the property (annual rental value (ARV)) which is as below.

(A) Annual water charges on the basis of ARV of houses

Annual Rental Values of Houses	Minimum Annual water charges		
	15mm dia connection	20mm dia connection	25mm dia connection
1	2	3	4
Upto Rs. 360.00	548.00	822.00	1279.00
Rs 361.00 to 2000.00	731.00	1096.00	1644.00
Rs 2001.00 to 3500.00	1096.00	1644.00	255.00
Rs 3501.00 to 5000.00	1462.00	2101.00	3106.00
Rs About to 5000.00	1827.00	2740.00	3654.00

Beside above, a flat rate water charge is applied @ 12.5% of the annual rental values of the houses and minimum of the two is levied.

(B) Annual Water Charges for non- ARV houses –

	15mm Dia connection	20mm Dia connection
1. Up to 13 m^2 plot area houses –	Rs. 731.00	Rs. 2940.00

	2. Above 13 m^2 plot area houses – Rs. 914.00 Rs. 3654.00

Proposed Tariff category-wise based on Volumetric Consumption as proposed in DPR.

S.N.	INCOME GROUP	% Population	Population	No. of House 5 person/ house	Per capita monthly consumption	Cess charge per KL of W/S	Avg. per house monthly consum. Kl	Per house monthly charge in Rs	Total annual Revenue for W/S in Rs Lacs
For year 2010 Total Population -				**527200**					
1	Lower	25	131800	26360	0-3 KL	3.20	15.00	48.00	151.834
2	Middle	42	221424	44285	3-5 KL	5.00	22.50	112.50	597.848
3	U/Middle	20	105440	21088	5-10 KL	7.00	37.50	262.50	664.272
4	Higher	13	68536	13707	10KL	9.00	50.00	450.00	740.19
	TOTAL								**2154.13**

Comparison of O & M and Revenue generation

(Rs. In lakhs)

Year	Expenditure on maintenance	Income	Surplus/deficit
2010	2147.50	2154.13	(+)6.63

The DPR has been examined and comments of CPHEEO are as under:

The proposed DPR for Water Supply Component for Trans-Varuna Area of Varanasi City may be accorded technical clearance at an estimated cost of Rs. 209.16 crore as per following break-up:

Sl. No.	Component-wise project cost	Proposed by UP Jal Nigam (Rs in lakh)	Recommended by CPHEEO (Rs.in lakh)
1.	Intake works at Rampur Dhab (Chaubeypur).		
a.	Intake Works (183 mld)	340.01	302.50
b.	Erection of 33 KV independent Transmission Line- 15 Km	240.00	240.00#
c.	Erection of 2000 KVA, 33 KV/11KV Sub-Station, 33KV & 11 KV HT Panels.	255.15	227.00
d.	Raw Water Pumps - 37 KL/minute 50m head capacity – 3 Nos.	474.33	422.00
2.	Raw-water rising main 1200mm dia. PSC-14- 16.30Km.	3843.79	3419.74

3.	Water Treatment Plant at Sarnath.		
a.	Water Treatment Plant (100 mld).	1686.10	1500.00
b.	Erection of 33 Kv independent Transmission Line-2.50 Km.	74.00	74.00#
c.	Erection of 1200 KVA, 33 KV/11KV Sub-Station, 33KV & 11 KV HT Panels.	230.94	205.46
d.	Clear Water Pumps - 37 KL/minute 45m head capacity – 3 Nos.	405.03	360.35
e.	Construction of building boundary wall & Road –	485.08	431.57
4.	Clear Water Feeder Main – 28.79 Km	3860.47	2733.80@
5.	Service Reservoir 26 Nos Total capacity 47.40 ML		
a.	CWRs at existing zonal water works site 6 Nos.	162.86	144.90
b.	CWRs at proposed zonal water works- 24 Nos.	545.36	471.20
c.	OHTs – 26 Nos. (Total Capacity 47. 40 ML)	3169.23	2819.60
d.	Booster Pumps – 60 Nos. at 30 locations	1260.71	1194.07
e.	Rising main from existing & proposed Tubewells to CWRs- 6.68 Km.	338.43	280.09
f.	New T.Ws. 10 Nos. & Rebore T.Ws., 4 Nos. with Pumping Plants & Chlorinating Plants.	339.68	302.21
6.	Repair of existing Zonal Pumping Stations.	26.98	24.00
7.	Distribution System (110mm dia to 600mm dia)- 228.47 Km	8062.40	5253.56@
	Sub Total	25800.55	20406.05
8.	Contingencies @ 2%	516.01	408.12
9.	Less Nigam Proficiency	(-) 1156.78	0.00
10.	Add .5% as administrative charges	-	102.03
	Grand Total	25159.78	20916.2
	Say	251.60 cr.	209.16 cr.*

** Reduction in cost is due to disallowing the provision of 12.4% escalation in cost estimate over estimated cost.*

** Similarly, the provision of 12.5% made in cost estimate towards the Departmental centage is not eligible for funding under JNNURM. However, State Government may allow the same from its state budget to compensate the cost incurred towards implementation of project by State Agency viz. UP Jal Nigam.*

 # No price escalation was included in the estimate.

@ Reduction in cost because of design criteria and change in pipe material.

The State Government may like to ensure the following technical remarks during the project implementation.

I. During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the VNN / State Government from their own resources.

II. All efforts should be made by State Government/ULB to ensure the long term sustainability of the project and should commit to generate adequate revenue to O&M of the scheme at various stages during its design life.

III. Engineer-in-charge for project implementation should ensure that people in project area should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

IV. The estimate has been prepared based on current schedule of rates (2008-09) market rates. However, any increase in project cost above the sanctioned cost for any reason has to be borne by State Government / ULB from its own resources and no central grant will be eligible.

V. A realistic water tariff as formulated in DPR need to be implemented on execution of DPR so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

VI. All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

VII. VNN has to formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there so as to avoid time over run resulting in cost over run.

VIII. The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit and billing of consumers based on volumetric consumption.

IX. Air valves and scour valves may be provided at strategic locations in the transmission mains.

X. After carrying out detail engineering, a set of final drawings including the distribution network may be prepared for reference and records.

XI. During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

XII. The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

XIII. The material and equipment to be procured should conform to BIS specifications.

XIV. Uninterrupted electric power supply must be ensured by VNN for trouble free operation and maintenance of the scheme.

XV. VNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

XVI. To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

XVII. Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

XVIII. No change in the scope of scheme is allowed without prior approval from CPHEEO.

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CPHEEO

Appraisal Note for Consideration of Projects under JNNURM by Central Sanctioning & Monitoring Committee of M/o Urban Development
(Water Supply Component- Phase-I for Cis-Varuna Area of Varanasi city)

Proposal	Water Supply Component Phase-I of Varanasi City
Name of District/State	Varanasi, Uttar Pradesh
Name of City	Varanasi
Objectives	To supply continuous safe drinking water in equitable distribution to the city as per national norms .
Whether CDP is prepared	Yes (PRIORITY -I)
Background	Varanasi, the holy city, said to be situated on Trinident of Lord Shiva is situated along the western bank of the river Ganga. It is the most ancient living city in the world. Its name is traceable in the ancient books like Vedas and Upanishads. Since time immemorial, it is a famous pilgrim centre and a seat of learning. Lakhs of foreigners and tourists visit the city every year especially to see beautiful scene of the crescent shaped ghats along the river Ganga. The ancient Buddha Stupa at Sarnath and the Golden Temple of Lord Vishwanath attracts millions of national and international tourists & devotees every year. The population of Varanasi as per 2001 census is 12.02 lacs and present population is 15.00 lacs (approx.). It is spread over an area of 79.79 sq km. Varuna river bifurcates the town into to parts. From water supply point of view, the entire city has been divided into two districts namely; Cis-Varuna and Trans-Varuna on either side of river Varuna. There are 91 wards divided into 15 water supply zones within the municipal boundary for the purpose of extending adequate and safe water supply facilities to the entire area of the city.
Existing water supply system	Water supply system in Varanasi town was introduced in the year 1892. Presently 280 mld of water is produced out of which 125 mld of water from river Ganga, 155 mld is extracted from 122 deep tube wells. The raw water lifted from Ganga river at Bhadaini Intake Works gets treated at water treatment plants situated at Bhelupur Water Works. One water treatment plant with rapid gravity filter of 60 mld was constructed in the year 1954, the works of which were integrated with the another water treatment plant of 250 mld capacity which was constructed after year 1985 near the

existing 60 mld plant in the same campus.

Treated water from these treatment plants is then stored in two underground sumps of 25 ML capacity each and one OHT of 1.2 ML at Bhelupur. Out of two sumps one is more than 50 years old and in dilapidated condition and is not economical to integrate. Water from sump is pumped/distributed to other storage tanks. In remaining area water supply is based on tube wells.

There are 16 over head tanks (OHTs) with total storage capacity of 16.8 ML along with 7 underground reservoirs (UGRs) with total storage capacity of about 37 ML. Total storage capacity including OHTs and UGRs is about 53.8 ML.

The total length of the distribution network as of now is 590 kms. Diameter of pipes varies from 90 to 750mm in different parts of the city and system consists CI and PVC pipes.

Population and water requirement

The projected population and future water demand of the city in different years is furnished in the following table.(Total Varanasi City)

Sl. No.	Year	Population	Water require-ment in mld	Water available			Deficit in mld
				from river	from TWs	Total	
1.	2010	1716100	275.41	125.00	95.00*	220.00	55.41
2.	2025	2523700	403.35	125.00	-	125.00	278.79
3.	2040	3367900	528.25	125.00	-	125.00	413.86

This project pertains to Cis-Varuna area for which water requirement in different years is as tabulated below:

Sl. No.	Year	Population	Water requirement in mld	Water available from river (mld)	Deficit (mld)
1	2	3	4	5	6
1.	2010	1188700	191.13	125.00*	Nil
2.	2025	1525000	243.77	125.00	118.77
3.	2040	1847500	295.30	125.00	170.30

**out of 95mld 70mld of Bore well water is being supplied to Cis Varuna area*

Necessity of the Project

Water demand for the year 2010 is 191.13 mld out of which merely125 mld raw water is available from surface source, thereby existing water supply is dependant on ground water as well as surface water.

The existing treatment capacity of Bhelupur WTP is 60+250= 310 mld. Out of two WTPs of 60 and 250 mld, 60 mld WTP was constructed in the year 1954 and has outlived its useful life and is not in sound condition. Thus, the same may not be economical to integrate in the present proposal to serve another 30 years or so and has not been considered in the present proposal. However this area will be utilized for constructing WTP for the demand of 2040 as and when it warrants

	Raw water pumps installed at Bhadaini Intake works in river Ganga in the year 1954 of pumping capacity 160 mld have completed their useful life and at present are out of order. Raw water pumps installed at Bhadaini Intake works in the year 1985 having pumping capacity 144 mld are functioning with frequent trouble and break downs and their present pumping capacity is limited to 125 mld only. These pumps have also completed its economic life and has been proposed for replacement in the present proposal. Clear Water Pumps installed at Bhelupur in 1985 have also completed their useful life and has been proposed for replacement to supply water for another 15 years. There is no 33/11 K.V. sub-station either at intake works or at water works. The erratic power supply and voltage fluctuations frequently interrupt the water supply in the town. Thus, provision for sub-station has been made in the estimate. The existing raw water transmission mains of size 600mm, 1050mm and 1200mm dia. are inadequate in size due to increased frictional losses and also one 600mm dia. pipe is more than 100 years old and has completed its useful life. As per design requirements, a new pipe of 1600mm PSC pipe of 1.8 km length has been proposed to meet the increased demand. Storage capacity of treated water is not sufficient. In most of the areas water supply is based on direct pumping due to shortage of over head reservoirs and hence need further enhancement of capacity. Against the requirement of 98.45 ML of storage (8 hours of total demand), the available storage capacity is 53.8 ML and provision for balance storage of 46.5 ML has been made in the estimate. Distribution mains/pipes are more than 50 years old and are causing heavy water losses which is around 30 percent of water supply. Hence, in view of the above, there is urgent need to take up the water supply scheme for Varanasi city Phase-I on priority basis
Proposed Water Supply Component for Varanasi city	An integrated approach has been adopted to develop a complete water supply system which will be capable to fulfill the water requirement for 30 years. However, the works to be taken up have been proposed in phased manner. Considering the urgency and importance of potable water supply there is urgent need to take up the following works in Cis-Varuna area of Varanasi city. ➢ **Renovation of intake works and replacement of raw water pumps**

at Bhadaini.

- **Installation of sub stations at Bhadaini Intake Woks and Bhelupur WTP.**
- **Laying of raw water transmission main.**
- **Rehabilitation / Renovation of Bhelupur WTP**
- **Replacement of old rising main.**
- **Construction of zonal CWRs/OHTs.**
- **Necessary arrangement for leak detection to reduce pipe line losses and to conserve fresh water**

Under Phase-II, reorganisation of distribution system of Cis-Varuna area is to be taken up along with the works of remaining part of Varanasi viz. trans-Varuna, the DPR for which is under preparation and is likely to be submitted by December 2007. The works of Phase-II shall also be taken up simultaneously and expected to be completed along with the works proposed in Phase-I project so that benefit could reach the people at earliest.

However, to provide complete integrated infrastructure for water supply system in Varanasi city for next 30 years, the following works shall be taken up in Phase-II projects.

- **Construction of intake well and WTP of 250 mld capacity near Chaubeypur for Trans Varuna area.**
- **Laying of Raw Water / Clear Water rising main**
- **Strengthening/Laying of distribution network**
- **Construction of storage reservoirs.**

DETAILS OF PROPOSED WORKS FOR WATER SUPPLY COMPONENT IN PRESENT PROJECT PHASE-I

Sl. No.	**COMPONENT-WISE PROJECT COST**	Recommended by CPHEEO Amount in Rs. lacs
1.	Bhadaini Intake Works	901.00
2.	Raw Water Transmission Line	346.50
3.	Bhelupur Treatment Plant	2342.02
4.	Clear Water Transmission System	1841.50
5.	Service Reservoir	4251.28
6.	Zonal Pumping Stations	714.70
7.	Leak detection equipment, Magnetic flow meters, DG sets etc.	381.75
	Sub-Total:	10778.75
	3% Contingencies	323.36
	Total:	**11102.11**

Period of Implementa-tion	36 months from the date of sanction.

<table>
<tr><td>Per capita cost (Rs.)</td><td>2010 - 934

2025 - 728

2040 - 600</td></tr>
<tr><td>Implementing Agency</td><td>UP Jal Nigam on behalf of Nagar Nigam, Varanasi</td></tr>
<tr><td>Funding Pattern</td><td>Cost Sharing Pattern (as per JNNURM guide lines
<table><tr><td></td><td>Share</td><td>Rs. in lacs</td></tr><tr><td>GoI</td><td>50%</td><td>5551.06</td></tr><tr><td>State Govt.</td><td>20%</td><td>2220.42</td></tr><tr><td>ULB</td><td>30%</td><td>3330.63</td></tr></table></td></tr>
<tr><td>Financial Phasing</td><td>• 20% of the GoI share (Rs. 1110.21 lacs), 20% of State Govt. share (Rs. 444.08 lacs) and 20% ULB share (Rs.666.13 lacs) of capital cost to be devolved in the year 2007-08.
• 30% of the GoI share (Rs. 1665.32 lacs), 30% of State share (Rs. 666.13 lacs) and 30% ULB share (Rs.999.19 lacs) of capital cost to be devolved in the year 2008-09.
• 30% of the GoI share (Rs. 1665.32 lacs), 30% of State Govt. share (Rs. 666.13 lacs) and 30% ULB share (Rs.999.19 lacs) of capital cost to be devolved in the year 2009-10.
• 20% of the GoI share (Rs. 1110.21 lacs), 20% of State Govt. share (Rs. 444.08 lacs) and 20% ULB share (Rs.666.13 lacs) of capital cost to be devolved in the year 2010-11.</td></tr>
<tr><td>Annual O&M Expenditure Existing</td><td>Income & expenditure data of Varanasi Jal Sansthan for last six year is tabulated below:
Amount in Rs. lakh
<table><tr><th>Sl. No.</th><th>Year</th><th>Net Revenue Receipt</th><th>Expenditure</th><th>(+) Profit
(-) Loss</th></tr><tr><td>1.</td><td>2000-2001</td><td>1540.91</td><td>1465.41</td><td>+75.50</td></tr><tr><td>2.</td><td>2001-2002</td><td>1422.86</td><td>1233.62</td><td>+89.24</td></tr><tr><td>3.</td><td>2002-2003</td><td>2091.09</td><td>1818.88</td><td>+272.21</td></tr><tr><td>4.</td><td>2003-2004</td><td>1351.80</td><td>1277.53</td><td>+74.27</td></tr><tr><td>5.</td><td>2004-2005</td><td>1079.58</td><td>1001.11</td><td>+78.47</td></tr><tr><td>6.</td><td>2005-2006</td><td>1212.48</td><td>1173.44</td><td>+39.04</td></tr></table></td></tr>
<tr><td>Proposed annual O&M Expenditure</td><td>O&M and Revenue Generation
<table><tr><th>Sl. No.</th><th>Particulars</th><th>Year 2010</th><th>Year 2030</th></tr><tr><td>1(i)</td><td>Annual O&M Expenditure (Rs. lacs)</td><td>3034.00</td><td>12911.00</td></tr><tr><td>(ii)</td><td>Annuity for repayment of loan</td><td>1226.00</td><td>1226.00</td></tr><tr><td>(iii)</td><td>Total Expenditure</td><td>4260.00</td><td>14137.00</td></tr><tr><td>2.</td><td>Annual Income (Rs. lacs)</td><td>4729.00</td><td>15426.00</td></tr><tr><td>3.</td><td>Net Profit (Rs. lacs)</td><td>469.00</td><td>1289.00</td></tr></table></td></tr>
</table>

The DPR has been examined and comments of CPHEEO are as under:

1) The scheme has been designed as per Manual on Water supply and Treatment.

2) The design of pumping based feeder network done on branch network has been checked for some newly proposed pipes. It is observed that in present case, the diameter arrived for feeder main through Branch network design are more or less same as obtained through pumping main design software. However, in some pipe segments it is found to be one diameter higher or lower or so. However, in the present project, the slight variation in diameters based on above two design options has been considered and the diameters arrived at based on Branch network design has been allowed for estimation purposes.

3) The water supply project for Varanasi city is proposed to be implemented in two parts. Part-I (the present proposal) is designed to basically renovate the existing water supply units which are in dilapidated condition and after its renovation/ augmentation, the same would boost the water supply to city. Part-II of the water supply scheme is stated to be under preparation based on detailed survey and investigation to cover the newly developed areas and other areas where water supply distribution network is inadequate. The part-II of the proposal would be submitted at later stage in December 2007. State Government should ensure the timely completion of both parts of proposal so that benefit may reach to the people after completion of scheme.

4) VNN/State Govt has provided Bar chart and expected to be completed by 36 months

5) The O& M Estimate has been provided in the DPR and also provided an action plan to recover the same from the beneficiaries

6) The VNN had agreed to provide bulk meters at various strategic places to have a routine water audit

In view of the above the project may be accorded technical clearance at an estimated cost of Rs. 111.02 crore (Cost Abstract) against the original proposed cost of Rs. 146.65 crore and State Government may like to ensure the under mentioned technical remarks.

Cost Abstract

Sl. No.	**COMPONENT-WISE PROJECT COST**	Proposed by UP Jal Nigam Rs in lacs	Recommended by CPHEEO Amount in Rs. lacs
1.	BHADAINI INTAKE WORKS	1133.72	901.00
2.	RAW WATER TRANSMISSION LINE	306.00	346.50
3.	BHELUPUR TREATMENT PLANT	3239.92	2342.02
4.	CLEAR WATER TRANSMISSION SYSTEM	343.00	1841.50
5.	SERVICE RESERVOIR	50.00	4251.28
6.	ZONAL PUMPING STATIONS	134.00	714.70
7.	LEAK DETECTION EQUIPMENT, MAGNETIC FLOW METERS, DG SETS ETC.	1731.25	381.75
8	DISTRIBUTION SYSTEM	1875.70	Phase -II
9	STAFF QUARTER	176.20	nil
10	TRAINING AND CAPACITY BUILDING	134.85	nil
	SUB-TOTAL:	9124.71	10778.75
	CENTAGE 12.5% *RESTRICTED TO 3% CONTINGENCIES	1140.59	323.36*
	TOTAL:	10265.30	11102.11
	ULB SHARE	4400.00	nil
	GRAND TOTAL	14665.30	11102.11

Technical Remarks

- The Varanasi Nagar Nigam (VNN) may imitate advance action immediately to acquire the identified lands for various units so as to avoid time over run resulting to cost over runs

- During the project implementation, the detailed design of each and every component of the project may be re-checked based on precise survey and prevailing ground situation and only after approval of designs by the competent authority not less than the level of Chief Engineer, the execution of the project should be started. However, if the cost estimate increased due to re-checking the design, the same will be borne by the VNN / State Government from their own resources.

- All efforts should be made by State Government/ULB to ensure the long term sustainability of the project and should commit to generate adequate revenue to O&M of the scheme at various stages during its design life.

- The NURM Directorate should release fund to State Government / ULB only after the State Government / ULB makes necessary budgetary provision for implementation of project in their budgets.

- As per suggestion of CPHEEO, efforts has been made to augment the system based on gravity supply rather than direct pumping based water supply by suitably breaking the big network network .

- Engineer-in-charge for project implementation should ensure that people should not suffer for want of water during execution of aforesaid project and implementation should be duly planned well in advance to avoid any water scarcity to the people.

- The estimate has been prepared based on current schedule of rates / market rates. However, any increase in project cost above the sanctioned cost for any reason has to be borne by State Government / ULB from its own resources.

- A realistic water tariff is designed so as to recover at least the O&M cost initially and to generate adequate revenue for future augmentation of the scheme.

- All efforts should be made to ensure that the scheme runs in self-sustainable manner in respect of O&M of the projects and the proposed tariff structure suggested in the DPR has to be implemented after commissioning of the scheme. State Government shall ensure a resolution to this effect from concerned ULB to implement the same on commissioning of the project.

- It is suggested that VNN, may formulate a realistic PERT (CPM) Chart and monitor it regularly and if any shortcomings found during monitoring, the same will be mitigated with suitable action/Action plan then and there.

- The Implementing Agency shall provide Bulk Meters at WTP, all Reservoirs including metering all HSCs so as to facilitate water conservation and water audit as envisaged in the DPR.

- The ANN, while selecting the size and type of pipe material for rising mains must keep in view the techno-economic viability of the different types of pipe materials.

- Air valves and scour valves may be provided at strategic locations in the transmission mains.

- After carrying out detail engineering, a set of final drawings including the distribution network may be forwarded to CPHEEO for reference and records.

- During the implementation of project, the project in-charge / State Government should ensure that requisite budgetary allocation is made by State Government as well as ULB so as to ensure smooth implementation of the scheme as per approved time schedule to avoid cost and time overrun.

- The routine raw water quality test should be carried out for physical, chemical and bacteriological parameters and suitable treatment and disinfections should be employed before supply. The quality of raw and treated water should be monitored regularly to maintain the drinking water guideline values at consumers' end, as prescribed in the CPHEEO's revised Manual on Water Supply and Treatment published in May 1999.

- Full protection of the existing as well as proposed sources against pollution of any nature should be ensured.

- The material and equipment to be procured should conform to BIS specifications.

- Uninterrupted electric power supply must be ensured by VNN for trouble free operation and maintenance of the scheme.

- VNN must ensure availability of trained technical manpower to execute the scheme in time and for its annual operation & maintenance after commissioning of the scheme.

- To the extent possible, involvement of community, right from the planning stage to operation and maintenance may be ensured.

- Necessary clearances/approvals may also be obtained from Railway Authorities, State/National Highway authorities, wherever necessary before implementing the scheme.

- No change in the scope of scheme is allowed without prior approval from CPHEEO.

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