



Ministry of Housing & Urban Affairs
Government of India



Urban Development
& Housing Department



SERVICE LEVEL IMPROVEMENT PLAN OF WATER SUPPLY

MUNICIPAL CORPORATION BHAGALPUR

PREPARED BY

Regional Centre for Urban and
Environmental Studies Lucknow

IN CONSULTATION WITH

Bhagalpur Municipal Corporation
&

Bihar Urban Infrastructure
Development Corporation Limited

CITY NAME – BHAGALPUR MUNICIPAL CORPORATION

WATER SUPPLY

1. Assess the Service Level Gap

The first step is to assess the existing situation and service levels gaps for Water Supply (AMRUT Guidelines; para 3 & 6). This will also include existing institutional framework for the sector. AMRUT is focused on improvement in service levels. The zone wise data shall be used in identifying the gaps. These zone-wise gaps will be added to arrive at city level service gaps. While assessing service level gap reply following questions not more than word indicated against each question.

Question: What kind of baseline information is available for water supply system of the city? Detail out the data, information, plans, reports etc related to sector. Is zone wise information available? (75 words)

Previous reports available relating to Bhagalpur water supply includes:

- The Subproject Appraisal Report of 2011 and an updated SAR of October 2013 for Bhagalpur Water Supply Project.
- Town of Bhagalpur: Draft Master Plan Vision 2027 - Prepared by the Department of Urban Development and Housing (UDHD), Government of Bihar, 2009; and
- Feasibility Project Report of Integrated Bhagalpur Water Supply Scheme under State Plan Prepared by Bihar Rajya Jal Parisad (BRJP), Government of Bihar, 2006.

The SAR prepared by GHK has been considered as reference for details. However, the CDTA Consultants have reviewed and updated the information for (i) the design base year to 2017 - which is the estimated date for final completion of the new intake, water treatment plant, transmission/feeder mains, Overhead Tanks, and distribution mains, and (ii) projected population of the city (based on the 2011 Census data), and (iii) ward-wise population and demand – which have been used to build the distribution and transmission Hydraulic Network Models (HNMs) for design purposes.

Bhagalpur Municipal Corporation (BMC) has 51 wards. Water supply of the town is owned and managed by Bhagalpur Municipal Corporation and has both ground water and surface water as sources of water. While BMC reports that 81% of households are connected with water supply, the 2001 Census data and Vision 2027 document indicate that 77% of households rely on private hand pumps or tube wells and only 22% have a tap connection. Others depend on open wells and other sources. The existing water supply system in Bhagalpur makes use of both river water and ground water. There are three WTPs on the bank of river Ganga with a total capacity of 17.25 MLD treated water. In addition to this there are 61 Tube Wells located in various parts of the town having a capacity to produce 20 MLD of water. However present supply of water to the town is only around 18 MLD. Presently the 3 WTPs are producing on an average of 8.3 MLD water and the TWs produce around 10 MLD water. The existing raw water intakes are located at Barari water works on a subsidiary channel of the River Ganga which remains dry for a considerable part of the year, particularly in summers. BMC has to periodically dredge the channel to bring water to the intakes. River water quality is a concern due to discharge of effluent from the Champa Nallah which drains much of the town's wastewater in Ganga River just upstream of intakes at Barari HW.

The existing total design capacity is therefore about 17.3 MLD. These filter plants have become very old and have serious O&M issues including substantially reduced performance levels. The treated water is stored in two clear water reservoirs and is disinfected by adding Bleaching Powder solution in a crude manner. The main reasons attributed for very low production level from WTPs compared to installed capacity is erratic and limited availability of power supply, poor

condition of electro-mechanical equipment and condition of WTP instrumentation, valves, under drainage system etc.

In addition to the surface water described above, there are 61 tube wells in the town. The tube wells are fitted with pump sets of varying capacity ranging from 7.5 HP to 30 HP. Total capacity of these tube wells is estimated at 18 MLD but are presently producing 10 MLD water only. The yield of the aquifer is reported to be limited and quality issues have also been raised by CDTA consultants.

There are 7 existing Over Head Tanks (OHTs), ranging from 0.4 to 1.0 lakh gallon capacity with staging ranging from 18 m to 22 m. At present only 4 are functional as water from TWs connected to them is pumping water directly to the distribution system. The distribution system in the town has a length of about 55 km (Old system) and about 74 km newly laid by BRJP in recent past.

Bhagalpur Water Supply subproject is being implemented in two phases. Phase I or Bhagalpur Water Supply Project 1 (BWSP1) included rehabilitation of existing water treatment works including pumping machinery and instrumentation, rehabilitation of existing OHTs and construction of new OHTs, and phased development of a new distribution system, including metered customer connections. Phase II or Bhagalpur Water Supply Project II (BWSP2), conceived to supplement BWSP 1, comprises the following proposed subproject components: (i) new intake works comprising a dredged approach channel, an intake well of capacity 135 MLD and dimensions 10m x 3 m on the banks of River Ganga and a jack well; (ii) new water treatment plant of 90 MLD for intermediate year demand (2032) with provision for augmentation to meet design year demand of year 2047; (iii) a 6 ML clear water reservoir (CWR) and pump house, (iv) control room with CWR; (v) electric substation with CWR; (vi) pumping arrangements for raw and clear water; (vii) new transmission systems for raw water (2.55 Km) and treated water (28.7 Km); (viii) a switch yard with 2 transformers 1250 kVA each; and (ix) SCADA system for monitoring of operation of assets created in both phases. The treated water is proposed to be conveyed to all the overhead service reservoirs existing and to be constructed in Phase 1.

Question: Have you collected census 2011 data? Are you aware of baseline survey data of MoUD? Have you correlated data from these and other sources? (75 words).

Yes, we have collected the Census 2011 data from Census of India website. Yes, we are aware of the baseline survey data of Ministry of Urban Development.

Yes, we had correlated the data from Census of India, MoUD Survey Data, DPRs, Primary and Secondary Data available in Municipal Corporation and other Parastatal Agencies that were involved in urban development schemes while preparing the Service Level Improvement Plan.

	Location of source of drinking water Population	Total number of house holds	Tap water from treated source
Total population (census 2011)	Total Population = 4,00,146	68,193	11,556
	Within the premises	50,162	7,302
	Near the premises	12,790	3,108
	Away	5,241	1,146
Departmental data 2015		83,844	10,983
Departmental data 2017		83,844	10,983

What are existing service levels for water supply in the city? What is the coverage of water supply Connections? What is per capita supply of water? How much is the extent of metering? How much is non-revenue water? Provide information in table

TABLE: STATUS OF WATER SUPPLY SERVICE LEVELS

Sr. No.	Indicators	Present Status		MOUD Benchmark	Reliability	
		2015	2017		2015	2017
1	Coverage of water supply connections 10983/83844	13.09 %	13.09 %	100%	C	C
2	Per capita supply of water 13 Surface Water+ 10 Ground Water= 23 MLD/4,00,146	57.47 LPCD	57.47 LPCD	135 LPCD	C	C
3	Extent of metering of water connections	0%	0%	100%	C	C
4	Extent of non-revenue water	100%	100%	20%	D	D
5	Quality of water supplied	90%	90%	100%	D	D
6	Cost recovery in water supply services	0%	0%	100%	D	D
7	Efficiency in collection of water supply related charges	0%	0%	90%	D	D

QUESTION: WHAT IS THE GAP IN THESE SERVICE LEVELS WITH REGARD TO BENCHMARKS PRESCRIBED BY MOUD? (75 WORDS).

S.No	GAP IN SERVICE LEVELS IS AS UNDER:	Year 2015	2017-Existing
1.	Gap in coverage of water supply	86.91 %	86.91%
2.	Gap in Per capita water availability as per present population is about	77.53 LPCD	77.53 LPCD
3.	Gap in Metering is	0%	0%
4.	Gap in NRW include leakage and free water supply to social gathering festivals along with water supply through stand posts.	80%	80%
5.	Gap in Quality of supplied water as per PHE norms.	10%	10%
6.	Gap in Cost recovery with expenditure on electricity and power.	100%	100%
7.	Gap in efficiency of water charges	90%	90%
Note: Data not available regarding NRW, Cost recovery and efficiency in collection of water related charges.			

SOURCE OF WATER AND WATER TREATMENT SYSTEM.

Please provide information in 150 words on the above responding to (however not limited to) following questions.

Question: What is the existing source of water? Is it surface water source or underground water source? What is the capacity of these sources?

Existing source of water supply is underground water and capacity of the source (Total Nos of tube wells x Average discharge of each tube well) is $\times 2 \text{ MLD} = \text{MLD}$
 $10 \text{ MLD} + 13 \text{ MLD} = 23 \text{ MLD}$

Question: Is there any treatment provided to water from these sources? How much water is required to be treated daily? What is the treatment capacity installed in the city?

No, chlorination of underground water supply is done. 54.01MLD water is required to be treated daily. Total treatment Capacity installed in the city is 23 MLD.

Question: What per capita water supply in LPCD (liter per capita per day) comes out, if you divide total water supply by the total population?

Existing source of water is ground water and already treatment facility is available. Per capita water supply in LPCD is $= (\text{Total water supply} / \text{total Population})$ $23 \text{ MLD} / 4,00,146 \text{ Population} = 57.47 \text{ LPCD}$

DISTRIBUTION ZONES

Please provide information in 150 words on the above responding to (however not limited to) following questions.

Question: City is divided in how many zones for water supply?

The work of Water Supply in Rural and Urban areas of Bihar is done by the Public Health and Engineering Department of Bihar Government and same is maintained by Gram Panchayat and Urban Local Bodies for smooth supply to the citizens but due to lack of proper infrastructure and shortage of funds it is impossible to achieve the desired results.

Ministry of Urban Development, Government of India introduced its flagship scheme AMRUT for enhancement of infrastructure related to water supply scheme and ensuring universal coverage. In line with the same Urban Development and Housing Department Government of Bihar took initiative and involved Bihar Raj Jal Parshad and BUDCIO as the Parastatal Agencies for preparation of Detailed Project Report and Implementation of the project under AMRUT.

In this above context, Bihar Urban Infrastructure Development Corporation Limited visited Municipal Corporation Bhagalpur and conducted a survey to collect information based on which the city was divided into 51 wards. However, it shall be about December 2018, as the rehabilitation of sources and creation of new DMA's will take significant time, because the service to existing customers cannot be discontinued or disturbed for any length of time.

TABLE: ZONE WISE COVERAGE OF HOUSEHOLDS

Question: Provide details of total no of Households (HH) in each zone, no of HH with and without water tap connections in the Table

Zone No.	Total No. of Households	Households with Water tap Connection	Households without water tap connections
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		2015	2017	Total	2015	2017	Remaining gap
1	2274 HH	277 HH	HH tap connection is under progress under BWSP -1 project (List of connection as on 30 th June 2018 is given as annexure)	277 HH	1997	Each household will be provided tap connection under the project	1997 HH
2	1539 HH	132 HH	0	132 HH	1407 HH	1407 HH	1407 HH
3	1621 HH	77 HH	0	77 HH	1544 HH	1544 HH	1544 HH
4	1536 HH	83 HH	0	83 HH	1453 HH	1453 HH	1453 HH
5	1617 HH	321 HH	0	321 HH	1296 HH	1296 HH	1296 HH
6	1285 HH	122 HH	0	122 HH	1163 HH	1163HH	1163HH
7	1023 HH	89 HH	0	89 HH	934 HH	934 HH	934 HH
8	1078 HH	113 HH	0	113 HH	965 HH	965HH	965HH
9	1267 HH	103 HH	0	103 HH	1164 HH	1164 HH	1164 HH
10	1778 HH	211 HH	0	211 HH	1567 HH	1567 HH	1567 HH
11	1204 HH	86 HH	0	86 HH	1118 HH	1118 HH	1118 HH
12	1550 HH	209 HH	0	209 HH	1341 HH	1341 HH	1341 HH
13	1320 HH	141 HH	0	141 HH	1179 HH	1179 HH	1179 HH
14	1789 HH	112 HH	0	112 HH	1677 HH	1677 HH	1677 HH
15	1351 HH	375 HH	0	375 HH	976 HH	976 HH	976 HH
16	1934 HH	481 HH	0	481 HH	1453 HH	1453 HH	1453 HH
17	1074 HH	259 HH	0	259 HH	815 HH	815 HH	815 HH
18	1054 HH	367 HH	0	367 HH	687 HH	687 HH	687 HH
19	1458 HH	360 HH	0	360 HH	1098 HH	1098 HH	1098 HH
20	1787 HH	473 HH	0	473 HH	1314 HH	1314 HH	1314 HH
21	1335 HH	455 HH	0	455 HH	880 HH	880 HH	880 HH
22	1281 HH	347 HH	0	347 HH	934 HH	934 HH	934 HH
23	2164 HH	388 HH	0	388 HH	1776 HH	1776 HH	1776 HH
24	1928 HH	363 HH	0	363 HH	1565 HH	1565 HH	1565 HH
25	1059 HH	357 HH	0	357 HH	702 HH	702 HH	702 HH
26	1469 HH	235 HH	0	235 HH	1234 HH	1234 HH	1234 HH
27	1193 HH	171 HH	0	171 HH	1022 HH	1022 HH	1022 HH
28	1823 HH	319 HH	0	319 HH	1504 HH	1504 HH	1504 HH
29	2539 HH	233 HH	0	233 HH	2306 HH	2306 HH	2306 HH
30	734 HH	259 HH	0	259 HH	475 HH	475 HH	475 HH
31	2008 HH	128 HH	0	128 HH	1880 HH	1880 HH	1880 HH

Zone No.	Total No. of Households	Households with Water tap Connection			Households without water tap connections		
		2015	2017	Total	2015	2017	Remaining gap
32	1698 HH	79 HH	0	79 HH	1619 HH	1619 HH	1619 HH
33	1965 HH	79 HH	0	79 HH	1886 HH	1886 HH	1886 HH
34	1394 HH	205 HH	0	205 HH	1189 HH	1189 HH	1189 HH
35	1215 HH	163 HH	0	163 HH	1052 HH	1052 HH	1052 HH
36	1810 HH	153 HH	0	153 HH	1657 HH	1657 HH	1657 HH
37	2116 HH	281 HH	0	281 HH	1835 HH	1835 HH	1835 HH
38	6378 HH	226 HH	0	226 HH	6152 HH	6152 HH	6152 HH
39	935 HH	92 HH	0	92 HH	843 HH	843 HH	843 HH
40	1075 HH	96 HH	0	96 HH	979 HH	979 HH	979 HH
41	1434 HH	258 HH	0	258 HH	1176 HH	1176 HH	1176 HH
42	1937 HH	185 HH	0	185 HH	1752 HH	1752 HH	1752 HH
43	2120 HH	112 HH	0	112 HH	2008 HH	2008 HH	2008 HH
44	1495 HH	135 HH	0	135 HH	1360 HH	1360 HH	1360 HH
45	899 HH	90 HH	0	90 HH	809 HH	809 HH	809 HH
46	1824 HH	117 HH	0	117 HH	1707 HH	1707 HH	1707 HH
47	1549 HH	331 HH	0	331 HH	1218 HH	1218 HH	1218 HH
48	2002 HH	82 HH	0	82 HH	1920 HH	1920 HH	1920 HH
49	1440 HH	194 HH	0	194 HH	1246 HH	1246 HH	1246 HH
50	1922HH	236 HH	0	236 HH	1686 HH	1686 HH	1686 HH
51	1564 HH	223 HH	0	223 HH	1341 HH	1341 HH	1341 HH
Total	83844HH	10983 HH	0	10983 HH	72861 HH	72861 HH	72861 HH

STORAGE OF WATER

Please provide information in 150 words on the above responding to (however not limited to) following questions.

Question: What is the total water storage capacity in the city? What is capacity of elevated and ground water reservoirs?

Storage capacity of in the city is as follows:-

07 Existing Reservoir out of 4 is Working

Total Elevated reservoir Storage Capacity Existing – 1.8 ML

19 Ongoing Elevated reservoir Capacity -

Proposed capacity : 26395 M3

Question: In case of surface water, does city need to have ground level reservoirs to store raw treated water?

As per the existing situation, Bhagalpur Municipal Corporation has both ground water and surface water as sources of water.

Clear water from both WTP 1 and WTP 2 is stored in an old underground reservoir (Sump-1) constructed in brick masonry with guiding baffle walls to reduce short circuiting of flow. This reservoir is at a higher elevation and is connected to two other clear water reservoirs (Sump 2 and Sump 3) at lower level adjacent to the Old Clear Water Pump House.

Total capacity of the underground sumps is 8,200 m³. Out of this, 5,400 m³ is available to store treated water from the Patterson Filter (WTP 1) and 2,700 m³ for treated water from the Mechanical Filter (WTP 2). Treated water is pumped to the city by two separate transmission mains, 300 mm (12") and 350 mm (14") diameters, both originating from the Old Clear Water Pump House.

Treated water from WTP 3 is stored in a separate sump (Sump 4) of capacity 20 lakh gallons with adjoining New Clear Water Pump House. Sump 4 is located at a higher elevation and connected by a gravity line of 300 mm diameter (with a sluice valve) to Sump 1 for operational flexibility.

Works that is envisaged in the Phase II of BWSP for financing under Tranche 2 of the ADB Loan include a Clear water reservoir, 50 x 30 X 4.5. Capacity – 9.1 ML including chlorination tanks.

Question: Is water being supplied to consumers through direct pumping or through elevated reservoirs?

There are 7 existing Over Head Tanks (OHTs), ranging from 0.4 to 1.0 lakh gallon capacity with staging ranging from 18 m to 22 m. At present only 4 are functional as water from TWs connected to them is pumping water directly to the distribution system.

Question: Is storage capacity sufficient to meet the cities demand?

No, storage capacity is not sufficient to meet the city demand.

DISTRIBUTION NETWORK

Please provide information in 150 words on the above responding to (however not limited to) following questions.

Question: What is the total length of water supply distribution pipe line laid in the city?

The distribution system in the town has a total pipe length of about 55 km, excluding those newly laid by BRJP, out of 328 km of road length. The distribution system is of CI pipes, ranging in size from 100 mm to 300 mm diameter. These pipelines were to replace most of the pipe works and the replacement works are being carried out under BWSP1 and 2010 to be modified.

Question: What is the total road length in the city? Is the pipe lines are laid in all streets? Is the objective of universal coverage of water supply pipe line is achieved?

The total road length in the city is 532 KM. Pipe lines are not laid in all the streets. The objective of universal coverage of water supply is not achieved as pipe line is not laid in all streets.

Question: What are the kind of pipe materials used in distribution lines?

Old connections use GI pipe and new connections use PVC.

Question: Provide zone wise details of street length with and without water distribution lines in the Table?

Table: Zone Wise length of distribution network

Zone No.	OHSR Site	Total Street Length In KM	Street Length With Water Distribution Pipe Line In Km			Street Length Without Water Distribution Pipe Line(In Kms		
			2015 (Existing)	2019 (14/4/2019-Project period)	Total	2015	Project period 14/4/2019	Remaining Gap
1	Abir Mishra Lane	19.853 KM	2.261 KM	17.592 KM	19.853 KM	17.592 KM	Laying of distribution pipeline is under progress	Work Under Progress
2	CTS-P	23.230 KM	-	23.230 KM	23.230 KM	23.230 KM	Laying of distribution pipeline is under progress	Work Under Progress
3	Mahashay Deodi 1	12.264 KM	1.753 KM	10.511 KM	12.264 KM	10.511 KM	Laying of distribution pipeline is under progress	Work Under Progress
4	Mahashay Deodi 2	17.134 KM	4.358 KM	12.776 KM	17.134 KM	12.776 KM	Laying of distribution pipeline is under progress	Work Under Progress
5	TNB University	25.444 KM	2.975 KM	22.469 KM	25.444 KM	22.469 KM	Laying of distribution pipeline is under progress	Work Under Progress
6	BMC Godown	31.579 KM	8.733 KM	22.846 KM	31.579 KM	22.846 KM	Laying of distribution pipeline is under progress	Work Under Progress

Zone No.	OHSR Site	Total Street Length In KM	Street Length With Water Distribution Pipe Line In Km			Street Length Without Water Distribution Pipe Line(In Kms)		
			2015 (Existing)	2019 (14/4/2019- Project period)	Total	2015	Project period 14/4/2019	Remaining Gap
7	Jaglal High School	29.889 KM	5.163 KM	24.726 KM	29.889 KM	24.726 KM	Laying of distribution pipeline is under progress	Work Under Progress
8	Lajpat Park	23.408 KM	5.297 KM	18.111 KM	23.408 KM	18.111 KM	Laying of distribution pipeline is under progress	Work Under Progress
9	RCD Adampur	17.267 KM	-	17.267 KM	17.267 KM	17.267 KM	Laying of distribution pipeline is under progress	Work Under Progress
10	Brahpura	34.813 KM	2.567 KM	32.246 KM	34.813 KM	32.246 KM	Laying of distribution pipeline is under progress	Work Under Progress
11	Manik Sarkar	28.487 KM	1.753 KM	26.734 KM	28.487 KM	26.734 KM	Laying of distribution pipeline is under progress	Work Under Progress
12	Ghanta ghar	5.987 KM	0.854 KM	5.133 KM	5.987 KM	5.133 KM	Laying of distribution pipeline is under progress	Work Under Progress
13	Housing Board	30.217 KM	2.114 KM	28.103 KM	30.217 KM	28.103 KM	Laying of distribution pipeline is under progress	Work Under Progress
14	Anand Nagar	34.884 KM	3.340 KM	31.544 KM	34.884 KM	31.544 KM	Laying of distribution pipeline is under progress	Work Under Progress

Zone No.	OHSR Site	Total Street Length In KM	Street Length With Water Distribution Pipe Line In Km			Street Length Without Water Distribution Pipe Line(In Kms)		
			2015 (Existing)	2019 (14/4/2019- Project period)	Total	2015	Project period 14/4/2019	Remaining Gap
15	Surkikal	22.714 KM	0.661 KM	22.053 KM	22.714 KM	22.053 KM	Laying of distribution pipeline is under progress	Work Under Progress
16	Thakur Badi	25.123 KM	3.251 KM	21.872 KM	25.123 KM	21.872 KM	Laying of distribution pipeline is under progress	Work Under Progress
17	Aliganj	28.152 KM	3.329 KM	24.823 KM	28.152 KM	24.823 KM	Laying of distribution pipeline is under progress	Work Under Progress
18	Goshala	4.491 KM	0.152 KM	4.339 KM	4.491 KM	4.339 KM	Laying of distribution pipeline is under progress	Work Under Progress
19	Mugalpura	25.434 KM	3.567 KM	21.867 KM	25.434 KM	21.867 KM	Laying of distribution pipeline is under progress	Work Under Progress
20	Bazar Samiti	61.207 KM	18.195 KM	43.012 KM	61.207 KM	43.012 KM	Laying of distribution pipeline is under progress	Work Under Progress
21	Sikandarpur	23.651 KM	1.419 KM	22.232 KM	23.651 KM	22.232 KM	Laying of distribution pipeline is under progress	Work Under Progress
22	Ishak Chak	2.671 KM	0.715 KM	1.956 KM	2.671 KM	1.956 KM	Laying of distribution pipeline is under progress	Work Under Progress

Zone No.	OHSR Site	Total Street Length In KM	Street Length With Water Distribution Pipe Line In Km			Street Length Without Water Distribution Pipe Line(In Kms		
			2015 (Existing)	2019 (14/4/2019- Project period)	Total	2015	Project period 14/4/2019	Remaining Gap
23	CTS -E	5.851 KM	0.748 KM	5.103 KM	5.851 KM	5.103 KM	Laying of distribution pipeline is under progress	Work Under Progress
Total (Kms)		531.997 KM	71.452 KM	460.545 KM		460.545 KM		

INSTITUTIONAL FRAMEWORK

Please provide information in 150 words on the above responding to (however not limited to) following questions.

Question: Define role and responsibilities in terms of O&M, policy planning, funding, service provision in table

Table: Functions, roles, and responsibilities

Planning and Design	Construction/ Implementation	O&M
DSC	Project Implementation Unit	Municipal Corporation Bhagalpur

Question: How city is planning to execute projects?

Following works are proposed under Phase I, under bidding process at the moment of submission of the present report:

- Laying of a dedicated 33kV feeder line from 132kV GSS at Sabur up to Barari HW to ensure continuous availability of dependable and good quality power supply and removing major constraint in getting designed production of water.
- Rehabilitation of the three WTPs at Barari so that they are able to produce designed quantity of water of acceptable quality.
- Rehabilitation/Replacement of electro-mechanical equipment at Raw Water Intakes and Clear Water Pumping Station to ensure sustained availability of raw water to the 3 WTPs and to the city OHSRs.
- Rehabilitation/Replacement of existing distribution pipe lines to reduce leakage losses and pipe break downs. Extension of distribution network to uncovered areas to achieve coverage of at least 95% households.
- Construction of additional OHSRs to provide required overhead storage for supply of water with a minimum terminal pressure of 12m on 24x7 basis.
- Provide metered service connections to all existing and future consumers in conjunction with introduction of volumetric tariff by BMC and provide customer service.
- Operation and Maintenance of existing water supply system and any new assets created

under the tranche for a period up to 2021.

Question: Shall the implementation of project be done by Municipal Corporation or any parastatal body? Please refer para 8.1 of AMRUT guidelines.

Yes, implementation of the project will be done by parastatal Agencies in consultation with Urban Local Bodies.

2. Bridge the Gap

Once the gap between the existing Service Levels is computed, based on initiatives undertaken in different ongoing programs and projects, objectives will be developed to bridge the gaps to achieve universal coverage. (AMRUT Guidelines; para 6.2 & 6.3, Annexure-2; Table 2.1). Each of the identified objectives will be evolved from the outcome of assessment and meeting the opportunity to bridge the gap.

Question: List out initiatives undertaken in different ongoing programs and projects to address these gaps. For this provide details of ongoing projects being carried out for sector under different schemes with status and when the existing projects are scheduled to be completed? Provide information in Table

**TABLE: STATUS OF ONGOING/ SANCTIONED PROJECTS
2015-16 & 2016-2017**

S.No.	Name of Project	Scheme Name	Cost	Month of Completion	Status (as on dd /2017)
1	Rehabilitation, Construction , Operation and Maintenance of BWSP-1 Distribution Network – 460.545, 19 OHT- Existing WTP 17 MLD work	ADB	318.75 Cr	14/4/2019	123.44 Kms Distribution line , Construction of 3 no. of OHSR are complete and 5 Nos. of OHSRs are under progress as on 30 th June , 2018
2	Rehabilitation, Construction , Operation and Maintenance of BWSP-2 Intake well & Jack well-90 MLD ,WTP-90 MLD Raw water Main, CWR, SCADA & Automation.	ADB	253.57 Cr	Yet to be tendered	Intake well & Jack well-90 MLD WTP-90 MLD Raw water Main, CWR, SCADA & Automation.

Question: How much the existing system will be able to address the existing gap in water supply system? Will completion of above will improve the coverage of network and collection efficiency? If yes, how much. (100 words).

Bhagalpur town has been growing steadily in recent decades although growth was erratic due to in-migration of refugees after the 1971 war. Furthermore, for the purpose of population projection, the area defined as Bhagalpur Urban Agglomeration (UA) is considered since these areas are rapidly being absorbed into the city, and need to be taken into consideration as part of future demand.

It has been proposed under Phase I to do away with existing ground water sources on account of their water quality issues and limited potential. Phase I also includes rehabilitation/replacement/extension of distribution network, provide metered connections and service the consumers. However, the Phase I project does not provide for increasing water production to meet water demand of the design year 2047.

Question: Does the city require additional infrastructure to improve the services? What kind of services will be required to fulfill the gap?

Yes, the city requires additional infrastructure to improve the services. The following kind of services will be required to fulfill the gap:

1. Better coverage of water supply system by increasing length of pipelines and creating awareness among people towards proper usage of municipal water.
2. Regularization of unauthorized water connections.
3. Reduction in NRW water by replacement of old & damaged pipelines.
4. Automation of tube wells
5. Metering of water supply.

Question: How does the city visualize taking the challenge to rejuvenate the projects by changing their orientation, away from expensive asset replacement programs, to focusing on optimum use of existing assets?

Vision of the City is to optimize the current infrastructure and identify the grey areas by reducing the NRW and mainstreaming the illegal connections. City is bound to provide universal coverage by including the unserved areas in the second phase of development through parastatal agencies.

Question: Has city conducted assessment of Non-Revenue Water? If yes, what is the NRW level? Is city planning to reduce NRW?

No, City has not conducted any assessment related to Non-Revenue Water but is planning to conduct a study on NRW for the purpose of reducing it.

Question: Based on assessment of existing infrastructure and ongoing / sanctioned projects, calculate existing gaps and estimated demand by 2021 for water supply pipe network, number of household to be provided with tap connections, and required

enhancement in capacity of water source/ treatment plant (MLD). Gaps in water supply service levels be provided as per Table

Component		2015	2017	Total		2021	
		Present	Ongoing	2015	2017		
				Demand	Gap		
Source	Ground Water	10 MLD	-	10 MLD	-	138 MLD for year 2047	23 MLD is fulfilled by Refurbishment of Tub well and no Gap after completion of project
	Surface Water	13 MLD	102 MLD	13 MLD	115 MLD		
Treatment capacity	Ground Water	10 MLD	-	-	10 MLD	138 MLD for year 2047	
	Surface Water	17 MLD	90 MLD	17 MLD	107 MLD		
Elevated Storage capacity		1.8 ML	26.40 ML	1.8 ML	28.02 ML	46 ML	
Ground Water Clear Reservoir		-	-	-	-	9.1 ML	
Distribution network coverage		71.452 KM	460.545 KM	71.452 KM	531.997 KM	531.997 KM	No Gap

OBJECTIVES

Based on above, objectives will be developed to bridge the gaps to achieve universal coverage. While developing objectives following question shall be responded so as to arrive at appropriate objective.

Please provide List out objectives to meet the gap in not more than 100 words.

Question: Does each identified objectives will be evolved from the outcome of assessment?

Yes. The objective is to increase the coverage to un-served areas and to reduce NRW and enhance storage capacity.

1. Universal coverage of water connections by laying of water supply pipe lines in shortfall areas and legalization of unauthorized water connections.
2. To reduce NRW, provision of replacement of old pipe lines, leakage detection machines and automation of tube wells will be made.

Question: Does each objective meet the opportunity to bridge the gap?

Yes, each objective meets the opportunity to bridge the gap.

3. Examine Alternatives and Estimate Cost

The objective will lead to explore and examine viable alternatives options available to address these gaps.. These will include out of box approaches. (AMRUT Guidelines; Para 6.4 & 6.8 & 6.9). This will also include review of smart solutions. The cost estimate with broad source of funding will be explored for each. While identifying the possible activities, also examine the ongoing scheme and its solutions including status of completion, coverage and improvement in O&M. Please provide information on the above responding to (however not limited to) following questions.

Question: What are the possible activities and source of funding for meeting out the objectives? (75 words)

The Asian Development Bank (ADB) approved a multitranches financing facility (MFF) to India for the Bihar Urban Development Investment Program (BUDIP, the Investment Program) in an amount of \$200 million on 29 March 2012. The Investment Program aimed to improve and expand the water and sewerage infrastructure in four towns in Bihar, namely Bhagalpur, Darbhanga, Gaya and Muzaffarpur, and assist the urban local bodies (ULB) of these four towns to ensure sustainable operations and maintenance (O&M) of the water and sanitation services.

The first loan under BUDIP, Tranche 1 or Loan 2861-IND, for \$65 million, was signed on 25 March 2013 and became effective on 6 June 2013. Project 1, supported by tranche 1 of BUDIP, included subproject for improvement of infrastructure, operations and sustainability in water supply in Bhagalpur. The ongoing scheme for water supply improvement in Bhagalpur (BWSP1) includes overall distribution network rehabilitation and expansion, including rehabilitation of the existing water treatment facilities, construction of overhead tanks and distribution networks, bulk water metering and house connections.

The proposed Project 2, supported by the proposed tranche 2 of BUDIP, will include physical and non-physical investments in water supply improvement in Bhagalpur.

Bhagalpur was selected for financing under Project 2 based on the implementation capacity, project readiness and sector priorities of the Government, in accordance with the agreed framework financing framework (FFA) for BUDIP. Project 2 is aligned with improved environment and well-being of residents in the program cities as defined by the Investment Program. It aims to improve access to sustainable water supply services in Bhagalpur.

Question: How can the activities be converged with other programme like JICA/ ADB funded projects in the city etc? (100 words)

The water supply project is already under ADB project.

Question: What are the options of completing the ongoing activities? (75 words)

The water supply project is already under ADB project.

Question: How to address the bottlenecks in the existing project and lessons learnt during implementation of these projects? (75 words)

A common Grievance Redress Mechanism (GRM) will be put in place to redress social, environmental or any other project and/or subproject related grievances. The GRM described

below has been developed in consultation with stakeholders, including affected persons and NGOs. Customer Service Centres (CSC) proposed in each town, including a central CSC will serve as the focal points for registration of grievances. The APs will also be encouraged to lodge their complaints through phone or email or post and seek a complaint registration number either through the CSCs or directly, through the project grievance redress cell at PIU.

Question: What measures may be adopted to recover the O&M costs? (100 words)

The operation of the plant shall be according to the control philosophy which will be approved. The train program shall be arranged to demonstrate the individual equipment of the plant manually and automatically also. The maintenance schedule of the individual equipment shall be fed in SCADA system which will provide reminders with stipulated time according to the hierarchy provided. In most of the cases, although Water Treatment Plants are designed and got constructed by State Public Health Engineering Departments or concerned Water Supply and Sewerage Boards, their operation and maintenance is carried out by local Municipal Corporations. The O&M of the Plant is proposed to be carried out by the executing Contractor for a period of at least 5 years post commissioning, although the BMC Staff will also be engaged by the Contractor subject to mutual consent. A rigorous and thorough operational training component with troubleshooting arrangement for different levels of BMC officers and staff is envisaged as a part of the Employer's Requirement. Subsequent to the completion of the O&M period specified in the Bid Document, BMC will take a call whether to maintain the plant on its own depending on whether requisite and adequate skill sets have been imbibed by the BMC staff.

Question: Will metering system for billing introduced?

Yes, Metering System will be introduced.

Question: Whether reduction in O&M cost by addressing NRW levels be applied? (75 words)

Yes, Bhagalpur Municipal Corporation will minimize NRW level to enhance O&M Cost by regularizing of unauthorized connections and replacement of old pipe lines with new ones. To enhance Efficiency of water charges collection metering system in water supply system and online billing, tracking system and spot billing machine will be introduced.

Question: Does each objective meet the opportunity to bridge the gap?

Yes, each objective meet the opportunity to bridge the gap.

THE ALTERNATIVE ACTIVITIES TO MEET THESE ACTIVITIES BE DEFINED AS PER TABLE

Table: Alternative Activities To Meet Objectives

Sr. No.	Objective	Activities	Financing Source
1	Universal Coverage	Household Connection along with laying of Water Supply Line in uncovered areas	AMRUT

Sr. No.	Objective	Activities	Financing Source
2	Per Capita of Water Supply	Installation of Tube-Well	AMRUT
3	Reduction of NRW	Replacement of Old-line along with Metering	AMRUT

4. CITIZEN ENGAGEMENT

ULBs will organize and conduct city level citizen consultation and receive feedback on the suggested alternatives and innovations. Each alternative will be discussed with citizens and activities to be taken up will be prioritized to meet the service level gaps. ULB will prioritize these activities and their scaling up based on the available resources. (AMRUT Guidelines; Para 6.6, 6.7 & 7.2). Please explain following questions in not more than 200 words detailing out the needs, aspirations and wishes of the local people.

Question: Has all stakeholders involved in the consultation?

Yes, all stakeholders are involved in the consultation process of formulation of Service Level Improvement Plan.

Question: Has ward/ zone level consultations held in the city?

Yes, ward/ zone level consultations are being held in the city.

Question: Has alternative proposed above are crowd sourced?

NA

Question: What is feedback on the suggested alternatives and innovations?

Feedbacks are regularly taken each month both in monthly MIC meetings and at ward level meetings.

Question: Has alternative taken up for discussions are prioritized on the basis of consultations?

NA

Question: What methodology adopted for prioritizing the alternatives?

NA

5. Prioritize Projects

Based on the citizen engagement, ULB will prioritize these activities and their scaling up based on the available resources to meet the respective objectives. While prioritizing projects, please reply following questions in not more than 200 words.

Question: What are sources of funds?

The Asian Development Bank (ADB) approved a multitranche financing facility (MFF) to India for the Bihar Urban Development Investment Program (BUDIP, the Investment Program) in an amount of \$200 million on 29 March 2012. The Investment Program aimed to improve and expand the water and sewerage infrastructure in four towns in Bihar, namely Bhagalpur, Darbhanga, Gaya and Muzaffarpur, and assist the urban local bodies (ULB) of these four towns to ensure sustainable operations and maintenance (O&M) of the water and sanitation services.

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The proposed Project 2, supported by the proposed tranche 2 of BUDIP, will include physical and non-physical investments in water supply improvement in Bhagalpur.

Bhagalpur was selected for financing under Project 2 based on the implementation capacity, project readiness and sector priorities of the Government, in accordance with the agreed framework financing framework (FFA) for BUDIP. Project 2 is aligned with improved environment and well-being of residents in the program cities as defined by the Investment Program. It aims to improve access to sustainable water supply services in Bhagalpur.

Question: Has projects been converged with other program and schemes?

The project is already under ADB.

Question: Has projects been prioritized based on “more with less” approach?

Yes, the projects are being prioritized based on “more with less” approach.

Question: Has the universal coverage approach indicated in AMRUT guidelines followed for prioritization of activities?

Yes, universal coverage approach indicated in AMRUT guidelines has been followed for prioritization of activities

6. Conditionalities

Describe in not more than 300 words the Conditionalities of each project in terms of availability of land, environmental obligation and clearances, required NOC, financial commitment, approval and permission needed to implement the project.

The Bihar Urban Infrastructure Development Corporation (BUIDCo) is the implementing agency, based in Patna. The PMU has complete authority, budget and powers to implement all aspects of the project, in accordance with the agreed Framework Financing Agreement and Facility Administration Manual for BUDIP. The PMU will seek state government’s clearance for

submission and disclosure of the environmental and social monitoring report to ADB. PMU will also coordinate with national and state level agencies to resolve inter-departmental issues, if any and obtain necessary clearances and NOCs from different departments.

7. Resilience

Required approvals will be sought from ULBs and competent authority and resilience factor would be built in to ensure environmentally sustainable water supply scheme. Describe in not more than 300 words regarding resilience built in the proposals.

Yes, resilience factor, disaster and environmental related factors are built-in, to ensure environmentally sustainable water supply scheme.

8. Financial Plan

Once the activities are finalized and prioritized after consultations, investments both in terms of capital cost and O&M cost has to be estimated. (AMRUT Guidelines; para 6.5) Based on the investment requirements, different sources of finance have to be identified. Financial Plan for the complete life cycle of the prioritized development will be prepared. (AMRUT Guidelines; para 4, 6.6, 6.12, 6.13 & 6.14). The financial plan will include percentage share of different stakeholders (Centre, State and City) including financial convergence with various ongoing projects. While preparing finance plan please reply following questions in not more than 250 words

Question: How the proposed finance plan is structured for transforming and creating infrastructure projects?

The Asian Development Bank (ADB) approved a multitranches financing facility (MFF) to India for the Bihar Urban Development Investment Program (BUDIP, the Investment Program) in an amount of \$200 million on 29 March 2012. The Investment Program aimed to improve and expand the water and sewerage infrastructure in four towns in Bihar, namely Bhagalpur, Darbhanga, Gaya and Muzaffarpur, and assist the urban local bodies (ULB) of these four towns to ensure sustainable operations and maintenance (O&M) of the water and sanitation services. The first loan under BUDIP, Tranche 1 or Loan 2861-IND, for \$65 million, was signed on 25 March 2013 and became effective on 6 June 2013. Project 1, supported by tranche 1 of BUDIP, included subproject for improvement of infrastructure, operations and sustainability in water supply in Bhagalpur. The ongoing scheme for water supply improvement in Bhagalpur (BWSP1) includes overall distribution network rehabilitation and expansion, including rehabilitation of the existing water treatment facilities, construction of overhead tanks and distribution networks, bulk water metering and house connections.

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Bhagalpur was selected for financing under Project 2 based on the implementation capacity, project readiness and sector priorities of the Government, in accordance with the agreed framework financing framework (FFA) for BUDIP. Project 2 is aligned with improved environment and well-being of residents in the program cities as defined by the Investment Program. It aims to improve access to sustainable water supply services in Bhagalpur.

Question: list of individual projects which is being financed by various stakeholders?

Water Supply Phase I and Phase II

Question: Has financial plan prepared for identified projects based on financial convergence and consultation with funding partners?

Yes, financial plan prepared for identified projects are based on financial convergence and consultation with funding partners i.e. GOI, state government and ULB.

Question: Is the proposed financial structure is sustainable? If so then whether project has been categorized based on financial considerations?

Yes, the proposed financial structure is sustainable and project has been categorized based on financial considerations.

Question: Have the financial assumptions been listed out?

Yes, financial assumptions have been listed out.

Question: Does financial plan for the complete life cycle of the prioritized development?

Yes, financial plan has been done for the complete life cycle of the prioritized development

Question: Does financial plan include percentage share of different stakeholders (Centre, State, ULBs)

Yes, financial plan include percentage share of different stakeholders (Centre, State and ULB)

Question: Does it include financial convergence with various ongoing projects.

Yes, it includes financial convergence with various ongoing projects

Question: Does it provide year-wise milestones and outcomes?

Yes, year-wise milestones and outcomes have been provided.

DETAILS IN FINANCIAL PLAN SHALL BE PROVIDED AS PER TABLE 8.1, 8.2, 8.3, 8.4 AND 8.5. THESE TABLES ARE BASED ON AMRUT GUIDELINES TABLES 2.1, 2.2, 2.3.1, 2.3.2, AND 2.5.

Table 8.1 Master Plan of Water Supply Projects for Mission Period (As per Table 2.1of AMRUT guidelines)

(Amount in Rs. Cr)

S.No.	Project Name	Priority number	Year in which to be implemented	Year In Which To Be Completed	Estimated Cost
1	Rehabilitation, Construction , Operation and Maintenance of BWSP-1	2	Oct,2014	April,2019	318.75 Cr

S.No.	Project Name	Priority number	Year in which to be implemented	Year In Which To Be Completed	Estimated Cost
2	Rehabilitation, Construction , Operation and Maintenance of BWSP-2	1	November ,2018	November, 2020	253.57 Cr

MASTER SERVICE LEVELS IMPROVEMENTS DURING MISSION PERIOD

S.No	Project Name	Physical Components	Indicator	Change in Service Levels			Estimated Cost
				2015	2017	2020	
1	Rehabilitation, Construction , Operation and Maintenance of BWSP-1	Distribution Network – 460.545, 19 OHT- Existing WTP 17 MLD work	Coverage	13.09 %		100%	318.75 Cr
			Per Capita Of Water Supply	57.47 LPCD		135 LPCD	
2.	Rehabilitation, Construction , Operation and Maintenance of BWSP-2	Intake well & Jack well-90 MLD ,WTP-90 MLD, Raw water Main, 4 ML CWR, SCADA & Automation.	Coverage	13.09 %		100%	253.57 Cr
			Per Capita Of Water Supply	57.47 LPCD		135 LPCD	
			NRW	100%		20%	
			Quality	90%		100%	
			Cost Recovery	0%		100%	

ANNUAL FUND SHARING PATTERN FOR WATER SUPPLY PROJECTS

(As per Table 2.3.1 of AMRUT guidelines)

(Amount in Rs. Cr)

Sr. No.	Name Of Project	Total Project Cost Approved By SHPSC	Share				
			GOI	State	ULB	Others (ADB)	Total
1	Rehabilitation, Construction , Operation and Maintenance of BWSP-1	11/07/2014		95.63 Cr		223.12 Cr	318.75 Cr

Sr. No.	Name Of Project	Total Project Cost Approved By SHPSC	Share				
			GOI	State	ULB	Others (ADB)	Total
2	Rehabilitation, Construction, Operation and Maintenance of BWSP-2	In Process		76.07 Cr		177.50	253.57 Cr
Total				171.7 Cr		400.62 Cr	572.32 Cr

ANNUAL FUND SHARING BREAK-UP FOR WATER SUPPLY PROJECTS

(As per Table 2.3.2 of AMRUT guidelines)

Sr. No.	Total Project Cost Approved By SHPSC	GOI	State			ULB			Convergence ADB	Others	Total
			14th FC	Others	Total	14th FC	Others	Total			
1	Rehabilitation, Construction, Operation and Maintenance of BWSP-1		-	30%	30%	-			70%	-	318.75 Cr
2	Rehabilitation, Construction, Operation and Maintenance of BWSP-2		-	30%	30%	-			70%	-	253.57 Cr
Total				30%	30%				70%		572.32 Cr

YEAR WISE PLAN FOR SERVICE LEVELS IMPROVEMENTS

(As per Table 2.5 of AMRUT guidelines)

Proposed Projects	Project Cost	Indicator	2015	Annual Targets (Increment from the Baseline Value)						
				FY 2016		FY 2017	FY 2018	FY 2019	FY 2020	
				H1	H2					
Rehabilitation,	318.75	Coverage	13.09 %						20%	100%

Proposed Projects	Project Cost	Indicator	2015	Annual Targets (Increment from the Baseline Value)					
				FY 2016		FY 2017	FY 2018	FY 2019	FY 2020
				H1	H2				
Construction , Operation and Maintenance of BWSP-1	Cr	Per Capita Of Water Supply	57.47 LPCD					57.4 7 LPC D	135 LPC D
Rehabilitation, Construction , Operation and Maintenance of BWSP-2	253.57 Cr	Coverage	13.09 %						100%
		Per Capita Of Water Supply	57.47 LPCD						135 LPC D
		NRW	100%						20%
		Quality	90%						100%
		Cost Recovery	0%						100%

DATA COLLECTION , DISCUSSION AND VALIDATION BY	
Name of the officer deputed in ULB	
Designation	Municipal Commissioner /Executive Officer/ Chief Engineer/.....
Signature	
Name of Parastatal Agency	BUDICO, Patna
Officer of Parastatal Agency deputed for the task	Mr.Tanay Kumar Das National Team Leader Shah Technical Consultant Pvt. Ltd Design and Supervision Consultant BUIDCo-ADB Contact Number- 9477577134 Email id- dtanay@hotmail.com
Signature of Team Leader DSC / Project In-charge	
Signature of Project Director BUIDCo	
Date of Finalization	