

Agenda Note For Approval Of Bifurcation Of Packages And Technical Sanction
Of
Package-1 & 3
Of Project For Improvement Of Water Supply Systems Of CHITTORGARH Sanctioned Under
Atal Mission For Rejuvenation And Urban Transformation (AMRUT)

1. Project Background

Government of India has launched AMRUT Mission for providing infrastructural facilities related to Water Supply, Sewerage, Drainage, Transportation and Green Spaces.

Under this mission, 25 towns are identified in State of Rajasthan. For improvement/ expansion of water supply in the project towns. Detailed Project Report for the water supply improvement works were got prepared through M/S WAPCOS & submitted to the State Level Technical Committee, headed by Principal Secretary Local Self Government for its approval.

The Administrative & Financial sanction to the estimate of proposals for improvement of following towns was accorded in the meeting of SLTC held on 25.10.2016 (**Annexure-IV**)

S. No.	Name of Town	District	Sanctioned amount (in Cr)	Agenda item of SLTC	Page no
1	Bikaner	Bikaner	34.95	2.1.1	03
2	Hindaun City	Karauli	20.57	2.1.2	06
3	Churu	Churu	20.79	2.1.3	08
4	Chittorgarh	Chittorgarh	55.00	2.1.4	11
	Total		131.31		

For implementation of the project, proposals for bifurcation of packages is being proposed considering following aspects

SN	Package	Items included in the package
1	Package 1 Rs. 4942.24 Lacs. (Annexure – I)	<ul style="list-style-type: none"> • Work which will be got executed through contractor consisting of Rising Mains, Distribution System, Storage Reservoirs, Electro mechanical works and other related civil works. • Installation of domestic water meters for each house hold. • Supply, erection, testing and commissioning of Instruments, RTU/PLC panel , SCADA System etc.
2	Package 2 Rs. 135.00 Lacs.	<ul style="list-style-type: none"> • Software and hardware for implementation of Integrated Management Information System (IMIS) for end to end management of O&M operations, consumer billing and consumer complaints, asset maintenance, NRW assessment. • IEC activities including collection consumer related data. The provisions made under this head for individual town shall be pooled for implementation by single agency having central servers at DOIT, Jaipur and required

		number of computer terminals at each city. A concept note on this shall be submitted separately for approval at competent level
3	Package 3 Rs.422.92 Lacs (Annexure - II)	Items for which no tender is to be issued, like electric connection, road repair charges to be deposited to respective maintenance agency , permission for Railway Line crossing, Utility Shifting etc.

Details of the package bifurcation are enclosed at **Annexure - III**.

2. Water Demand Assessment

Water demand assessment for the town, as a whole has been done for different design horizons of 2021, 2031 & 2047. Water demand has been done considering per capita demand prescribed in the manual, duly accounting for the water demand for floating population, and bulk demand for commercial, institutional/industrial, fire etc.

The water demand for future years is arrived at with adoption of per capita domestic demand of 135 LPCD, floating population demand of 40 LPCD, commercial & institutional demand of 3%, transmission & distribution losses of 15%. Floating population is adopted as 10% of total population. It is assumed that in future years of 2021,2029, 2032 & 2047, the 0%, 15%, 18% and 20% of water demand shall be met from recycled water respectively. The water demand for future years comes out to be as follows:

PARTICULARS	UNIT	YEAR-2011	YEAR-2021	YEAR-2029	YEAR-2032	YEAR-2047
RESIDENT POPULATION	NOS.	116406	147777	178866	192224	278101
FLOTING POPULATION	NOS.	11700	14800	17900	19300	27900
DOMESTIC WATER DEMAND	MLD	16.18	20.54	24.86	26.72	38.66
COMMERCIAL & INSTITUTIONAL	MLD	0.49	0.62	0.75	0.81	1.16
INDUSTRIAL DEMAND	MLD		4.5	5	5.5	7
FIRE DEMAND	MLD		1.22	1.34	1.39	1.67
SUB TOTAL	MLD	16.67	26.88	31.95	34.42	48.49
TRANSMISSION & DISTRIBUTION LOSSES	MLD	2.51	4.04	4.8	5.17	7.28
GROSS WATER DEMAND	MLD	19.18	30.92	36.75	39.59	55.77
RECYCLED WATER		0.00	0.00	5.51	7.13	11.15
NET FRESH WATER DEMAND	MLD	19.18	30.92	31.24	32.46	44.61

3. Existing Water Supply System

The water supply of Chittorgarh has recently been augmented & re-organized under ADB funded RUIDP project. Water production capacity of surface sources has been increased by 22.5 MLD due to the construction of new WTPs at new surface source at Ghosunda dam and Bherda Mines. Clear water storage capacity has been augmented by 3150 KL by construction of 4 new

CWRs. Distribution system has been re-organized by construction of 6 new OHSRs + 1 GLSR& laying of 57 km of distribution system.

The first water supply system at Chittorgarh was commissioned in the year 1954 with few open wells as source. Gambhiri River as source, the water from this source is filtered at Padan Pole head works. Than after several augmentation proposals have been taken up, number of tube wells have been drilled in the town and connected to the system. Nearly five years back a new source via the Berada mines pit near Chanderia has also been added to the system. Presently the town depends on:

- Water brought from Bharda Mine Pit, 8.5km from the town in the North,
- Discharges from 84 active T/Ws (1# dry now) and 4 # O/Ws (1# out of 5# is dry now) drilled/excavated within and outskirts of the town
- Baglia Deh on Gambhiri River that passes through the City (seasonal surface water). The total production of water at the time of benchmark study was reported as 15223 KLD.

3.1 Source

3.1.1 Ground water source

There exist 84TWs and 4 OWs in Chittorgarh. The total production capacity from underground sources is 17.79 MLD in winters and 14.43 MLD in summers. The depth of TW's varies from 80 meters to 180m, and draw down varies from 10 to 70 meters. Thus, the total production capacity of all the water sources sums up to about 36.9 MLD.

3.1.2 Surface water

Sengwa Head works:

Sengwa Head Work is a 15 MLD water treatment plant, Uses Ghosunda Dam as its source. The Ghosunda dam has been constructed by Hindustan Zinc Limited, for multipurpose use, which includes their own requirement, other industries and that of PHED.

Bherda Head works:

Bherda head work is a 7.5 MLD water treatment plant, Uses raw water from Bherda mines. The Birla Cement Works had carried out mining operation nearly 8.5 kms away from Chittorgarh town. The location of mining pit is such that it falls immediately after and near the junction of Gambhiri & Berach rivers. The depth of the mining pit is nearly 28.0 meters below nearby ground and 26.0 meters below the river bed. The pit remains full till onset of summers, and then after the available storage can be utilized. The Bherda head work is used to furnish water to the chanderiya area and to fulfill the demand of Shastri Nagar Head Work and Padan Pol Head Work

3.2 Clear Water Reservoirs

In the previous system there were 21nos. (17 Nos. CWRs having a total capacity of 3295 KL as per SMEC & 4 new CWRs have been added under ADB funded RUIDP project.)

S. No.	Location	Capacity (KL)	Type of CWR/GLR
1	Bhagaliala	225	GLR
2	Bundi road	225	GLR

3	Chanderiya Housing Board	100	GLR
4	Bhagatsingh park	100	GLR
5	Ramdevjikachanderiya	50	GLR O/G
6	Gandhi Nagar sec. 4	100	GLR
7	Shastrinagar New	450	CWR partial under ground
8	Chanderiya Ward no. 1	200	CWR
9	Pratap Nagar	250	CWR partial
10	Kumbha Nagar	100	GLR
11	Kumbha Nagar new	250	CWR partial U/G
12	Senthi Old GLR	225	CWR
13	Senthi New CWR	200	CWR partial
14	ChanderiyaRangaswami	60 -	CWR
15	Berda mines	180	CWR
16	Sindhi colony	300	CWR partial
17	Shastrinagar	90	CWR OLD U/G
18	Sengwa	1500	CWR
19	Padan Pole	600	CWR
20	Bagalia	300	CWR
21	Bherda WTP	750 -	CWR

3.3 Pumping Stations

The details of pumping stations present in the existing system are as follows;

S.No.	Location	Size of Pump House (Meters X Meters)	Year of Construction	No. Pumps Installed in Pump House
1	2	3	4	5
1	Padan Pole	7. x 16.30	1970	5
2	Bagaliya GLR	Steel Gumti	2003	1
3	Bundi Road GLR	3 x 3	2003	1
4	Senthi	4.75 x 6.80	2005	2
5	Bhagat Singh Park	Steel Gumti	1998	2
6	Sindhi Colony	5.65 x 10.60	2010	4
7	Pratap Nagar	3.80 x 6.85	1998	2
8	Kumbha Nagar	4 x 9	2004	2
9	Shastri Nagar	4 x 4	1980	4
10	Chanderiya	Steel Gumti	1998	2
11	Chanderiya H.B	3 x 3	1997-98	2
12	Chanderiya Rangaswami Basti	4.5 x 4.5	2010	2
13	Bagaliya Intake	2.5 x 4	2004	2
14	Bherda Mincs Pressure Filter	5.65 x 5.65	2010	2
15	Shastri Nagar New	5.68 x 10.60	2008-09	4
16	Bherda Mincs Penal Room	5.60 x 9.20	2010	6
17	Gandhi Nagar Sec.4	Steel Gumti	2008	1

3.4 Service Reservoirs

The details of Existing Service Reservoirs are given below:

S.NO.	LOCATION OF SERVICE RESERVOIR	GLSR/OHSR	CAPACITY IN KL	YEAR OF CONSTRUCTION
1	Padan Pole	GLSR	450	1975
2	Padan Pole	GLSR	675	1980
3	Delhi Gate Harijan Basti	GLSR	390	1995
4	Fort	GLSR	135	1968
5	Uparla Pade Bohra Maszid	GLSR	100	2004
6	Gandhi Nagar Akashwani	OHSR	320	1986-87
7	Gandhi Nagar Housing Board	OHSR	160	1993-94
8	Gandhi Nagar HUDCO	OHSR	230	1988
9	Shastri Nagar	OHSR	450	2009
10	Pratap Nagar	OHSR	540	1993-94
11	Kumbha Nagar	OHSR	600	2004
12	Sainti	OHSR	800	2005
13	Segwa Housing Board	OHSR	130	1997-98
14	Parijat Housing board	OHSR	50	1998
15	Chanderiya	OHSR	540	1992
16	Collectorate	OHSR	100	2006-07
17	Segwa housing board 2	OHSR	100	2003-04
18	Chanderiya Housing Board	OHSR	200	2009
19	Chanderiya Rangaswami Basti	OHSR	150	2009
20	Sindhi Colony (Meera Vachnalaya)	OHSR	520	2009
21	Akashwani	OHSR	450	
22	Kailash Nagar	OHSR	550	
23	Keer Kheda	OHSR	1350	
24	Madhuvan	OHSR	450	
25	Chanderiya	OHSR	1350	
26	Vidyaniketan	OHSR	450	
27	Kumbhanagar new (U/E)	OHSR	600	
28	Bundi Road	GLSR	1100	
29	Sengwa HW 3	OHSR	300	

4. Need of Project

The interventions proposed in this project are, basically, to compliment the works already completed under ADB funded RUIDP project so as to achieve & sustain the service delivery improvements. Even after increase in water production a reorganization of the distribution system for future demand, the water supply duration & water supply pressure have not improved to the designed level.

A problem of low pressure & small duration still persists. The outer area of the town is remains uncovered with the distribution system & there is no planning for expansion of the distribution system, falling within the municipal limits/master plan limits. Further, there is no system for evaluation & reduction of NRW in different zones of the distribution system. Through the project, under AMRUT mission, it is proposed to fill in these gaps & implement necessary interventions

4.1 General

The proposed interventions are designed on basis of design criteria adopted from PHED Guidelines, Norms & Policies, CPHEEO Manual of Water Supply & Treatment, relevant Indian Standards and other sources.

4.2 Source

No Sources has been proposed under AMRUT Mission, the available water is sufficient for 2032.

4.3 Proposed Service Reservoirs

The whole of the town is divided into 38 zones. Out of 38 Zones, It is proposed to construct nine service reservoirs in nine zones as per the availability of land and the hydraulic conditions manually. This is reviewed considering the fact that part of the projected populations would develop in this areas beyond the command of the existing ward boundaries. These new residential areas have been indicated in the Municipal boundary of the town. The details are given below:

ZONE NO	POPULATION 2047	DEMAND 2047 (KLD)	CAPACITY OF ESR	STATUS OF ESR
10 (Shyama Prashad Mukherjee)	5165	826	300	PROPOSED
18 (Tilak Nagar)	9003	1724	600	PROPOSED
21 (Chanderiya)	11989	1796	600	PROPOSED
26 (Neelkanth)	15188	1748	600	PROPOSED
27 (Hospital)	6883	1101	400	PROPOSED
30 (Gandhi Nagar Sector 4)	4763	1223	400	PROPOSED
31 (Panchwati)	7634	1754	600	PROPOSED
32 (Maheshpuram)	1758	880	300	PROPOSED
36 (Fort GLSR)	4719	755	200	PROPOSED

4.4 Proposed Pumping Stations and Other Buildings

Under the project, it is proposed to construct 6 new booster pumping system at Kailash nagar, Tilak Nagar, Neelkanth, Bundi Road, Fort, Padan Pol, and 3 new pumping station at Bhagaliya headworks, Chanderiya railway station, Gandhi nagar sec 4

Duty Conditions

The duty conditions of pumps is calculated for flows of Year 2032 as life of pumping machinery is adopted as 15 years. The Station losses in pumping stations is adopted as 1.5 mtr for Year 2032 and 2.0 mtr for Year 2047. The terminal pressure at discharge point at receiving CWR/ESR is taken as 0.5 mtr. In addition, a design margin of 5% in pump head is adopted for any unforeseen conditions.

The Pump Duty conditions for various pumps to be replaced/installed under this project is as follows;

PUMP DESIGN FOR CHITTORGARH OF THE DESIGN YEAR 2032							
S.N	Location of Pump	Pumping To	Pumping Hours	Flow KLD	Flow Cum/Hr	Duty condition proposed Year- 2032	
						Cum/hr	Head (mWC)
1	CWR Kailash Nagar	ESR kailash	22	720.0	32.73	33	29
2	CWR Neelkanth	ESR Neelkanth	22	720.0	32.73	33	29
3	CWR Tilak Nagar	ESR Tilak NAGAR	22	1710	77.7	78	29
4	GLSR fort	FORT area distribution	22	522	23.73	24	15
5	GLSR fort	FORT area distribution	22	1044	47.45	48	15
6	GLSR padan pole	Padan Pol distribution	22	1614	73.35	74	25
7	GLSR padan pole	Padan Pol distribution	22	3227.54	146.71	147	25
8	GLSR Bundi Road	Bundi Road distribution	22	1150.9	52.31	53	17
9	GLSR Bundi Road	Bundi Road distribution	22	2301.8	104.63	105	17
10	Padan Pole	GLSR fort	22	522	23.73	24	136
11	Bhagalia HW	For ESR Bhagat singh and Gandhi Nagar	22	1059.70	48.17	49	34
12	CWR Gandhi nagar sec 4	ESR gandhi nagar sec 4	22	1170	53.18	54	34
13	CWR chanderiya railway station	ESR (540 KL) chanderiya	22	1056	48	48	29

4.5 Proposed Rising Mains

Adequate rising mains shall be taken to fill the newly proposed CWRs and ESRs based on the economic design as given below:

FROM	TO	E/P	LENGTH	MATERIAL	DIAMETER
JN-30	ESR TILAK NAGAR	P	260	DI K-7	100
JN-X	JN-31	P	2340	DI K-7	200
JN-X	JN-N	P	500	DI K-7	200
JN-N	ESR SEGWA HOUSING BOARD 3	P	30	DI K-7	150
JN-N	JN-0	P	870	DI K-7	150
JN-0	ESR MAHESHPURAM	P	20	DI K-7	100
JN-27	ESR HOSPITAL	P	174	DI K-7	150
JN-28	ESR PANCHWATI	P	360	DI K-7	150
JN-29	ESR NEELKHANTH	P	688	DI K-7	200
SHASTRI NAGAR HW	ESR COLLECTORATE	P	800	DI K-7	100
JN-12	JN-X1	P	200	DI K-7	150
JN-X1	RAJIV AWASH YOJANA	P	200	DI K-7	100

JN-X1	ESR KAILASH NAGAR HW	P	10	DI K-7	100
JN-P	SHYAMA PRASHAD MUKHERJEE OHSR	P	3294	DI K-7	100
PADAN POLE PUMP HOUSE	GLSR fort	P	1045	DI K-7	200
BAGHALIYA PH	JN-33	P	595	DI K-8	200
JN-33	ESR GANDHI NAGAR SEC 4	P	901	DI K-9	100
CWR gandhinagar	ESR GANDHI NAGAR SEC 5	P	200	DI K-9	150
BHERDA MINES	BHERDA HW	P	100	DI K-9	350
JN-0J	ESR PROPOSED CHANDERIYA	P	1560	DI K-7	200

Length of 2500 m of diameter 150mm DI K-7(at Udaipur road from pratap circle to sengwa road housing board tiraha), 400m of diameter 250mm DI K-7 (at Bhilwara road birla railway fatak to petrol pump in chanderiya) distribution pipeline is also proposed under this project for road widening purpose.

The summary of proposed pumping mains for tubewells is as follows;

FROM	TO	E/P	LENGTH	DIAMETER
JN-8	JN-7	P	179	200
JN-7	JN-6	P	179	200
JN-6	JN-5	P	340	200
JN-5	JN-4	P	80	200
JN-04	JN-03	P	399	200
JN-03	CWR BHAGALIA	P	435	200
T-18	JN-15	P	236	100
T-19	JN-15	P	10	100
JN-15	JN-14	P	145	100
JN-13	CWR GANHI NAGAR SEC 4	P	250	150
T-15	CWR GANHI NAGAR SEC 4	P	100	100
T-14	CWR GANHI NAGAR SEC 4	P	90	100
JN19	JNB	P	100	200
JN-B	CWR BUNDI ROAD	P	75	200
JN-25	CWR ASHOK NAGAR	P	100	200
JN-A	JN-B	P	640	100
T-38(O)	SHASTRI NAGAR	P	200	100
JN-35	CWR U/E KUMBHA NAGAR	P	300	100
JN-37	CWR NEELKHANTH	P	49	150
JN-45	CWR TILAK NAGAR	P	265	150
JN-F	CWR TILAK NAGAR	P	290	100
T-57(O)	ESR HOSPITAL	P	260	100
T-41(O)	JN-G	P	43	100
T-42(O)	JN-G	P	43	100
JN-G	CWR BHOI KHERA	P	31	100
T-40(O)	ESR SHAYAMA PRASHAD	P	357	100

4.6 Proposed Distribution System

Design Philosophy

The distribution networks are hydraulically modelled with assumption that water will be supplied to consumers by 24x7 system. The water demand adopted is for Year 2047 as distribution networks are normally designed for a design period of 30 years. The peak factor adopted in modelling is 3.0 according to recommendations of CPHEEO Water Supply Manual.

A residual pressure of 12.0 meters is adopted in hydraulic design of networks which is sufficient to supply water to two storey houses.

The distribution networks have been modeled using the WATERGEMS software. The summary of results of this hydraulic design & modelling in various zones is discussed in succeeding paragraphs.

Laying Of New Distribution System

It is proposed to lay new distribution lines in the areas not covered with water supply system to provide safe drinking water. Distribution system would also cover the colonies developed by the colonizers the matter of changing development cost/peripheral changes from these colonies is to be divided at the Municipal council/State Government level.

These pipes have large number of unauthorized tapings. It is proposed to replace all the old and leaking AC/PVC pipe lines with HDPE pipes/DI pipes as per the new pipe policy.

The pipe material shall be decided as per the actual field condition of earth strata along the alignment of the pipe line. The work of service connection taping and laying of service line shall also be done along with the laying of the head pipe line to avoid excavation at the time of releasing meter connections to the consumers.

The pipe material shall be decided as per the actual field condition of earth strata along the alignment of the pipe line. The work of service connection taping and laying of service line shall also be done along with the laying of the pipe line to avoid reopening of the trench at the time of shifting of consumer connections.

The distribution networks hydraulic modelling is done adopting HDPE pipes below 225 mm size and DI pipes for sizes above 200 mm as per pipe policy. But, as the town has 20-30% area rocky strata, excessive trafficon some road stretches, considering possible damage to pipes due to recurrent excavation, DI pipes of equal or higher diameter are proposed to be laid against the designed HDPE pipes and same lengths are adopted for preparation of cost estimates. The summary of pipe lengths finally adopted in cost estimates are as follows;

DISTRIBUTION LENGTH SUMMARY								
Diameter	HDPE(P)	DI (P)	uPVC (E)	CI (E)	DI (E)	AC (E)	AC/CI (E)	LENGTH
90	11998	0	0	0	0	0	0	11998
110	20822	0	0	0	0	0	0	20822
100	0	49152	0	21011	1297	22782	0	94242
101.4	0	0	9050	0	0	0	0	9050
125	6063	0	0	0	0	0	0	6063
140	7125	0	0	0	0	0	0	7125

160	5651	0	0	0	0	0	0	5651
147.4	0	0	1634	0	0	0	0	1634
150	0	9433	553	623	0	948	249	11806
180	4274	0	0	0	0	0	0	4274
200	3972	0	0	0	0	0	0	3972
184.6	0	0	1171	0	0	0	0	1171
200	0	4594	0	0	0	356	25	4975
225	1924	0	0	0	0	0	0	1924
250	0	5924	0	0	0	136	36	6096
300	0	2876	0	0	198	0	96	3170
350	0	608	0	0	57	0	0	665
400	0	87	0	0	143	0	0	230
450	0	0	0	0	76	0	0	76
500	0	0	0	0	46	0	0	46
Total	61829	72674	12408	21634	1817	24222	406	194990

(It is proposed some small diameters of DI k7 in distribution network due to rocky strata in some areas)

Length of 2350 m of diameter 150mm DI K-7, 200 m of 200mm DI K-7 and 2500m of 100mm DI K-7(at Udaipur road from pratap circle to sengwa road housing board tiraha), 1850m of diameter 150mm DI-7 and 3400m of 100mm DI K-7 (at Bhilwara road birla railway fatak to petrol pump in chanderiya) distribution pipeline is also proposed under this project for road widening purpose.

4.7 Proposed Clear Water Reservoir

It is proposed to provide clear water reservoirs of capacity equal to two hours pumping of total capacity 375 KL at Kailash Nagar, Neelkanth, Tilak Nagar.

DESIGN FOR CAPACITY FOR CLEAR WATER RESERVOIRS								
S.N O.	LOCATIO N OF CWR	WATER DEMAND (KL)		CAPACITY REQUIRED FOR 2 HOUR PUMPING (KL)		EXISTING CAPACIT Y AVAILABL E (KL)	CWR CAPACIT Y REQUIRE D UNDER THE PROJECT (KL)	CWR CAPACITY PROPOSED UNDER PROJECT (KL)
		203 2	2047	DESIGN HORIZO N 2032	DESIGN HORIZO N 2047			
1	Kailash Nagar		720		65	-	65	100
2	Tilak Nagar		1710		155	-	155	175
3	Neelkanth		720		65	-	65	100

4.8 Proposed SCADA & Automation

For efficient & un- interrupted running of pumps at various pumping stations and at the same time ensuring the desired quantity of water to be delivered to Each ESR, it is proposed to install

required field instruments and also the communication devices and central control system at the Pumping Stations, ESRs, Electric Substations etc.

This SCADA System scheme envisages a Master Control Centre to be established at City Centre, 25 Nos. Local Control Centres are to be established at Headworks/IPS, 29 Nos. ESR Control Centres to be established at all the ESRs on the city-wide distribution network, 84 Nos. PLC/RTU panels to be established at all the Tubewells on the city wide network and 82 Nos. RTU Panels to be established at the number of DMA sites as detailed below:

- The Master Control Centre (MCC) will be located at City Center.
- The Local Control Centres (LCC) are to be located in the following Headworks:
 - At Gosunda Dam RWPS
 - At Bherda Mines RWPS
 - At Zink RWPS
 - At Segwa CWPS
 - At Bherda Mines CWPS
 - At Senthil CWPS
 - At Chanderiya Housing Board CWPS
 - At Chanderiya Railway Station CWPS
 - At Chanderiya Basti CWPS
 - At Pratap Nagar CWPS
 - At Meera Vachnalaya CWPS
 - At Khumba nagar CWPS
 - At Padampole CWPS
 - At Baghaliya CWPS
 - At Shastri Nagar CWPS
 - At Fort IPS
 - At Padampole IPS
 - At Bundi Road IPS
 - At Tilak Nagar IPS
 - At Neelkanth Colony IPS
 - At Kailash Nagar IPS
 - At Chanderiya Railway station CWPS
 - At Gandhi Nagar Sec4 CWPS
 - At Bhagaliya HW
- The ESR Control Centres (ECC) are to be located in the following distribution sites:
- 29 ESRs Sites located outside Campus
- The RTU panels are to be located in the following distribution sites:
 - ✓ 48 pressure measuring point at DMA centres
 - ✓ 29 pressure and flow measuring points at DMA centres (where more than 1 DMA is connected to an ESR)
 - ✓ 84 Nos. Tubewell Sites

Master Control Center

The MCC SCADA system shall consist of a high end dual redundant server system (with MS SQL database) operating on a dual redundant high speed Ethernet bus cable system and communicating with:

- a. A minimum of 2 PC based operator workstations complete with 21" LCD screen, keyboard and mouse, one unit being configurable as an engineering workstation.
- b. A server based large screen display system comprising 2 no 46" LCD displays.
- c. Laser printers for the purposes of alarm and event reporting and for the production of reports and historical trends.
- d. A server based telecommunications system operating with ISDN and GPRS communications media.

The SCADA System shall be provided with proprietary Microsoft Windows based Supervisory Control and Data Acquisition (SCADA) software. The software package chosen shall be branded and written for applications in water industry and shall have a proven record of use for monitoring and controlling large distributed water supply systems.

The SCADA System shall provide the following facilities:

- a. Display status of all the items of the water transfer system etc. in a graphical and tabular format
- b. Display analogue values on the appropriate graphic screen
- c. Annunciate alarms along with time of occurrence of alarm. The software chosen shall have a comprehensive alarm handling capability with the ability to annunciate, acknowledge, sort and maintain a historic record of current and past alarms including details of when the alarm occurred, when it was acknowledged and when it returned to normal.

The SCADA System will provide facilities for the operator to:

- a. Select duty and standby drives
- b. Adjust process set points
- c. Select operation modes
- d. Acknowledge alarms
- e. View a journal of alarms
- f. Display the duty / standby status drives
- g. Display set points
- h. Provide real time and historic trending of analogue values
- i. Provide data archiving of all analogue values
- j. Prepare daily and weekly reports, providing details of daily and weekly throughputs against numbers of pump running hours and power usage
- k. Password protection shall be provided for security of operations, change of set points and changes in the software. There shall be various levels of security.
- l. Printing of alarms and events along with the time of occurrence.

Field Instruments

It is proposed to install various instruments at pumping stations to monitor the operational efficiency and state of health of system components. The various instruments proposed to be installed at these locations are as follows;

At Each Pumping System

- Full Bore Electromagnetic flowmeter at Inlet of CWR
- Ultrasonic water level Sensor at CWR to monitor/manage Pumping Operation.
- Pressure sensor & transmitter (IP 68) on suction & delivery pipes of pump.
- Full bore Electromagnetic flowmeters on feeder mains
- Energy Meter on outgoing feeder to motor
- Multi-Function Meter on incomer from transformer
- Online Chlorine Sensor

- Remote Terminal Unit (RTU) for processing and transmitting data related to flow, pressure, energy consumption and voltage, to central control room

At each Service Reservoir

- Full bore electromagnetic Flow meter at Inlet of ESR
- Ultrasonic water level Sensor at ESR to monitor/manage Pumping Operation.
- Remote Terminal Unit (RTU) for processing and transmitting data related to flow, Water Level etc. to central control room

At Each DMA Inlet

- Ultrasonic/Woltzman Type Flowmeter
- Pressure Sensor & Transmitter
- Remote Terminal Unit (RTU) for processing and transmitting data related to flow, Pressure, residual chlorine etc. to central control room

At each DMA Pressure measuring Point

- Pressure Sensor & Transmitter
- Remote Terminal Unit (RTU) for processing and transmitting data related to Pressure etc to central control room

At Each Tubewell

- Ultrasonic/Woltzman Type Flowmeter
- Pressure Sensor & Transmitter
- Energy Meter
- Remote Terminal Unit (RTU) for processing and transmitting data related to flow, Pressure, residual chlorine etc. to central control room

The objective of monitoring of pumping systems is as below;

- Ensure optimum up time of the running of pumps by getting an alert for situation when power is available but pump is not operating.
- Ensure efficient operation of the pump sets by constantly monitoring the power consumption vis-à-vis discharge & the output pressure, being sensed by flow meter & the pressure transducer respectively.

Monitoring of Pumping System

At pumping stations, the pump operation shall be guided to with respect to level of water in the CWR to ensure that the pumps are turned off when level is very low & incoming water rate is lower than the outgoing rate.

Similarly when level is high & rising ever after two pumps running, the PLC would generate alarm to enable timely shutting off of incoming water, locally or from remote by Central Control room.

I/O Modules

The summary of I/O modules at different instrument locations is as follows;

S.No.	Location	Digital Input (DI)	Digital Output (DO)	Analog Input (AI)	Analog Output (AO)	Modbus communication (RS-485)
1	At Gosunda Dam RWPS	0	2	4	0	5
2	At Bherda Mines RWPS	0	2	8	0	7

3	At Zink RWPS	0	2	6	0	16
4	At Segwa CWPS	0	2	10	0	9
5	At Bherda Mines CWPS	0	2	18	0	23
6	At Senth CWPS	3	4	8	1	7
7	At Chanderiya Housing Board CWPS	3	4	8	1	8
8	At Chanderiya Railway Station CWPS	3	4	8	1	8
9	At Chanderiya Basti CWPS	3	4	8	1	8
10	At Pratap Nagar CWPS	3	4	8	1	7
11	At Meera Vachnalaya CWPS	3	4	12	1	9
12	At Khumba nagar CWPS	3	4	8	1	8
13	At Padampole CWPS	3	4	14	1	14
14	At Baghaliya CWPS	0	2	6	0	6
15	At Shastri Nagar CWPS	3	4	12	1	12
16	At Fort IPS	28	18	9	0	8
17	At Padampole IPS	42	26	13	0	12
18	At Bundi Road IPS	28	18	9	0	8
19	At Tilak Nagar IPS	14	10	5	0	6
20	At Neelkanth Colony IPS	14	10	5	0	6
21	At Kailash Nagar IPS	14	10	5	0	6
22	At Chanderiya Railway Station CWPS	14	10	5	0	6
23	At Bhagaliya CWPS	14	10	5	0	6
24	At Gandhi Nagar Sec-4 CWPS	14	10	5	0	6
25	At ESRs (29 Nos)	3	2	2	1	1
26	for measurement of pressure and flow (29 Nos)	1	0	2	0	0
27	at DMAs for measurement of pressure (53 Nos)	0	0	2	0	0
28	At Tubewells	1	0	1	0	1

4.9 Proposed Consumer Metering

In a meeting held on 21.09.2015 under the Chairpersonship of Hon'ble Minister, PHED, it is decided to adopt following guidelines for water meters in PHED;

- In domestic connections, the replacement of non functional meters shall be taken up by New BIS/EEC/MID certified magnetic type Class B domestic water meters conforming to IS:779 or ISO:4064 standards and FCRI tested.
- In Non-Domestic and commercial connections, the replacement of non functional meters shall be taken up by New BIS/EEC/MID certified magnetic type Class B of automatic meter reading (AMR) with latest technology (Like AMR/GPS/GSM) for accurate meter reading.
- In bulk consumer connections and industrial connections, the replacement of non functional meters shall be taken up by New EEC/MID certified ultrasonic meters with automatic meter reading (AMR) with latest technology (Like AMR/GPS/GSM) for accurate meter reading.

As per these guidelines, it is proposed to install Magnetic type Class B Meters for domestic connections, Magnetic type Class B Meters with AMR facility for Non domestic & commercial connections and ultrasonic meters with AMR facility for Bulk & Industrial connections.

The details of various connections proposed under this project are as follows;

S.No.	Connection Type	Connection Size				
		15 mm	20 mm	25 mm	32 mm	40 mm
1	Domestic Connections	11408	175	59	0	0
2	Non Domestic Connections	294	5	2	0	0
3	Industrial Connections	59	1	1	0	0

5. Cost Estimation Of Interventions Proposed Under This Project

ESTIMATION OF CAPITAL COST OF PROPOSED WORK

RWSSMB, Rajasthan have issued guidelines for adoption of rates of various material & construction vide circular No Circular/D&S/2015-16/04 issued vide letter No D&S/BSR/2015-16/1411-41 dated 06-01-2016 and are as follows;

- Rate of pipeline to be adopted from PHED BSR circulated through above circular
- Rate of civil works to be adopted from PWD BSR as applicable in the area of work/project
- Adoption of rated of BSR of RUIDP for all other items till approval of BSR by department for these items.

Accordingly, following sources are considered in preparation of cost estimates for this project;

- Pipeline BSR of PHED
- Latest SOR of RUIDP
- Rates in practice in Special Projects, PHED
- Market Rates for few items not available in other sources and their Rate Analysis

Operational and Maintenance Cost

Along with construction contract, it is proposed to have provision for O&M for 7 years considering the fact that the life of consumer water meter proposed under the contract is 7 years.

Package - I

This package consist of construction works to be got executed through contractor consisting of Rising Mains, Distribution System, Storage Reservoirs, Electro mechanical works, other related civil works and metered house service connections & supply, erection, testing and commissioning of Instruments, RTU/PLC panel , SCADA System etc. The total cost of this package is **Rs. 5705.99 Lacs** (capital cost Rs. 4942.24 Lacs and Rs. 763.75 Lacs for O&M cost for 7 years).

Package - III

This package consists of deposit works of repairs to road cuts to be executed by PWD/ULB, work of power feeders/connections to be executed by the DISCOM and Utility Shifting. The total cost of this package is **Rs. 422.92 Lacs.**

The Technical Committee of RWSSMB is requested to consider the agenda and accord its approval to bifurcation of work packaging and Technical sanction of Package I.



Executive Engineer
(PHED), Chittorgarh



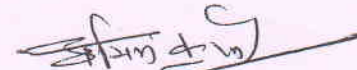
Superintending Engineer
(PHED), Chittorgarh



Additional Chief Engineer
(PHED), Udaipur



SE & TA to CE (HQ)
PHED, Jaipur




Chief Engineer (HQ)
PHED, Jaipur


Annexure – I

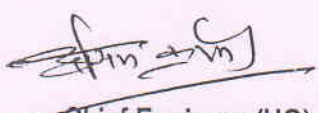
GENERAL ABSTRACT OF COST (Package - I)		
S.No.	Description	Amount (Rs in Lacs)
1	Provision for DI K-7 class rising mains of different sizes to pump water to different OHSRs	675.26
2	Provision of construction of RCC Clear water Reservoirs	45.06
3	Provision for construction for new RCC Over head Service Reservoir in different Parts of the city	593.95
4	Provision for Water Distribution System consisting of HDPE & DI pipe	2,002.11
5	Provision for consumer meters and making House Service connections	267.89
6	Provision for Pumping Machinery and Electromechanical equipment in pump houses	169.50
7	Provision for Construction Of New Pumping Stations, Other Buildings, boundary wall, campus development works and Repair/Rehabilitation of Existing pumping stations and other buildings.	387.60
8	Provision for instrumentation, Automation and SCADA for efficient operations of Water Supply System.	556.70
9	Provision for 11/43 KV GSS and dedicated power feeders.	219.17
10	Provision for Leak detection equipment, T&P and water quality testing equipment and energy efficient lighting in Office building, Pump houses and campus	25.00
Net cost proposed under package - I (Rupees in Lacs)		4,942.24
O & M Cost for 7 Years under package - I (Rupees in Lacs)		763.75
Net cost proposed for Package - I (Rupees in Lacs)		5,705.99


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(PHED), Chittorgarh


Additional Chief Engineer
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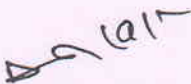

SE & TA to CE (HQ)
PHED, Jaipur



Chief Engineer (HQ)
PHED, Jaipur


Annexure - II

GENERAL ABSTRACT OF COST (PACKAGE - III)		
S.No.	Description	AMOUNT (Rs. In Lacs)
1	Provision for Road restoration work for the road cutting done in laying of rising mains, distribution and house service connections.	344.92
2	Provision for 11/43 KV GSS and dedicated power feeders.	48.00
3	Utility Shifting Charges	30.00
	Net cost proposed to be Sanctioned for Package - III (Rupees in Lacs)	422.92


Executive Engineer
(PHED), Chittorgarh


Superintending Engineer
(PHED), Chittorgarh



Additional Chief Engineer
(PHED), Udaipur

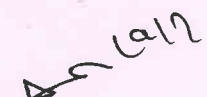

SE & TA to CE (HQ)
PHED, Jaipur



Chief Engineer (HQ)
PHED, Jaipur


Annexure - III

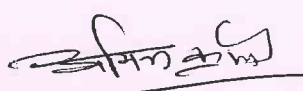
PACKAGE BIFURCATION					
S.No.	Description	Amount (Rupees In lacs.)	Pipe Line , PH, Instruments, CWR , ESR Etc. (Package - I)	IMIS & IEC (Package - II)	Non Tendering Items (Package - III)
1	Provision for DI K-7 class rising mains of different sizes to pump water to different OHSRs	675.26	675.26	-	-
2	Provision of construction of RCC Clear water Reservoirs	45.06	45.06	-	-
3	Provision for construction for new RCC Over head Service Reservoir in different Parts of the city	593.95	593.95	-	-
4	Provision for Water Distribution System consisting of HDPE & DI pipe	2,002.11	2,002.11	-	-
5	Provision for consumer meters and making House Service connections	267.89	267.89	-	-
6	Provision for Pumping Machinery and Electromechanical equipment in pump houses	169.50	169.50	-	-
7	Provision for Construction Of New Pumping Stations, Other Buildings, boundary wall, campus development works and Repair/Rehabilitation of Existing pumping stations and other buildings.	387.60	387.60	-	-
8	Provision for Road restoration work for the road cutting done in laying of rising mains, distribution and house service connections.	344.92	-	-	344.92
9	Provision for instrumentation, Automation and SCADA for efficient operations of Water Supply System.	556.70	556.70	-	-
10	Provision for 11/43 KV GSS and dedicated power feeders.	267.17	219.17	-	48.00
11	Provision for Leak detection equipment, T&P and water quality testing equipment and energy efficient lighting in Office building, Pump houses and campus	25.00	25.00	-	-
12	Provision for software and hardware for implementation of Integrated Management System for end to end management of the UWSS	111.00	-	111.00	-
13	Information Education and communication (IEC) activities in the project area to create awareness and motivate people to discontinue use of underground tanks and boosters.	24.00	-	24.00	-
14	Utility Shifting Charges	30.00	-	-	30.00
	Net cost proposed to be funded under AMRUT Mission (Rupees in Lacs)	5,500.16	4,942.24	135.00	422.92


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