MAHARASTRA JEEVAN PRADHIKARAN DIVISION JALGAON

JALGAON MUNICIPAL COUNCIL, JALGAON.

JALGAON WATER SUPPLY SCHEME, TAL.& DIST.- JALGAON.

(Under AMRUT ABHIYAN)

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MAHARASHTRA JEEVAN PRADHIKARAN REGIONAL OFFICE NASHIK

NAME OF SCHEME:- **Jalgaon** Water Supply Scheme (AMRUT Project)
Tal.Dist.Jalgaon.

CERTIFICATE

Superintending Engineer, Maharashtra Jeevan Pradhikaran Circle Nashik has prepared & submitted the DPR on / /2016 for Jalgaon Water Supply Scheme Tahsil Jalgaon District Jalgaon as per the demands made by the Jalgaon Muncipal corporation & prevailing site conditions. This is to certify that the DPR submission meets the requirement of guidelines issued by technical wing of MoUD i.e. CPHEEO, GOI New Delhi vide. Manual for preparation of detailed project for rural piped water supply scheme and standard practices of Maharashtra Jeevan Pradhikaran.

CHIEF ENGINEER
Maharashtra Jeevan Pradhikaran
Regional Office, NASHIK

MAHARASHTRA JEEVAN PRADHIKARAN CIRCLE NASHIK

MAHARASHTRA JEEVAN PRADHIKARAN DIVISION JALGAON

MAHARASHTRA JEEVAN PRADHIKARAN SUB DIVISION JALGAON

NAME OF SCHEME:- **Jalgaon** Water Supply Scheme
(AMRUT Project)
Tal.Dist.Jalgaon.

C E R T I F I C A T E

1. Certified that the Jalgaon Municipal Corporation as adopted necessary resolution approving the water supply scheme with all its financial implications vide resolution No. dated
2. Certified that the estimate have been proposed as per D.S.R. 2015-16 of Maharashtra Jeevan Pradhikaran and P.W.D. D.S.R.2015-16
3. Certified that the cent percent check on arithmetical calculations has been exercised in this office and the calculation are found to be correct.
4. Certified that the land to be acquired is more than one acre by negotiation from Municipal Corporation with private land owner.
5. Certified that percentage charges levied are in accordance with current practice in Maharashtra Jeevan Pradhikaran.
6. Certified that taxation proposed are made as per norm of Maharashtra Jeevan Pradhikaran

Sub Divisional Officer
Maharashtra Jeevan pradhikaran
Sub-Division Jalgaon

Executive Engineer
Maharashtra Jeevan pradhikaran
Division Jalgaon

Certified that 10% supervisory check has exercised in this office and the calculations are found correct.

Assistant Superintending Engineer
Maharashtra Jeevan pradhikaran
Circle Nashik.

Superintending Engineer
Maharashtra Jeevan pradhikaran
Circle Nashik.

MAHARASHTRA JEEVAN PRADHIKARAN DIVISION JALGAON

MAHARASHTRA JEEVAN PRADHIKARAN SUB DIVISION JALGAON

NAME OF SCHEME:- **Jalgaon** Water Supply Scheme (AMRUT Project)
Tal.Dist.Jalgaon.

C E R T I F I C A T E

Subject:- Varification of Design calculations of Rising main proposed in various water supply scheme.

Reference:- Circular No.VWS/1089/132/PBR-II/shreyas chamber 4th floor, 175 D.N.Road, Mumbai-1

Certified that, I have verified the calculation regarding water hammer and class of pipe adopted.

Sub Divisional Officer Maharashtra Jeevan pradhikaran Sub-Division Jalgaon	Executive Engineer Maharashtra Jeevan pradhikaran Division Jalgaon

CHECK LIST FOR SUBMISSION AND SCRUTINY OF DPR (WATER SUPPLY)

Sr.No.	Description	Write "Yes" or "No" etc. in the column If yes, give page No./DPR Volume reference. If No , reasons thereof
3	**GENERAL COMPONENTS**	
3.1	Name of the town/City/District/State for which scheme has been formulated with name of the scheme	**Jalgaon Tal & Dist Jalgaon**
	a) Name of the City/Town	**Jalgaon**
	b) Name of the District	**Jalgaon**
	c) Name of the State	**Maharashtra**
	d) Name of the Scheme	**Jalgaon City Water Supply Scheme under AMRUT SCHEME**
3.2	The cost and date of approved by Apex Committee of Govt. of India as per SAAP	
	1) Date of Approval	
	2) Cost as per approved SAAP	
	3) Estimated cost of DPR	
	4) Major comments/observations	
3.3	Whether the commitment to launch the scheme immediately after approval of Govt. of Maharashtra Administrative approval of the scheme is appended in DPR. (whether administrative approval of state Government is obtained to implement the scheme immediately after approval of Govt. of India and enclosed in DPR)	

3.4	a) Whether Project formulation justification (need for the project) has been furnished in DPR. Please justify the need of the project. **Justification** b) Whether executive summary of the project is furnished in the DPR.	**Yes**
3.5	Whether linkages of this scheme have been established with othe ongoing water supply schemes being funded by the Central/State Govt./Other agencies, if any. Please furnish relevant information alongwith quantum and cost of the works in the ongoing projects.	**Yes**
3.6	Whethe the map showing administrative and political jusrisdiction of the project area has been given in the DPR. Area within Municipal limt : **68.46 Sq.Km.** Extent of area considered in the DPR : **NIL** Additional area (beyond Municipal limit) considered in the DPR: ..... Sq.Km.	
3.7	Whether the land use parttern of the city/town/project area as per the approved Master Plan has been given in DPR	**Yes**
3.8	Whether the DPR including the design, drawings, cost estimates, analysis of rates has been authenticated by competent authority of the State Govt./ULB and Quasi-Technical sanction of DPR/Technical and Financial Verification Certificate has been attached with DPR.	**Yes**
3.9	Index map to scale of 1 cm = 2 Kms showing all components of existing and proposed scheme. It shall also shown existing and proposed sources.	**Yes**
3.10	In case proposed transmission main/water supply line is crossing Railway line/Highway and their bridge (whichever applicable), whether the clearance from concerned authority such as State Pollution Control Board (SPCB), Highways, PWD, Railways has been obtained and copies of the permission and their estimate for the same has been provided in DPR. Please specify.If not, the present status of action initiated may be furnished below:	**proposal submitted on dated 18 jan 2016 for one junction in state highway, two junction in national highway and one junction for railway authority**
3.11	Whether the provision for separate electric feeder line for water treatment plant and service reservoir (to take care of frequent power failure and voltage fluctuation problem) from HT line and an agreement between Electricity Department and Urban Local Bodies (ULBs) has been furnished in the DPR,	**HT/LT Load reuired. Cost has been included in the estimates.**

3.12	Whether the commitment from Electricity Department for un-interrupted power supply is obtained.	**Applied by JCMC till not received**
3.13	Whether the Topographic map of the city/town/project area to the scale has been given in DPR/Zonewise maps to scale showing all streets.	**Yes**
3.14	a) Wheher soil investigation report- bore hole logs at least at a grid of 1 Km x 1 Km or Geological survey data has been appended with DPR. b) Whether drawings of the test reports attached	**Yes**
3.15	Whether contour map of the project area has been annexed with the DPR and Google map	**Yes**
3.16	Whether resolution from the ULB for implementation of proposed tariff structure to ensure self-sustainable of the scheme is enclosed in DPR.	**Yes**
3.17	Existing Source : Ground Water / Surface Water Proposed Source : Ground Water / Surface Water Surface Water : Whethert the proposed source of water has been identified. If yes, then a certificate from the concerned authority mentioning water availibility / yield / reservation etc. for next 30 years has been appended in the DPR. (Reliability of source based on flow measurement data for last 10/15 years need to be appended duly certified by Department responsible for allocation / water use of river / stream). Whether recommendation of source proposed for this scheme is attached along with justification. Ground Water : Whether opinion of the SWGB / CGWB has been obtained with respect to quantity and quality of water and certificate / report furnished permitting extraction of Ground Water.	**Existing surface water source is considered and same is used for proposed scheme.**
3.18	a) No. of house hold in the town - **98434** b) No. of house hold with service connection - **58975** c) No. of house hold without service connection - **27719** d) Whether zone wise detail are attached - **Yes, attached here with**	
4	**ENGINEERING COMPONENTS**	

4.1	Please furnish the details of city/project area, a) Area of town/city(municipal limit): **68.46 sq.km** b) Extent of the project area are considered in the DPR : **68.46 sq.km** c) Additional Area (beyond municipal limit) considered in the DPR : …**Nil…**……..sq.km d) No. of households (as per 2001 and 2011 census): **for 2001- 73983 HHs, for 2011- 97317 HHs** Whether the population project has been made as per CPHEEO Manual and given in DPR - **Yes** **A) City Population** As per 2001 census : **3.68 lakhs** As per 2011 census : **4.60 lakhs** Initial stage (year 2018) **5.25 lakhs** + floating populqation (if any) **0 Lakh** (Year in which project is likely to be commissioned) Intermediate stage (year 2033) **6.75 lakhs** + floating populqation (if any) **0 Lakh** Ultimate stage (year 2048) **8.42 lakhs** + floating populqation (if any) **0 Lakh**	

	Population growth rate adopted **41.11 %year** (based on the past 4 decadal growth rateWhether population forecasted, their methods and justifications ae attached. Whether any certificate for floating/tourist population has been obtained from tourist department and furnished in the DPR. Please justify. **No** **B)** Whether the population project has been made in consonance with the Development Master Plan - **Yes** **C)** Project Area (part of the City) Initial stage (year 2018) **: 5.25 lakhs** Intermediate stage (year 2033) : **6.75 lakhs** Ultimate stage (year 2048) : **8.42 lakhs** Population growth rate adopted **41.11 %**year (based on the past 4 decadal growth rate)	
	d) Zone wise population (separately) …… **(On Shet No.2)**	**Yes**
4.2	Whether existing details of water supply for urba/urban agglomeration has been furnished in DPR. Please furnish the details	**Yes**
	a)Name of the sources-	**Waghur dam on waghur river, jalgaon**
	b)Total availability of water : **175.34 MLD**	**175.34 ML**
	c) Surface water : 175.34 MLD	**175.34 ML**
	d) Ground water : NIL	**Nil**
	e) Existing capacity of WTP and Nos : 132.00 MLD (01 Nos)	**132.00 MLD**
	f) Capacity utilization : 80.00 MLD	**80.00 MLD**
	g) No. of tubewells and total abstraction and yield of each tube well : _____ (Nos) _____ MLD _____ lpm (range)No. of borewells / tube wells (operational/inoperational) : _____ Nos.	**Not used**

	h) Total supply in the town/city (capacity of WTP/Tubewell separately Surface water **80.00 MLD** Ground water **NIL**	
	i) Total water supply in town (residential/commercial/institutions) : 80.00 MLD	**80.00 MLD**
	j) Total supply to the industries : NIL	**NIL**
	k) %of populationcoverage of the town/city/% of area covered : _____%/_____%	
	l % of population coverage in project area/.% of area covered : _____%/_____%	
	m) % population coverage of various zones zone wise	
	zones % coverage	
	Zone - I	
	Zone - II	
	Zone - III	
	Zone - IV	
	Zone - V	
	Zone - VI	
	Zone - VII, etc.	
	n) Average per capita water supply level (existing) in city : _____ lpcd	70 LPCd
	o) Average per capita water supply level (existing in the project : _____lpcd	
	p) Whether statement showing details of lpcd calculation (Gross and net) are appended in DPR	**Yes**
	q) Existing UfW : _____% (please specity any study was conducted	
	r) Existing No. of house service connections: 66887 Nos.	**66887 Nos**
	s) Existing No. of HSCs with meters : 0 nos.	**0 Nos**
4.3	Design demand and availability of water	
	a) Proposed per capita water supply and system losses	**1) Residential - 137 Lpcd 2) Commercial and institutional - 830 Lpcd 3) Industrial - 135**
	b) Gross water demand (city/town)	
	Initial stage :	**70.85**

	..... MLD	
	Intemediate stage : ..... MLD	**91.14**
	Ultimate stage : ..... MLD	**113.63**
	c) Demand of commercial. If any	
	Initial stage : ..... MLD	
	Intemediate stage : ..... MLD	
	Ultimate stage : ..... MLD	
	d) Industrial demand	
	Initial stage : ..... MLD	
	Intemediate stage : ..... MLD	
	Ultimate stage : ..... MLD	
	e) Institutional demand	
	Initial stage : ..... MLD	**4.62**
	Intemediate stage : ..... MLD	**5.83**
	Ultimate stage : ..... MLD	**7.24**
	f) Fire demand	
	Initial stage : ..... MLD	**2.291**
	Intemediate stage : ..... MLD	**2.598**
	Ultimate stage : ..... MLD	**2.901**
	g) Floating population	
	Initial stage : ..... MLD	
	Intemediate stage : ..... MLD	
	Ultimate stage : ..... MLD	
	h) Gross water demand project area	
	Initial stage : ..... MLD	**45.47**
	Intemediate stage : ..... MLD	**51.42**
	Ultimate stage : ..... MLD	**54.79**

	i) Existing water availability : ..... MLD	**175.34 MLD**
	j) Net Water demand - City/Town	
	Initial stage : ..... MLD	**86.305**
	Intemediate stage : ..... MLD	**113.214**
	Ultimate stage : ..... MLD	**141.46**
	k) Net Water demand - Project area	
	Initial stage : ..... MLD	**40.01**
	Intemediate stage : ..... MLD	**45.25**
	Ultimate stage : ..... MLD	**48.22**
	l) Whether zonewise water demand statement is enclosed	**Yes**
4.4	Whethr the existing water supply infrastructure has been taken into consideration in DPR. Please furnish the details of various components of the existing system.	**Yes**
	I) Intake well and water Treatment Plant	**Not required**
	a) Design capacity of Intake well (year of construction)	**NIL**
	b) Design capacity of WTP (year of construction)	**NIL**
	c) Quantity of water treated	**NIL**
	d) No. of tubewells/ground water sources	**NIL**
	e) Quantity of water abstracted from tube well	**NIL**
	f) Total (c & e)	**NIL**
	g) Shortfall in capacity	**NIL**
	h) Justification for upgradation, if any	
	II) Pumping main (Raw and Clear Water)	
	Size and length of material -	**a) 1500 mm dia. X 2 no's of M.S. material pipes of length 0.05 Km. b) 2150 mm dia.M.S. material pipes of length 0.30 Km. and c) 1168 mm dia. X 1 no's of M.S. material pipes of length 8.0 Km.**
	Static head, Water hammer head	**65.90 m, 251 m**

	Year instllation	**from 2008**
	Justification for upgradation/deletion, if any	
	III) Service Reservoir	
	a) Total No. of service reservoir and capacity, year of construction of each :	**Statement Attached Annexure- A**
	b) Height of service reservoir (please specify No.s and capacity and age)	**Statement Attached Annexure-B**
	c) Justification for upgradation, if any	**Statement Attached Annexure -C and given in report**
	IV) Pumping Machinery (Raw and Clear water)	
	a) Type of pumps -	**Centrifugal pumps (6 no's- working 4.00 no's and standby 2.00 no's)**
	b) Discharge Head - **75.00 m** HP - **500 hp**	
	c) Year of installations -	**2008**
	d) justification for replacement, if any	**No replacement proposed**
	V) Distribution System	
	a) Total length of road of City/Town	**703.025 Km.**
	b) Total length of road in project area : …… Km.	
	c) Type of roads and their length	**703.025 Km. length of various types**
	d) Total length of distribution network in the town	**566.677 Km.**
	e) Total length of distribution network in the project area : …… Km.	**303842**
	f) Material and age of the existing pipe (GI/PVC/AC/PSC/MS/DI etc:	**Annexure - D**
	g) Size and length of material of existing pipes (sizewise: ……mm (dia) .. Km. (length)	**Annexure - D**
	h) Pipe length to be retained in the system : …… Km.	**Annexure - D**
	i) Pipe length to be replaced (to be discarded from the existing system) (with reason)	**Annexure - D**
	VI) Bulk Meters	

	a) Total Nos.	
	b) Locations	
	Types and diameter ,	
	VII) Connection (diawise)	
	a) Domestic	**52418 Nos.**
	b) Industrial	**821 Nos. (Non domestic)**
	c) Institutional	**182 Nos.**
	d) Others	**NIL**
	VIII) Details of Meters (dia wise retail meters details	
	a) Domestic Nos.	**NIL**
	b) Working Nos	**NIL**
	c) Non-working Nos.	**NIL**
	Industrial Nos	**NIL**
	Working Nos	**NIL**
	Non-working Nos.	**NIL**
	Institutional Nos.	**NIL**
	Working Nos	**NIL**
	Non-working Nos.	**NIL**
	Others	**NIL**
	Working Nos	**NIL**
	Non-working Nos.	**NIL**
4.5	Please furnish the proposed major components and component-wise estimated cost	**Yes**
4.6	Whether the design of Intake, WTP, Pumping main, Service reservoir and distribution system of proposed water suppy infrastructure has been provided in DPR. Please furnish the details	**Yes**

	I) Intake Structure with facilities	**NIL**
	a) design period (30 years as per CPHEEO Manual) : …… Year	**NIL**
	b) Capacity of Intake : …… MLD	**NIL**
	c) Total quantity of withdrawal of water : …… MLD	**NIL**
	II) Water Treatment Plant	
	a) Design period (15 years as per CPHEEO Manual) : …… Year	**NIL**
	b) Capacity of WTP	
	Existing : …… MLD	**132 MLD**
	Proposed : …… MLD	**NIL**
	a) Shortfall in capacity, if any, to meet the intermediate demand : …… MLD	**NIL**
	c) Whether Life-cycle cost assessment of treatment technologies has been furnished:	**Yes**
	c) Whether a detailed note on performance of existing WTP (If considered in the proposal) has been furnished	**Yes**
	d) Whether temperature, elevation and location of the town has been taken into account while designing the process of the WTP, whether required and furnished	**Yes**
	e) Whether reasons for inadequate performance of existing WTP (If considered in the proposal) have been furnished	**considered in the estimate**
	f) Whether provision has been made for sludge treatment facilities in WTP	**Yes**
	III) Total No. of tube wells proposed and total drawal	**Not required**
	Existing : …… MLD	**NIL**
	Proposed : …… MLD	**NIL**
	Yield of each tubewell (new) : …… lpm	**NIL**
	IV) Pumping main/rising mains and feeder main:	
	Pumping Main/Rising mains	
	a) design period (30 years as per CPHEEO Manual) : …… Year	**30 years**
	b) i) Whether design of economic size of pumping main has been done using computer software for the purpose (no manual design should be enclosed)	**Yes**
	ii) Whether water hammer is considered in design	**Yes**

	iii) Whether design of pumping machinery is enclosed	**Yes**
	c) Standby for pump sets (please specify50% or 100%)	**02 no's**
	d) Total No. of pumping/Rising mains	**01 no.**
	e) Average flow considered in different pumping mans : …… MLD	**25.76 MLD**
	f) Availability of powr supply : …… kWh	**3.3 kva**
	g) Pumping hours considered (20 to 22 hrs) : ……Hrs.	**20 hrs.**
	h) Pumping efficiency considered (60 to 80%) : ……%	**70%**
	i) Capacity of pum set proposed for various pumping mains : ……. HP	**290 HP (100% Stand by)**
	j) whether genset/express feeder has been proposed : ……. kVA Please specify Nos. and capacity	**Already Available**
	Feeder Mains	
	k) Design period (30 years as per manual) (please specify the actual)	**30 years**
	l) Whether design of economic size of pumping main has been done using computer software for the purpose (no manual design should be enclosed)	**Yes with Bentley Water gem Software**
	m) Standby for pump sets (please specify 50% or 100%)	**100%**
	n) Total No. of feeder mains	**22**
	o) Average flow considered in different pumping mains : ……MLD	**25.76 MLD**
	p) Availability of power supply : ……. kWh	**216.34 KWH**
	q) Pumping hours considered : …… Hrs.	**Between 16-20 hrs.**
	r) Pumping efficiency considered : ……%	**70%**
	s) Capacity of pump sets proposed for various pumping mains :	**Statement Attached Annexure E**
	t) Whether genset has been proposed (please specify Nos. and capacity):	**No.**
	V) Service Reservoirs	
	a) Design period (15 years as per manual) : ……. Years	**30 Years**

	b) Total No of service reservoir and capacity : …….(ML).. Nos	**77.10 ML**
	c) Height of servoir reservoir (please specify No.s and capacity and age	
	d) Capacity calculations of the MBR/ESR/GSR atttached	**Yes Attached in DPR Report**
	e) Justification for upgradation, if any.	
	f) No. of service reservoir to be utilised in the proposed system (Please specify Nos. and capacity	**Attached in Annexure - C**
	g) Whether total proposed capacity is based on the 1/3rd requirement of intermediate demand (please speify the total capacity of service reservoir and intermediate demand)	
	i) 1/3rd of intermediate demand : ……. ML	**38.61 ML**
	ii) Total capacity of reservoirs : ……. ML	**77.10 ML**
	h) If not, please justify	
	VI) Distribution network	
	a) design period (30 years as per CPHEEO Manual) : 30 Year	**30 Years**
	b) Total length of road of city/town :	**703 KM**
	c) Total length of road in the project area : ……. Km.	**Approx 260 KM**
	d) Total length of distribution network : ……. .Km	**466 Km**
	e) Total length of distribution network in the project area : ……. Km.	**303 Km**
	f) Material of the proposed pipe :	**DI- K7, DI K-9, HDPE**
	g) Size of distribution network in the town :	**Annexure - D**
	h) Total length of proposed line accounted for : ……. Km.	
	i) Additional length of pipe network proposed : ……. Km.	
	j) Peak factor adopted (2 to 3) as per manual : …….	**It varies hourly from 0.2 to 2.5**
	k) 'C' Value of the proposed pipe material (100 to 145) as per manual:	**Attached in Annexure - H**
	l) 'C' value of existing pipe material and age of pipe …… (……..years)	**Attached in Annexure - H**

	m) Residual head in distribution network (minimum residual head and range of available pressure (7 m, 12m, 17m & 22 m,) (to be adopted as per manual depending on nature of town and its requirement) and justify the reasons .....m	**10 M to 22 M**
	n) Maximum velocity in distribution network .....m/s (<3m/s)	**2.6 M/sec**
	o) Head loss considered in the design (m/s) .....m/Km.	**4 m/Km**
	p) total No. of layouts (network) .....Nos/.....Nos	**9**
	r) Total length of distribution lines (zonewise) : ..... Km.	**Included in DPR**
	s) Proposed pipe sizes : .....mm	**Included in DPR**
	t) Please flow from the outlet of service reservoirs as per the design (layout wise / DMS wise/Zonewise) and total peak flow from all the service reservoirs..... (zonewise and .....MLD (Total)	
	u) Whether hydraulic zone wise population and demand statement is enclosed	**Yes**
	v) Whether the average flow from all the service reservoirs is matching the ultimate demand of the city/town/project area (please specify the total average outflow from all service reservoir	**Yes**
	w) Whether the provision thrust blocks, anchor blocks, expansion joints, scour / drain valves air / vacuum releases valve and surge protection devices, wherever needed has been proposed	**Yes**
	x) Whether distribution system has been done based on convention approach	**Yes**
	y) Whether design details with input and outputs statement is attached in soft and hard copies	**Yes**
	aa) % of population coverage (including existing and proposed .....%.....Nos	**80%**
	bb) % of area coverage (including existing and proposed .....% (.....Sq.km.)	**43.6736**
4.7	House service connection (please specify	
	Existing	**67280 Nos**
	Proposed	**20193 Nos**
4.8	Whether the proposed scheme envisges supervisory control and data acquisition SCADA aggangemnt	**No**

4.9	Whether modular approach has been adopted to facilitate "addition" units to WTP at a future date, whenever required.	**Not required**
4.10	Whether computer Aided Design (both design and simulation) for water treatment plant, pumping station, distribution network has been furnished in DPR.	**Yes**
4.11	a) Whether the raw water characteristics of source have been tested by State Public Health Engineering Dept./Pollution Control Board MOEF authorised laboratory State Govt. authorised laboratory and furnish in DPR	**Yes**
	b) Whether water supplied to consumers is tested and its latest report are attached in DPR	**Yes**
4.12	Whether treated water shall conform to the standard drinking water as per BIS:10500 and its latest amendments?	**Yes**
4.13	Whether surge analysis using computer software for transmission main has been done and furnished in the DPR	**Yes**
4.14	a) Whether key plan of the scheme is enclosed.	**Yes**
	b) Whether hydraulic flow diagram (HFD) with head loss calculation for WTP and layout plan of WTP with other components has been furnished in DPR	**Yes**
4.15	i) Whether maps of proposed distribution system indicating RL, Node No., Link No., available head etc. for all the zones (project area) are enclosed with the DPR existing pipe ines (scale 1:200) and alingment map.	**Yes**
	ii) Whether L section of internal of 150 m of the proposed pumping main/transmission main have been furnished in DPR (30 m in case of undulations)	**Yes**
	iii) Whether detailed drawing of all structures considered in scheme are enclosed	**Yes**
4.16	Whether the site of the proposed WTP has been located as per that earmarked in the Master plan of the town.	**Yes**
4.17	Whether the provision of the land for the land acquisition for the water treatment plant, serice reservoirs water supply network, if any, has been made as per 30 years requirement and future expansion in the DPR?	**Yes**
	a) Total requirement of land for:	
	WTP : .....Hectars	**Not required**
	Tubewell : ..... Hectars	**Not required**
	OHSR/GLR : ..... Hectars	**2.50 Hect**
	Laying pumping mains : ..... Hectars	**Available**
	Distribution mains :	**Available**

	…… Hectars	
	Transmission mains : …… Hectars	**Available**
	Total : …… Hectars	
	b) Whether land in possession with Implemnting agency …… Hectars	**90 % Land in Possession Statement Attached in Annexure - G**
	c) Whether govt. land is yet to be transferred to the Implementing agency and specify time required for transfer : ……Hectars ……month	**Not required**
	d) Whether private land under acquisition and time required for acquisition.	**Yes**
	: ……Hectars/ …… Months	**0.25 Hect**
	e) Status of action initiated for transfer of Govt. land and acquisition of private land please specify	**Yes, letter of requirement of land for acquisition given to town planning section**
4.18	Whether Bill of Quantity (BOQ) and cost estimates of individual components of water supply sstem prepared as per latest SOR and copy of latest Schedule of Rates (SOR) and proforma invoices have been annexed with DPR	**Yes**
	a) Schedule of Rates adopted (Please specify the year)	**MJP DSR of year 2014-15 PWD DSR of year 2015-16**
	b) In case of SOR adopted is old, please specify the cost index	**Cuurent SOR 2014-2015 Adopted**
	c) Any price escalation proposed in cost estimates (no escalation shall be proposed in DPR)	**Not Proposed**
	d) Whether analysis of rate alongwith minimum required quotation has been worked out for all the items and appended with DPR	**Yes**
	e) Whether Bill of Quantities of individual component has been furnished in DPR	**Yes**
	f) Whether lump-sum provision for any item has been proposed, please specify the maximum amount supported by reasons and documents.	**Yes**

4.19	Whether detailed drawing, estimation and detailed BOQ for ancillary works such as boundary wall/fencing, approach and internal road, external electrification, buildings, water supply and drainage, site development/landscape etc. has been provided in the DPR	**Yes**
4.20	Whether provision for road restoration, if any has been made as per PWD/State PWD/ Urban local body norms.	**Yes**
4.21	Whether detailed PERT/CPM network showing implementation schedule has been furnished in DPR	**Yes**
4.22	Whether internal Rate of Return (IRR)/Ecpmp,oc Rate of return (ERR) has been furnished in DPR	
4.23	Whether traffic diversion/control management for public and workers' safety, arising out of construction phase of water supply works have been furnished in DPR	**Yes**
4.24	Whether Institutional and Financial status of project Executing Agency (PEA) has been reported in DPR	**Yes**
4.25	Whether Operation and Maintenance cost and revenue generation details (O & M Frame Work - existing and proposed) has been furnished in DPR	**Yes**
	a) Existing water tariff/cess/charges (in Rs.)	**for 12 mm dia.**
	Residential	**2000**
	Commercial	**7160**
	Institutional	**7160**
	Industrial	**7160**
	b) Proposed water tariff/cost/charges (in Rs.)	
	Residential	**NIL**
	Commercial	**NIL**
	Institutional	**NIL**
	Industrial	**NIL**
	c) Annual O & M cost (Rs. In lakhs (Headwise)	
	i) Existing (last 5 years)	
	2011-12	**183109566**
	2012-13	**218994824**
	2013-14	**187700247**
	ii) Proposed	
	2015-16	**316510000**
	d) Annual assessment	
	i) Last 5 years	
	e) Annual Revenue (Rs. In lakhs)	

	i) Existing (last 5 years)	
	2011-12	**150478850**
	2012-13	**159239889**
	2013-14	**150074260**
	ii) Proposed	
4.26	Whether project implementation period of project has been furnished in DPR specify the implementation period …….year	**2 years**
4.27	Whether service level benchmarking has been furnished in DPR, Please furnish SLBs	**Yes**

S.No.	***WATER SUPPLY INDICATOR VALUES***	***WATER SUPPLY INDICATOR VALUES***	***Unit***	***FY 2014-2015***
1	Coverage of water supply connections	100	%	60
2	Per capita supply of water (At consumer end)	135	Lpcd	102
3	Extent of metering of water connections	100	%	0
4	Extent of Non Revenue Water	20	%	72
5	Continuity of water supply	100	Hours/ Day	0.50
6	Efficiency in redressal of customer complaints	100	%	77
7	Quality of water supplied	100	%	100
8	Cost recovery in water supply services	100	%	90
9	Efficieny in collection of water supply related charges	90	%	75

WATE Unit FY 2014-2015

4.28	Whether envoronmental and social problem (if applicable) has been furnished in DPR	**No**
4.29	Whether PPP involved in the project, Please specify the PPPcomponents and funding patter by the Govt. and Private sector	**No**
4.30	Whether Rehabilitation and Resettlement plant (if applicable) has been given in DPR	**Yes**

4.31	Whether all the hard copies of the DPR furnished alongwith soft copies	**Yes**
4.32	Period of completion of project	**Up to year 2017**

	Name:- Dilip Thorat **Designation :- City Engineer**	**Name:- Sanjay Kapadnis** **Designation:- Commissioner**

I. GENERAL REPORT

1.1. JALGAON CITY

Jalgaon is 'D' class Municipal Corporation and is head quarter of Jalgaon District in Nasik revenue division of Maharashtra. It is located on National Highway No. 6 (Mumbai Howrah) and is an important station on Mumbai-Delhi / Howrah Central Railway board gauge route and Bhusawal-Surat-Ahmadabad Railway Route. Besides this, the National Highway No.6, there are other important state highways which are from districts Jalgaon-Aurangabad-Pune road

1.1.1. CONNECTIVITY:

A] Road: Jalgaon is well connected to the major cities of Maharashtra state as well as to the cities like Mumbai, Nagpur, Drug, Raipur, Sambalpur and Kolkata through Asian Highway no. 46 (formerly National Highway no. 6).

B] Rail: Jalgaon railway station lies on the main railway line Mumbai - Bhusawal & Surat -Bhusawal. Bhusawal Main railway junction On Central Railway route is exactly 25 Km away from Jalgaon city, is one of the major railway junctions in Maharashtra. It connects the city with New Delhi, Mumbai, Kolkata, Chennai, etc.

C] Air: Jalgaon Airport, at Kusumba (approximately 6 km from the city) has been upgraded by the AAI and was inaugurated on 23 March 2012 by the President of India. Presently Citizens of Jalgaon have to access Aurangabad Airport (150 KM) to gain access to air services.

1.1.2. INDUSTRIAL DEVELOPMENT:

The Maharashtra Industrial Development Corporation (MIDC) and co-operative Industries Estate Comprising area of 372 Ha and 18.36 Ha respectively have

boosted the growth of industries like Chemical, Pharmaceutical, and Engineering and sub industries like synthetic fiber bulbs, packing and luggage (VIP) and large scale industries like PVC pipes and other products, food, silk mill etc. and also indicate the city as an Industrial city.

1.1.3. TOURIST & TRADE:

The Jalgaon city is famous for different temples. The city forms on important stop point for transit tourism. The most important and world famous **Ajanta** and **Ellora caves** are 55 Km and 185 Km from city. The Jalgoan Municipal limit covers total area of 68.24 Sq.Km. This city is situated at 21°0'52"N latitude and 75°33'52"E longitudes. The city receives 99% of rainfall in the month of June to September.

Jalgaon is often known as the "Banana Capital" of India. Jalgaon district produces more than 16% of India's bananas and thus 3% of world banana production happens in Jalgaon. Jalgaon thus produces more bananas than most of the countries of the world. According to Mahabanana, an association of banana growers of Maharashtra, 66% of Maharashtra's land under banana crop is in Jalgaon.

1.1.4. TOPOGRAPHY:

The Jalgaon town is situated in generally in flat region. A general slope is towards North and the Girna River flows in South North direction along Western boundary of Jalgoan town near Nimkhedi village. The city contains four to five big nallahs flowing from south to north between the cities. Some portion in the city has hilly areas and one or two places there low lying areas. In some part of the town the topography is adulating and some wards of the town are thickly populated and some wards have less population and due to this adulating topography.

1.1.5. CLIMATE:

The Climate is hot and dry expect in Monsoon. The maximum temperature rises up to 48˚C and average rainfall is about 730 mm. 95 to 99% of which is received during monsoon month (June-September).

1.2. CITY STATISTICS:

Name of City	Jalgaon	Data Source
Class of City	"D" Class Municipal Corporation	Vol.I (A) of DPR,
Tahasil & District	Jalgaon, Tal. & District: Jalgaon	
Region	Nasik	
Coordinates:	21°0'52"N 75°33'52"E	
Population	**1991:** 242193 **2001:** 368618 **2011:** 460468 (As per preliminary census data) **2013:** 522406	
Municipal Council Area	68.24 Sq.km.	
Average Rainfall (mm)	730 mm	
Nos. of Wards	69	
Present water supply source	Waghur Dam	
Whether covered / likely to be covered with sewage?	Yes	

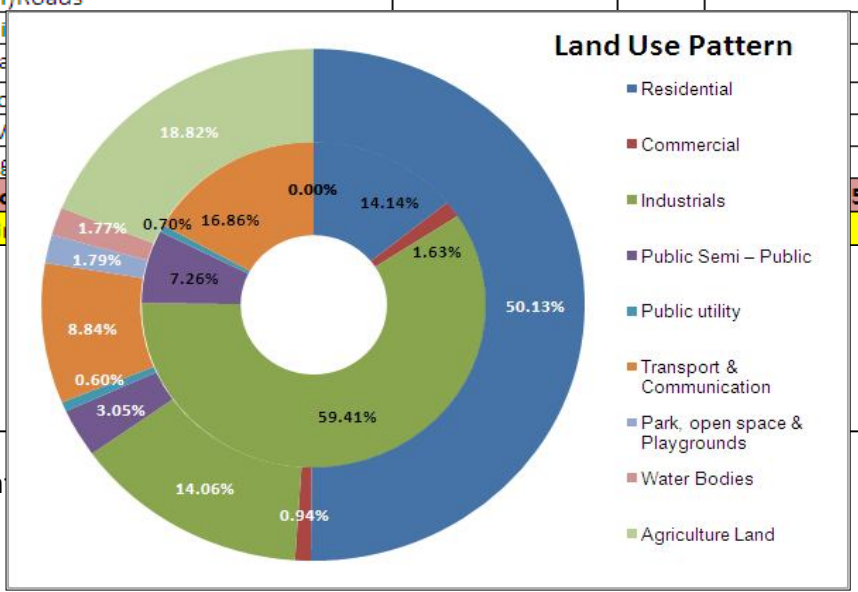
1.2.1. POPULATION:

As Per Provisional Reports Of Census India, Population Of Jalgaon In 2011 Is 460,468; Of Which Male And Female Are 241,228 And 219,240 Respectively.

Jalgaon City	Total	Male	Female
Population (2011)	**460,468**	241,228	219,240
Literates	**363,778**	198,426	165,352
Children (0-6)	**51,544**	28,548	22,996
Average Literacy (%)	**88.96**	93.3	84.26

1.2.2. LAND USE (AS PER DP PLAN)

Land Use	DP plan 1993 (Old Municipal limit – 1983)		Proposed land use 2011	
Land Use Type	Area (A-1) in hectares	%	Area (A-2) in hectares	%
Residential	164.97	14.14	2847.12	50.1355
Commercial	19.01	1.63	53.45	0.94121
Industrials	693.27	59.41	799	14.0698
Public Semi – Public	84.73	7.26	173.61	3.05713
Public utility	8.22	0.7	34.36	0.60505
Transport & Communication	196.75	16.86		
i)Roads			444.49	7.82711
i			37.37	0.65806
Pa			102.21	1.79984
To			4491.61	
W			100.62	1.77184
Ag			1086.62	19.1345
To			**5678.85**	**100**
G				



1.3. DEVELOPING & IMPLEMENTING AUTHORITY: JALGAON MUNICIPAL CORPORATION

Jalgaon Municipal Corporation (JMC) was founded in 22 Sept. 2003. Earlier to that it was “A” Class Municipal council. Civic affairs of the city are managed through various departments of the Municipal council.

1. DETAILS OF EXISTING WATER SUPPLY SCHEME

4.1. SOURCE OF WATER:

Present Source of Raw Water for Jalgaon City is Waghur Dam on Waghur River. The Waghur dam site is located near village Raipur @25 Km from Bhusawal & 21 km from Jalgaon. Site is approachable from village Umale located on Jalgaon–Aurangabad State Highway. Salient feature of the dam & its storage capacity is as given below.

Water Reservation for Jalgaon City: (Data: DPR Jalgaon WSS Stage-V, Ph-1, (Reframed) Vol.-III – Annexure)

Irrigation Department (GoM) Vide their letter Dt. 08-12-1997, has sanction water reservation of **64.00 Mm3** (54.90Mm3 for Drinking & 9.10 Mm3 for Industrial use) for Jalgaon city, subject to condition that " Height of Dam should be increased by 2.0 m and cost of same should be borne by WS & Sanitation Department" . Same is yet to be implemented.

Location	Near Vill. Raipur
Latitude	20^0- 56' - 00" (N)
Longitude	75^0 - 43' -00" (E)
Catchment Area:	2145 Sq.Km
Submergence area	4363 Ha
Avg. Annual runoff	455.75 Mm3
75% Yield	349.30 Mm3
Ht of Dam :	ED = 27.50m
	MD = 39.50m
Length of Dam	1070 m
Width of Gate spillway	297.25
Nos. of Gate	20 Nos. (12x8m)

U/s view of water supply sluice

D/s view of sluice gate & Piping

Gross Storage-	325.00 Mm3
Live Storage-	**283.02 Mm3**
Dead Storage-	41.98 Mm3
River Bed RL	201.000 m
River sluice RL	215.000 m
Irrigation & Power Sluice (left Bank)	220.750 m

Water supply Sluice	**218.700 m**	
MDDL	**223.600 m**	
Crest Of spillway	226.100 m	
FRL	**234.100 M**	
Max. FL	235.158 m	
TBL of dam	238.500 m	
Data source : Brief Note & Salient Features of Dam Recd From JMC		

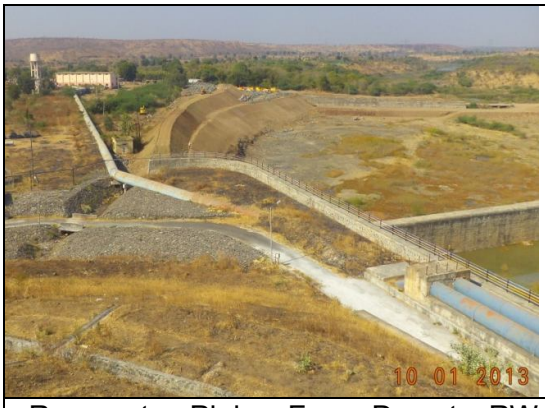
4.2. EXISTING SCHEME COMPONENTS:

This scheme is satisfactorily commissioned in year 2008.

2.2.1. RAW WATER INTAKE

- Water supply sluice with two gates, one operative and one standby, provided in body of dam. Twin MS pipes of 1524 mm (10 mm thick) and 45M in length are taken out from gated sluice to connect into single MS conduit, of 2150 mm Dia. 12 mm thick and 256 M long, laid at the downstream toe of the dam to pumping station. Surge tower (Elevated Storage tank) as indicated in photograph is constructed to take care of cavitations in suction piping.

The Caring capacity of Raw water Intake piping is 175.34 MLD considering Raw water Demand for design year 2030.



Raw water Piping From Dam to RW Pumping station

Suction Mani fold

	
Suction Y pipe Junction & Air valve	Surge tower

2.2.2. RAW WATER PUMP HOUSE:

The raw water pump house is of RCC frame structure with BB Masonry staining wall. Size of Pump house is 58.65 x 12.4 x 10M. Plinth RL of Pump House is 217.650m

2.2.3. RAW WATER PUMPING MACHINERY

6 Nos. of Centrifugal pumps (4 Nos. working & 2 Nos. as standby) each of capable to derive 13,52,500 lph against 75 M total gross head.

Waghur Raw Water Pumping [Pump Details]						
Pump Detail	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Pump ID Code/ Sr. No.	1709604001	1709604002	1709604003	1709604004	1709604005	1709604006
Model No	09R4A287p/0100	09R4A287p/0100	09R4A287p/0100	09R4A287p/0100	09R4A287p/0100	09R4A287p/0100
Type of Pump	12vpH -4	12vpH -4	12vpH -4	12vpH -4	12vpH -4	12vpH -4
Manufacturer's Name	Kirloskar	Kirloskar	Kirloskar	Kirloskar	Kirloskar	Kirloskar
Rated Flow (M^3/hr)	1355.00 M^3/hr	1355.00 M^3/hr	1355.00 M^3/hr	1355.00 M^3/hr	1355.00 M^3/hr	1355.00 M^3/hr
Rated Head (M)	75.00 m	75.00 m	75.00 m	75.00 m	75.00 m	75.00 m
Rated Pump Power (kW)	325.600kw	325.600kw	325.600kw	325.600kw	325.600kw	325.600kw
Rated Speed (rpm)	1485	1485	1485	1485	1485	1485

Waghul Raw Water Pumping [Motor Details]						
Description	Motor-1	Motor-2	Motor-3	Motor-4	Motor-5	Motor-6
Motor No	180098	180098	180098	180098	180098	180098
Frame	355 - 93	355 - 93	355 - 93	355 - 93	355 - 93	355 - 93
Manufacturer's Name	Alstom ltd	Alstom ltd	Alstom ltd	Alstom ltd	Alstom ltd	Alstom ltd
Rated Voltage (V)	3300	3300	3300	3300	3300	3300
Rated Full load Amps	82	82	82	82	82	82
Rated Pump Power (kW/HP)	375 Kw	375 Kw	375 Kw	375 Kw	375 Kw	375 Kw
Rated Speed (rpm)	1482	1482	1482	1482	1482	1482
Rated Motor Efficiency (%)	93%	93%	93%	93%	93%	93%

View of 6 Nos. of RW Pump Installation

View of Pump, Suction & delivery pipe assembly


View of Individual Pump Installation


View of Individual Electrical Panel

2.2.4. RAW WATER RISING MAIN

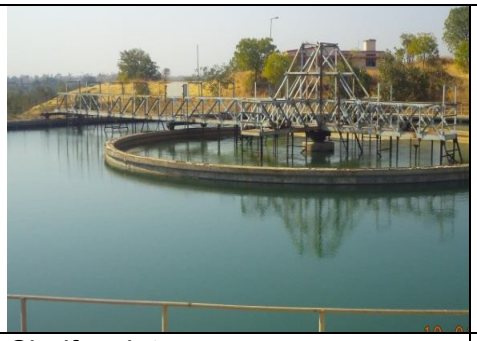
Raw water rising main 1168 mm MS and 10mmthick having length 7325 M from Raw water to Aeration fountain.

2.2.5. WATER TREATMENT PLANT

A conventional water treatment plant for 130 MLD Capacity was constructed near village “Umale”. Civil works of first two unit’s i.e. Aeration fountain and the Partial flume units are designed and constructed for 215.8 MLD (considering 20% overloading) for ultimate stage water demand. Other components are design for Intermediate stage demand 108.20MLD + considering 20% overloading. MBR with CCT, of total 260 lakhs lits. Capacity is constructed under the scheme.

Aeration Fountain

Conveyance channel & Parshal Flume

	
Clarifoculators	Filter Beds
	
Part top view of plant	Part top view of plant
	
Wash water pumps	Blowers
	
Chemical House & Filter Annex	Transformer Yard

Wash water tank

Recirculation Pumps

Details of Wash Water Pump, Recycle Pumps etc are Incorporated in Energy Audit PFR

2.2.6. PURE WATER TRANSMISSION MAIN

- The existing Transmission system from the 26 ML capacity MBR at water treatment plant site has been commissioned. This consists of mainly of Pre stressed concrete and mild steel pipes. **The details are as below:**

Sr. No.	Diameter (mm)	Length (Scaled) (m)				Grand Total
		Cast iron	PSC	PVC	Steel	
1	200	30	-	13	140	183
2	300	21	-	-	-	21
3	350	22	-	-	-	22
4	375	43	-	-	-	43
5	**450**	**78**	**3823**	**-**	**1060**	**4961**
6	500	30	3900	-	-	3930
7	550	-	-	-	72	72
8	600	-	6692	-	3421	10113
9	750	69	-	-	-	69
10	800	-	2051	-	-	2051
11	1000	-	1629	-	-	1648
12	1200	-	3008	-	-	3008
13	1500	-	11668	-	-	11668
Grand Total		**293**	**32771**	**13**	**4712**	**37789**

This transmission system is connected to all the existing ESRs and up to location of proposed ESR in MIDC for zone 12.

- The Work of Pure water transmission main varying from 600 mm dia PSC of Class 14 to 1500 mm dia PSC of Class 6 -10 and work of 600mm dia MS pipe (7.9 mm thick) to 1524 mm dia MS pipe (10 mm thick) at Pipe Junction, crossing and at intermediate locations having different lengths is completed with all specials, chambers etc. System is commissioned in 2008.
- The work of sump and pump house and erection of pumping machinery near DSP Chowk is held up due to contractual issues.

Note: Alignment of existing Feeder main From MBR to ESR is indicated in Dwg. No.DRA/WA DPR/JAL/003 attached hereafter In drawing section.

2.2.7. PURE WATER PUMPING MACHINERY (AT BOOSTER PUMPING STATION)

Being a Gravity transmission system from MBR to ESR, No Pumps installed at WTP to lift the water, all ESR are feed by Gravity except DSP, Girana & Nityanand Nagar ESR which is fed by local BPS.

A] Girna BPS:

There are 2 (75 Hp & 80 Hp) pumps each (1w+1sb) are installed at Girana Pump House. 75 Hp pump lift the water from sump to Girana ESR & 80 HP pump lift the water to DSP ESR.

Girana Pumping Station				
	(To DSP ESR)		(To Girana ESR)	
Pump Detail	Pump 1	Pump 2 (Not in Work)	Pump 1	Pump 2
Pump ID Code/ Sr. No.	17461000104	1747200099	1747208072	1747208073
Model No		2111A1000101	2188A 9280	2188A 9281
Type of Pump	UP 200130	UP 150138B	UP 150138 B	UP 150138 B
Manufacturer's Name	Kirloskar	Kirloskar	Kirloskar	Kirloskar
Rated Flow	475 m^3/hr	375 m^3/hr	375 m^3/hr	375 m^3/hr
Rated Head (M)	26.00 m	29 m	25 m	25 m
Rated Pump Power (Hp)	80	80	75	75
Rated Speed (rpm)	1475	1475	1470	1450

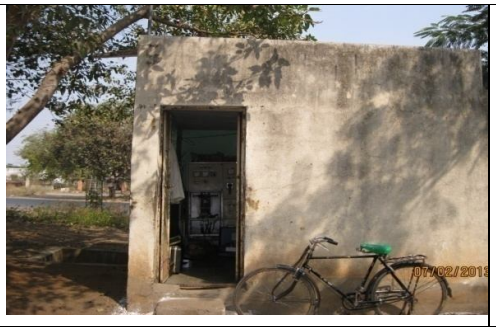
	
75 Hp pump (to Girana ESR)	**80 Hp Pump (to DSP ESR)**

Two HSC pumps (1W+1 SB) of 50 HP are also provided to pump water to ESR, located In Collector Bungalow, and operated twice a week as per the water requirement.

B] Raymond BPS:

At Raymond Chowk, 75 HP booster pump is installed.Near Raymond Chowk, Branch main inlet & outlet piping is connected to 1500mm dia Main feeder main From Waghur to Girna as well as MIDC feeder main laid in parallel to Waghur Feeder Main.

Water is fed from Raymond booster pump tapping point to Mehrun area distribution directly. The Pump is used at Raymond Chowk booster pumping station are horizontal centrifugal type with rating of 500 M3/hr.



Raymond Pump Details				
Description			**Description**	
Make	Kirloskar		Total Head (m)	30
Pump Sr. No.	1747200072		Rated Speed (rpm)	1450
Pump Type	UP 200/30		Motor (HP)	75
Pump Input (KW)	53.04		Size	150x200 mm
Rated Discharge M^3/hr	500			

C] DSP Chowk BPS:

At DSP Chowk 75 HP booster pump is installed. Water is fed from DSP booster pump tapping point to Nityanand ESR area distribution directly. The Pump is used at DSP Chowk booster pumping station are horizontal centrifugal type with rating of 382 m3/hr.

DSP Chowk Pump Details	
Description	**Pump**
Make	Kirloskar
Rated Discharge (m3/hrs)	382
Total Head (m)	34
Motor (HP)	75
Input suction Dia. (mm)	266.75

2.2.8. STORAGE RESERVOIR:

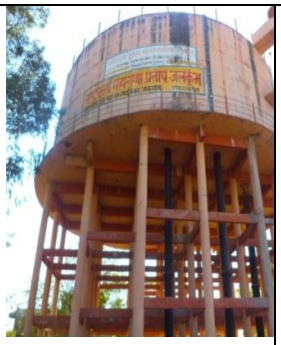
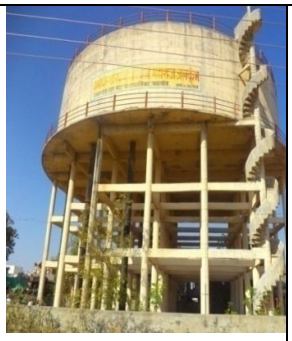
At present there are 12 No of Elevated Service Reservoirs in the city constructed under old Girna water supply scheme and augmented under Waghur WSS scheme. These 12 ESRs with their capacities are as under:

S. No	Name of ESR	Cap. In ML	Level as per TS Survey			
			GL (m)	LWL (m)	FSL (m)	St. Ht. (m)
1	Gendalal Mill	2.00	210.0	222.5	228.5	12.5
2	Akashwani	2.50	231.0	246.5	253.5	15.5
3	DSP Chowk (New)	2.80	241.0	262.0	267.0	21.0
4	DSP Chowk (old)	2.80	241.0	253.5	260.5	12.5
5	Nityanand Nagar	2.80	254.0	266.5	273.5	12.5
6	Sindhi Colony	3.90	223.0	238.0	245.0	15.0
7	Khanderao Nagar	2.80	214.0	226.5	233.5	12.5
8	Pimprala Shivar	2.80	213.0	224.5	230.5	11.5
9	Nimkhedi Shivar	2.80	209.0	221.0	228.0	12.0
10	Girna Takki premises	2.80	238.0	250.5	257.5	12.5
11	Shyama Prasad	2.80	214.0	226.5	233.5	12.5

12	Dreamland	2.80	215.0	227.5	234.5	12.5
	Total Capacity (ML)	**33.60**				

- Storage capacity is equal to 8 hours of daily water demand of area served from respective ESRs. Present condition of these ESRs is indicated as below

	
Gendalal mill ESR	**Aakashwani Chowk ESR**
	
DSP Chowk ESRs	**Nityanand Nagar ESR**
	
Hemu Colony ESR	**Khanderao nagar ESR**

		
Pimparala ESR	**Khote Nagar (Nimkhedi) ESR**	**Girna Takki Premises ESR**

- There are total 3 Nos. of GSRs. @ Girna premises. GSR 1 & 2 of cap. 2.25 ML, GSR.-3 of 4.5 ML are constructed with Girna WSS. Third GSR 3.5 ML is constructed during Waghur WSS.

	
Side view GSR I & II	**GSR III (Roof slab Damage)**

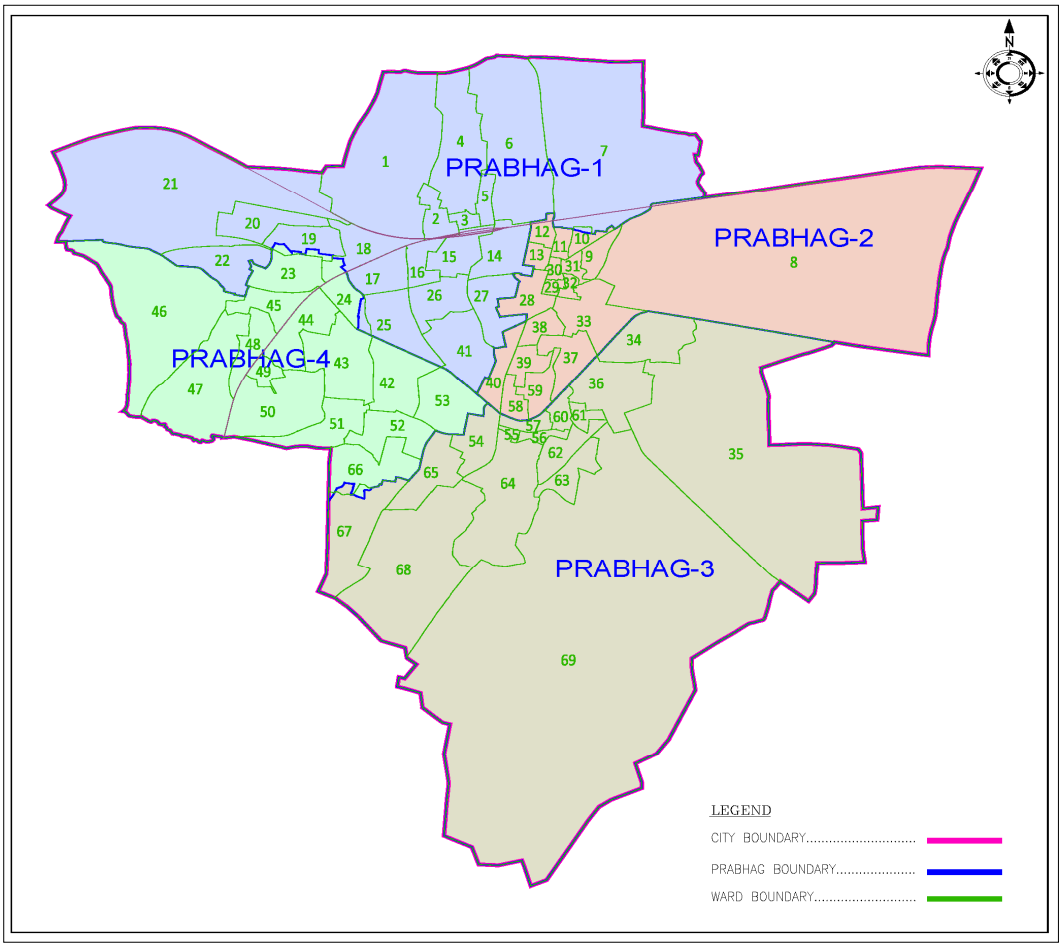
Sump of 0.2 ML cap. constructed during Girna scheme is being used for Pumping water to Girna & DSP ESR through PW pump installed on it. This sump is connected to GSR 1 &2 from where inflow to sump is regulated.

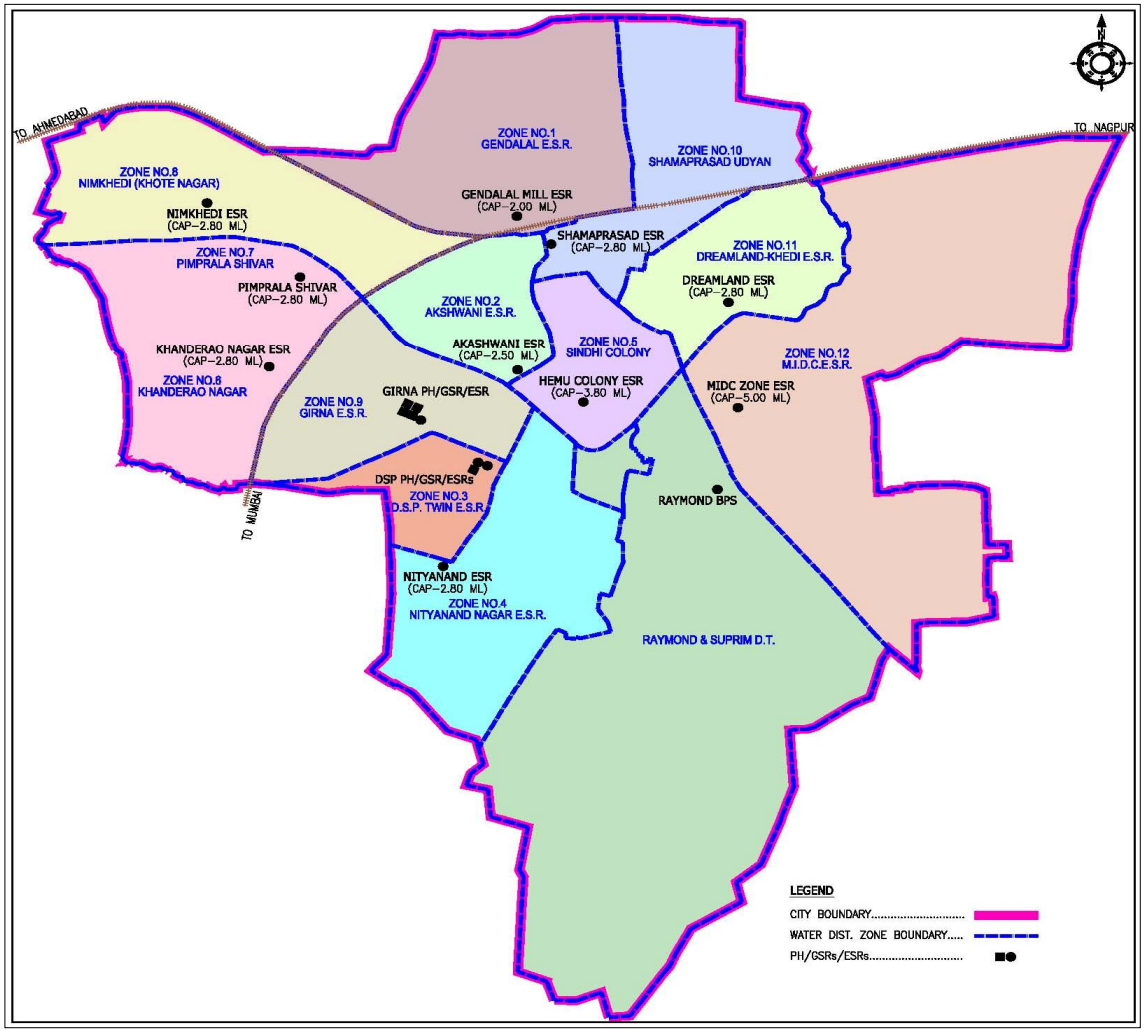
GSR /SUMP	Capacity in ML	GL (M)	FSL (M)	Size
GSR-I	2 x 1.125 = 2.25	235.61	237.90	36.5 x22.1x 3.4
GSR-II	4.50	235.61	237.90	37.5 x 37.5 x 3.2
GSR-III	3.50	235.61	237.90	
PW SUMP	0.20	235.65	235.75	For BPS

2.2.9. Water Supply Zone

ZONES	ESR	Contributing wards	Total area of Zone (in Ha)
Zone-1	Gendalal Mill	1(P),4,6,2(P),3,21(P)	583.22
Zone-2	Akashwani	15(P),2(P),16,17,24,25,20, 41(P)	247.40

AZone-3	DSP Chowk (Old) DSP Chowk (New)	51(P),42(P),66,67(P),52	176.24
Zone-4	Nityanand Nagar	67(P),65,68,64(P),53(P),54	514.63
Zone-5	Sindhi Colony	28(P),27,38,40,41(P),58,59, 37,39,33(P)	228.93
Zone-6 & 7	Khanderao Nagar & Pimprala Shivar	22,21(P),23,45,46,47,48	523.3
Zone-8	Nimkhedi Shivar	23(P).20,21(P),19,18,1(P)	490.967
Zone-9	Girna Col.	53(P),42,43,51(P),49,50,44	332.68
Zone-10	Shyama Prasad Udyan	7,10,11,12,13,14,15(P),28(P), 8(P)	461.20
Zone-11	Dreamland	9(P),8(P),31,30,32,29,33(P), 28(P)	309.18
Zone-12	MIDC	8(P),35,34,36(P)	1374.20
	Supreme & Raymond DT		1733.97
	Total		**6975.917**





2.2.10. EXISTING Distribution SYSTEM

The ext. distribution pipes as detailed below were laid during year 1970 to latest 2013 in various stages of augmentation of project.

Dia. (mm)	Material								Total Length (m)	%
	AC	CI	DI	GI	HDPE	MS	PSC	PVC		
25				517					**517**	0.09
40				445					**445**	0.08
50				5043			5813		**10856**	1.92
63								22678	**22678**	4.00
75								51717	**51717**	9.13
80	301	1021		335					**10846**	1.91

Dia. (mm)	Material								Total Length (m)	%
	AC	CI	DI	GI	HDPE	MS	PSC	PVC		
		0								
90								131725	**131725**	23.25
100		6021		1508					**7528**	1.33
110								127153	**127153**	22.44
140								810	**810**	0.14
150		7410							**7410**	1.31
160								118268	**118268**	20.87
200		6349						25341	**31690**	5.59
250		3908							**3908**	0.69
300		14279							**14279**	2.52
315					353			10407	**10760**	1.90
350		3801							**3801**	0.67
400		1545							**1545**	0.27
450		2620							**2620**	0.46
500		3164			62		557		**3782**	0.67
600		2012							**2012**	0.35
800		163					1531		**1694**	0.30
1000						426	208		**634**	0.11
Total (m)	**301**	**61481**	**0**	**7847**	**415**	**426**	**8110**	**488098**	**566677**	100
Total (Km)	**0.30**	**61.48**	**0.00**	**7.85**	**0.41**	**0.43**	**8.11**	**488.10**	**566.68**	
%	0.05	10.85	0	1.39	0.07	0.08	1.43	86.13	100	

4.3. SOURCE INVESTIGATION AND ITS RECOMMENDED BY COMPETENT AUTHORITY.

A) SOURCE OF WATER:

Present Source of Raw Water for Jalgaon City is Waghur Dam on Waghur River. The Waghur dam site is located near village Raipur @25 Km from Bhusawal & 21 km from Jalgaon. Site is approachable from village Umale located on Jalgaon–Aurangabad State Highway. Salient feature of the dam & its storage capacity is as given below.

Water Reservation for Jalgaon City: (Data: DPR Jalgaon WSS Stage-V, Ph-1, (Reframed) Vol.-III – Annexure)

Irrigation Department (GoM) Vide their letter Dt. 08-12-1997, has sanction water reservation of **64.00 Mm3** (54.90Mm3 for Drinking & 9.10 Mm3 for Industrial use) for Jalgaon city by considering the future population of year 2016 subject to condition that " Height of Dam should be increased by 2.0 m and cost of same should be borne by WS & Sanitation Department" .

At present, JCMC water requirement is 40.00 mm3. As per Detailed project Report and demand calculations of future population works out to 150.00 MLD by year 2048 which is less than the 175.34 MLD quantity of water reserve by irrigation department. Jalgaon Municipal Corporation has submitted proposal for increasing period of reservation up to year 2048.

II. Information of Scheme in progress

At present, no Scheme is proposed other than the proposal submitted in AMRUT Scheme.

4.4. CONSUMER DETAILS

Connection size	Domestic	Non Domestic	Grand Total
12 MM (1/2")	66515	306	66821
18 MM (3/4")	233	72	305
25 MM (1")	132	10	142
50 MM (2")	5	2	7
75 MM (3")	2		2
100 MM (4")		1	1
Grand Total	66887	391	67278
Data source: Consumer survey data			

III. Problems faced by ULB

3.1 LIMITATIONS OF EXISTING SYSTEM:

The limitations of existing components are address in this chapter for respective components considering,

- suitability for continuing their use in future,
- possibility to increasestheir serviceability by renovation / rehabilitation
- possibility to increasestheir capacity with suitable renovation / rehabilitation

- addition of proposed component in parallel, to augment it for desired capacity
- Replacement with revised parameters & capacity.

3.1.1. SOURCE

Water reservation in Waghurdam,forJalgaon City is of 64 Mm^3 (i.e. equivalent to 175 MLD) Prospective demand as workout and given in **Para 6.5** for design year 2033 = @120MLD & for year 2048 =150 MLD.***Hence there is no limitation of source& it is sufficient to meet the prospective water demand up toultimate design year 2048.***

3.1.2. RAW WATER INTAKE

Refer **Para 2.1.2.** Exiting raw water intake system is designed for 175.34 MLD. ***Hence there is no limitation of RW intake capacities &are sufficient for prospective demand up to ultimate design year 2048.***

3.1.3. RAW WATER PUMPING MACINERY:

Existing 6 nos of pumps (4W+2Sb) was installed under Waghur scheme in 2008. Thses pumpsare likely to complet their useful life of 10 years by 2018 (design base year). Normal life of pumping machinery considered for design is 15-20 years. Also the discarging capacity of 4 pumps in operation (run for 20 hrs) is 108 mld & if run for 22 hrs it can deliver 119.24 mld.

Hence existing pupms can be utilised during intermidiate phase (2018 to 2033) or till completion of their useful life.

4 nos of pump having dischaging capacity of 1355 m3/ hr(each) , operated for @ 22.25 hours are capable to meet prospective demand of 120 MLd by year 2033.

But for prospective demand, In ultimate phase (2033 to 2048), it necessary to replace the same with higher head and install additional 1 pump as proposed below to meet the prospective demand.

4+1 nos of pump having dischaging cap. of 1355 m3/ hr(each),& Head = 81m operated for @ 22.25 hours will capable to meet prospective demand of @150 MLd by year 2048

3.1.4. RAW WATER PUMPING MAIN (RISING MAIN):

Existing Raw water rising main, from Raw water to Aeration fountain, is of 1168 OD (ID of pipe = 1128 mm) mm MS and 10mmthick having length 7325 M.

- Pump Floor RL = 217.000m &RL of water supply sluice = 218.70 m
- Max draw down level In dam = 223.60
- Lip of aeration fountain = 289.50 m
- **Static head In worst case = (289.50 -223.60) = 65.90 m**

The head loss & vel. for various stages of discharge on respective design year is as follows

Design Year	**Pump Parameters**	**Total Disc. In (MLD)**	**Velocity (m/sec)**	**Rate of Head loss m/ km**	**Total Head Loss In 7.325Km**	**Residual Head available at end point (m)**	**Remark**
Existing	**4W+2SB** Q = 1355m^3/hr Head = 75 m Hrs of op. 20	108	1.50	1.09	7.98	75 – (65.90 +7.98) = 1.12 m	
2018 to 2033	**4W+2SB** Q = 1355m^3/hr Head = 75 m Hrs of op. 22.25	120	No change in discharge on increase in operating hrs				
2033 to 2048	**(4+1)W+2SB** Q = 1355m^3/hr Head = 75 m	150	1.88 Permissible upto 2.1 as	2.0	14.65	75 – (65.90 +14.65) = (-) 5.55 m	**Replacement needed with pump of higher**

	Hrs of op. 22.25		per CPHEEO manual table 6.4				**head i.e. 81 m (min)**

3.1.5. RAW WATER FEEDER MAIN (WTP TO ESR/GSR):

1. The existing feeder mains,ranging from 600-1500mm dia is of Pre-stressed concrete (PSC). It was laid underWaghurproject in Year 1998-2008.
2. The line from WTP to Girana GSR premises is repaired in multiple locations, several times by removing the 2-3 PSC pipe at each leakage points and replacing it with MS pipe of desired length.
3. During to water crises, water supply from MBR is managed by cyclic operation of main valve at MBR, which exerts thrust in various section of pure water transmission main, and leads to bursting of line or leakages through pipe joints.
4. During to water crises, water supply from MBR is managed by cyclic operation of main valve at MBR, which exerts thrust in various section of pure water transmission main, and leads to bursting of line or leakages through pipe joints.
5. Losses in transmission Main is as asses during water audit is @ 17 to 18 %
6. The elevation difference between MBR at WTP & FSL of ESRs is much higher, except for Nityanandnagar ESR & DSP ESR. Hence whenever there is drawl for filling low level ESR, pressure in d/s of this connectivity get reduce affecting schedule of D/s ESR. **Hence it is necessary to provide suitable flow & pressure controlling mechanism (FCV & PRV) in system.**
7. There are following authorized direct tapping from feeder main for supplying to distribution network in the command area as there is no ESR.
    a. Supreme colony
    b. Raymond BPS
    c. MIDC ESR Tapping on line to dream land ESR
    d. DSP Chowk
    e. Tapping on near NH crossing to line leading Gendalal ESR

Due to this direct tapping there are frequent pressure drops in feeder main which causes problems in ESR fillings.

8. The repair work is difficult & tedious work in case of PSC pipes.

Hydraulic Flow diagram of Feeder Main & Output table of model run with water demand of 2018 is as below.

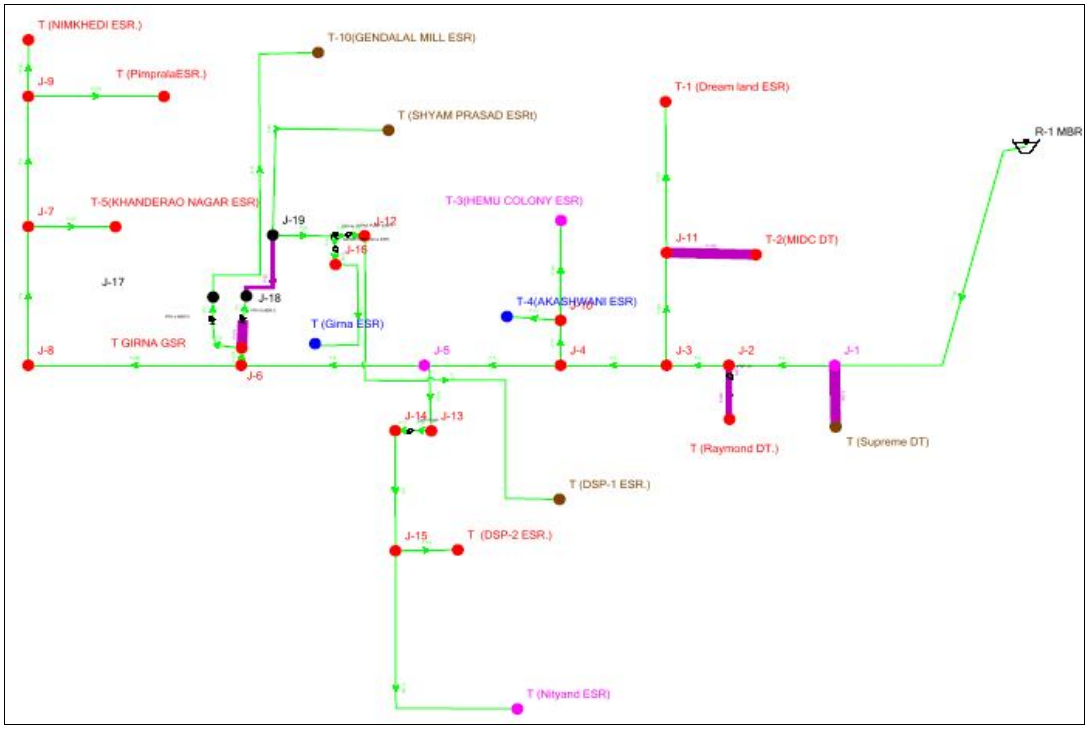


Fig 3.1: Schematic Existing Feeder Main

A] Junction Report

Label	Water Demand Yr.2018 (MLD)	FSL of Tank (m)	Hydraulic Grade (m)	Residual Pressure (m)
T (DSP-2 ESR.)	5.66	267.00	299.94	32.90
T (DSP-1 ESR.)	5.66	260.50	268.81	8.30
T (Girna ESR)	5.48	257.50	268.09	10.60
T (NIMKHEDI ESR.)	5.93	228.00	268.39	40.30
T (Nityand ESR)	4.98	273.50	299.72	26.20
T (PimpralaESR.)	3.77	230.50	268.58	38.00
T (Raymond DT.)	7.90	234.50	286.63	52.00
T (SHYAM PRASAD ESR)	7.41	233.50	236.70	3.20
T (Supreme DT)	3.41	247.00	253.73	6.70
T GIRNA GSR	0.00	238.00	269.66	31.60
T (Dream land ESR)	2.19	234.50	270.60	36.00
T(MIDC DT)	5.31	227.00	266.46	39.40
T(HEMU COLONY ESR)	11.45	245.00	268.99	23.90
T(AKASHWANI ESR)	6.51	253.50	269.27	15.70
T(KHANDERAO NAGAR ESR)	4.18	233.50	268.75	35.20
T(GENDALAL MILL ESR)	8.51	228.50	235.06	6.60

B] Pipe Report

Start Node	Stop Node	Dia. (mm)	Material	Length (m)	"C "value	Flow (MLD)	Vel. (m/s)	Hf (m/km)
R-1 MBR	J-1	1,500	PSC	9,532	140	88.35	0.58	0.164
J-1	J-2	1,500	PSC	1,505	140	84.94	0.56	0.152
J-2	J-3	1,500	PSC	610	140	77.04	0.50	0.127
J-3	J-4	1,200	PSC	1,880	140	69.54	0.71	0.311
J-4	J-5	1,200	PSC	780	140	51.58	0.53	0.179
J-5	J-6	1,000	PSC	875	140	40.94	0.60	0.284
J-6	J-8	800	PSC	2,320	140	13.88	0.32	0.113
J-8	J-7	600	PSC	1,380	140	13.88	0.57	0.461
J-7	J-9	600	PSC	770	140	9.70	0.40	0.237
J-1	T (Supreme DT)	200	Cast iron	947	85	3.41	1.26	18.183
J-2	Raymond BPS	300	Cast iron	329	85	7.90	1.29	11.958
Raymond BPS	T (Raymond DT.)	300	Cast iron	1,323	85	7.90	1.29	11.958
J-3	J-11	1,000	PSC	760	140	7.50	0.11	0.012
J-11	T (MIDC DT)	200	Ductile	254	140	5.31	1.96	16.389
J-11	T (Dream land ESR)	600	PSC	1,800	140	2.19	0.09	0.015
J-4	J-10	600	Steel	475	100	17.96	0.74	1.384
J-10	T-3(HEMU COLONY ESR)	600	Steel	675	100	11.45	0.47	0.601
J-10	T (AKASHWANI ESR)	600	Steel	575	100	6.51	0.27	0.211
J-5	J-13	600	Steel	31.88	100	10.64	0.44	0.525
J-13	DSP BPS	600	Steel	5	100	10.64	0.44	0.525
DSP BPS	J-14	600	Steel	5	100	10.64	0.44	0.525
J-14	J-15	600	Steel	10	100	10.64	0.44	0.525
J-15	T (DSP-2 ESR.)	500	Cast iron	20	100	5.66	0.33	0.396
J-15	T (Nityand ESR)	600	Steel	1,790	100	4.98	0.20	0.129
J-6	T GIRNA MBR Com	1,000	Steel	15.00	100	27.06	0.40	0.251
Girna MBR-3	J-17	450	PSC	10	140	8.51	0.62	0.755
J-17	T (GENDALAL MILL ESR)	450	PSC	3,875	140	8.51	0.62	0.756

Start Node	Stop Node	Dia. (mm)	Material	Length (m)	"C "value	Flow (MLD)	Vel. (m/s)	Hf (m/km)
J-17	T (GENDALAL MILL ESR)	450	PSC	3,875	140	8.51	0.62	0.756
Girna MBR-2	J-18	500	PSC	10	140	18.55	1.09	1.915
J-18	J-19	375	Cast iron	13	100	18.55	1.94	7.778
J-19	Sump	375	Cast iron	7.46	100	11.14	1.17	3.025
Sump	GIRNA BPS (DSP)	450	Steel	5	100	5.66	0.41	0.662
GIRNA BPS (DSP)	J-12	450	Steel	5	100	5.66	0.41	0.661
J-12	T (DSP-1 ESR.)	450	Steel	1,080	100	5.66	0.41	0.662
J-16	T (Girna ESR)	450	Cast iron	20	100	5.48	0.40	0.624
J-19	T (SHYAM PRASAD ESR)	500	PSC	3,400	140	7.41	0.44	0.350
J-7	T(KHANDERAO NGR ESR)	600	Steel	100	100	4.18	0.17	0.093
J-9	T (PimpralaESR.)	800	Steel	200	100	3.77	0.09	0.019
J-9	T (NIMKHEDI ESR.)	600	PSC	1,990	140	5.93	0.24	0.095

- From Junction Report, it can be observer that: As the MBR at WTP is located on higher elevation thanaveragecity level & and there is no pressure controlling mechanism in pure water transmission system. Hence the feeder mainsare always remain pressurized, which leads to leakages though joint. **Hence it is necessary to provide suitable flow & pressure controlling mechanism (FCV &PRV) in system.**This is proposed and explainsinnextchapter titled as “Proposed system”.
- From pipe report (velocity & head loss/km) it can be observed that, existing feeder main has sufficient capacity to cater the prospective demand. **Hence no need to change the same except 1200mm dia line which was intervene in past for several time for repairingleakages.**
- **Some links are required to modify so as to cater the prospective demand maintain hydraulics of system.**

3.1.6. STORAGE RESERVOIRS

A] Limitation Considering Capacity

Table below indicates, Existing water distribution zones, population by 2018, water demand (considering 135 lpcd water supply + permissible losses in dist. network + fire & bulk demand) by 2018, existing capacities of ESR/ GSR linked to respective areas, storage capacity required (considering 33%), excess & deficit in storage capacityetc.

Table 3.1: Capacity Limitation of Existing Reservoirs to Cater Proposed Demand

Name of Exist. Water distribution Zone & ESR/GSR command area (CA)	Contributing Propspective popn In Zone 2018	Contributing Propspective popn In Zone 2033	Contributing Propspective popn In Zone 2048	Total Demand @ ESR 2018 [@ 135 lpcd + 10% losses & prop. Fire demand] (ML)	Total Demand @ ESR 2033 [@ 135 lpcd + 10% losses & prop. Fire demand] (ML)	Total Demand @ ESR 2048 [@ 135 lpcd + 10% losses & prop. Fire demand] (ML)	ESR cap reqd. 2018 (ML)	ESR cap reqd. 2033 (ML)	ESR cap reqd. 2048 (ML)	Existing Storage Capacity (ML)	surpls/ deficit In 2018 (ML)	surpls/ deficit In 2033 (ML)	surpls/ deficit In 2048 (ML)
Nimkhedi ESR CA	37132	49940	65455	5.96	7.97	10.40	2.0	2.7	3.5	2.8	0.8	0.1	-2.7
Gendalaal ERS	47365	68838	96789	7.96	10.83	15.10	2.7	3.6	5.0	2.0	-0.7	-1.6	-5.7
SHAMAPRASAD UDYAN ESR CA	42532	50129	58813	7.00	8.26	9.71	2.3	2.8	3.2	2.8	0.5	0.0	-2.8
Dreamland ESR CA	37717	42985	47784	6.26	7.19	8.04	2.1	2.4	2.7	2.8	0.7	0.4	-2.0
MIDC	35540	48991	63696	5.42	7.48	9.72	1.8	2.5	3.2	Direct Tapping / Boostin g			
Supreme D.T + Raymond BPS	79428	96539	114614	12.27	14.87	17.67	4.1	5.0	5.9				
Nityanand ESR CA	41486	56108	71958	6.72	9.02	11.50	2.2	3.0	3.8	2.8	0.6	-0.2	-3.3
Dsp Twin ESR CA	25875	38010	52016	4.54	6.50	8.79	1.5	2.2	2.9	5.6	4.1	3.4	1.2
Girna ESR CA	43640	57613	73257	7.45	9.75	12.29	2.5	3.3	4.1	2.8	0.3	-0.5	-3.8
Akaashwaani ESR CA	36490	42294	45951	6.67	7.83	8.75	2.2	2.6	2.9	2.5	0.3	-0.1	-2.6
Sindhi col ESR C.A	49665	54920	56795	8.21	9.19	9.68	2.7	3.1	3.2	3.9	1.2	0.8	-2.1
Pimprala & Khanderao ESR C.A	47977	68718	94558	7.96	11.19	15.23	2.7	3.7	5.1	5.6	3.0	1.9	-2.1
Total	**524847**	**675085**	**841686**	**86.42**	**110.08**	**136.88**				**33.6**			

From Table it can be observed that,

- In 2018 , there is deficit in Gendalal CA, where as it is excess in DSP ESR CA (considering utilisation of both ESRs)
- In 2033, this deficit increases and also there is deficit in other command areas except Pimprala&Khanderao ESR CA
- In 2048, The deficit again increases in almost all areas except, DSP ESR CA

- ***Hence it is necessary to re-structure existing water distribution command areas so as to utilise existing storage capacity for the area closed to ESR/ GSR location & proposes new storage reservoir in newly developing area.***

B] Limitation Considering Age & Condition

Table 3.2: Age Limitation of Existing Reservoirs to Cater Proposed Demand

Statement of Existing Storage Reservoir & Year of Construction						
Command Area Name	**Existing Storage capacity (ML)**	**Yr. Of Construction**	Age In Year 2018	Age In Year 2033	Age In Year 2048	Remark
Nimkhedi Shivar	2.80	Waghur Prj. (1998-2008)	15	30	45	
Akashwani ESR	2.50	**1981**	37	52	67	Rehabilitation proposed
DSP Twin ESR	2.80	**DSP OLD. 1981**	37	52	67	Rehabilitation proposed
	2.80	DSP New. (1998-2008) Not in operation	15	30	45	
Nityanand ESR -	2.80	Waghur Prj. (1998-2008)	15	30	45	
Khanderao ESR	2.80	Waghur Prj. (1998-2008)	15	30	45	
Gendalal ESR	2.00	**1981**	37	52	67	Rehabilitation proposed
Shyamaprasad ESR	2.80	Waghur Prj. (1998-2008)	15	30	45	
Pimprala shivar ESR	2.80	Waghur Prj. (1998-2008)	15	30	45	
Girna ESR	2.80	Waghur Prj. (1998-2008)	15	30	45	
Girna GSR 1 &2	2.25	**1981**	Deteriorating condition			Proposed to Discard
Girna GSR 3	4.50	**1981**	37	52	67	Rehabilitation proposed
Girna GSR 4	3.50	Waghur Prj. (1998-2008)	15	30	45	
Sindhi Colony ESR	3.9	Waghur Prj. (1998-2008)	15	30	45	
Dreamland ESR	2.8	Waghur Prj. (1998-2008)	15	30	45	Rehabilitation proposed
Total	43.85					

Storage reservoirs was constructed either during Aug. of scheme with Girna river source, in 1981 or during Augmentation of scheme with Waghur Dam as source in year (1998 to 2008). ***The reservoirs constructed under old scheme (Girna) shall complete their useful life by 2033, hence it is necessary to rehabilitate / strengthen them to increase their service life for next 20 to 30 years***

Photographs above indicate deteriorating condition of GSR 2x1.25 ML

C] Limitation Considering Staging Height

Table 3.3: Staging Height Limitation of Existing Reservoirs

Summary Controlling levels at Proposed and Existing ESR								
S.No	Name of ESR	Level as per Contours					Highest point (HP)	RL Diff (HP- GL)
		GL (m)	LWL (m)	FSL (m)	FWL (m)	St. Ht. (m)		
1	Gendalal Mill	210.00	222.50	228.50	6	12.50	211.100	-1.10
2	Akashwani	231.00	246.50	253.50	7	15.50	232.000	-1.00
3	DSP Chowk (New)	241.00	262.00	267.00	5	21.00	248.000	-7.00
	DSP Chowk (old)	241.00	253.50	260.50	7	12.50	237.470	3.53
4	Nityanand Nagar	254.00	266.50	273.50	7	12.50	257.350	-3.35
5	Sindhi Colony	223.00	238.00	245.00	7	15.00	229.340	-6.34
6	Khanderao Nagar	214.00	226.50	233.50	7	12.50	214.120	-0.12
7	Pimprala Shivar	213.00	224.50	230.50	6	11.50	216.000	-3.00
8	Nimkhedi Shivar	209.00	221.00	228.00	7	12.00	210.500	-1.50
9	Girna Takki premises	238.00	250.50	257.50	7	12.50	238.000	0.00
10	Shyama Prasad	214.00	226.50	233.50	7	12.50	218.830	-4.83
11	Dreamland	215.00	227.50	234.50	7	12.50	218.000	-3.00

From above table it can be noted that, staging height of mostofexistingESRs is ranges from 11.5 to 15.5 m. With this staging height & highest points in command area,higher than the GL of ESR, it is difficult to get minimum residual head. Staging height of some of the existing ESRs' is not enough to deliver minimum head of 8m in its own command area.

Hence restructuring of ESR command area is necessary to get minimum residual head of 12.0 m at consumer end.

While restructuring higher pockets identified are either shifted to nearby zone having ESR located at higher elevation or proposed to feed through new ESR of sufficient staging height.

3.1.7. DISTRIBUTION SYSTEM :

A. DIRECT TAPING: Areas as mentioned in **Para 3.1.5 (7)**is served through direct tapping as there is no ESR in this command area. Such areas are required to be shifted on any nearby Existing ESR or served by proposing new ESR.

B. OLD PIPE NETWORK: Refer Table given at Para 2.3. About 11% pipe line is of **Cast Iron** Pipe materiallaid(in 1981), during augmentation of Water supply scheme with Girna source. Carrying capacity of CI Pipe goes on decreasing which affects the efficiency of the distribution network. Percentage (%)**PVC pipe** laid in various decades are as under. (Source: Network developed in respective decade is demarcated by JMC authorities)

- During 1978 to 1990 Approx. 31 %
- During 1991 to 2003 Approx. 42 %
- During 2004to 2013 Approx. 27 %

C. LIMITATION OF DIAMETER OF PIPE: As per CPHEEO Manual 1999, pipe dia less than 100 mm should not be used in urban distribution network. Hence service lines of lower than this Dia are required to be discarded.

D. BRANCHED SYSTEM:Most of the Pipe network is observed to be laid in branch pattern as per development trendin city. Hence consumer at tail end as well as located at higher elevation (within the CA) receive less water and at lower pressure

E. MATERIAL OF PIPE:About 88% of pipe length is of AC; GI, & PVC pipe material, hence physical losses are much more.***Hence JCMC vide letterNo. JCMC/projects 06/2014, dt. 22-04-2014 directed to replace old PVC, AC & GI lines with new pipe material. (Copy attached Refer Annexure-4)***

F. INSUFFICIENT PRESSURE HEAD: There is no consumer satisfaction due to, low pressure and irregular water supply at the consumers' end.

G. NO ACCOUNTABILITY: Not possible to monitor or measured quantum of water actual used by particular consumer as there is no metering installed in system. It is also not possible to measured actual losses /theft etc.

H. MIXED NETWORK: The distribution networks for the different ESR CA are mixed in the existing system. Due to this the operation and maintenance work becomesasit becomes difficult to detect the actual source of supply.

I. TARRIF STRUCTURE: As the water tariff is on flat rate basis, consumer using less Water has to pay more or consumer using more water has to pay less.

J. HEAVY SYSTEM LOSSES: Refer Table given in Para 3.1.8, indicating NRW calculation in existing system works out on the basis of water audit & DMA study carried out recently by the consultant (M/s ADCC Info tech Nagpur). Losses in distribution network is @ 56 %

3.1.8. WATER AUDIT RESULTS: SYTEM LOSSES (NRW CALCULATION):

From table given below it can be noted that there are total @ 72 % physical losses in system. Hence it is necessary to rehabilitate existing distribution system considering following points,

- Control higher pressure in feeder main with provision of suitable flow & pressure controlling mechanism.
- AC, GI pipe material should be discarded
- CI & PVC pipe material should be replace in phased manner
- Installation of flow meter at all major components
- Replacement of existing House service connection with MDPE pipe material
- Installation of bulk &consumer meter in distribution system for accountability & monitoring.

Rate of Supply at Source and at consumer end

System Losses as Per Water Audit & DMA Study conducted In Yr. 2014-15

A	B	C	D	E
System Input Volume (ML) = 90.3	Authorized Consumption (ML) (25.6+0) = 25.60 28%	Billed Authorized Consumption (ML) (0 + 25.6) = 25.6 28%	Billed Metered Consumption (including water exported) (ML) 0.000	Revenue Water (ML) 25.60 28%
			Billed Un-metered* Consumption 25.6 28.00%	
		Unbilled Authorized Consumption (ML) (0 + 0) = 0.000 0.00%	Unbilled Metered Consumption(ML) 0	Non-Revenue Water (ML) 64.70 72%
			Unbilled Un-metered Consumption (ML) 0.000 0.00%	
	Water Losses (ML) 65.00 72%	Apparent Losses (ML) (0 + 0) = 0	Un-authorized Consumption (ML) 0.000	
			Metering Inaccuracies (ML) 0	
		Real Losses (ML) (8.12+6.518+ 50.35)= 65.00 72%	Leakage on RW Transmission (ML) 8.120 8.99%	
			WTP Losses (ML) +	
			Leakage on PW Transmission (ML) 6.518 (6.518)/ +(90.3) 7.22%	
			Leakage on Service Connections up to point of Customer metering (ML) 50.350 (50.35)/ +(90.3) 55.76%	

IV. Recovery percentage of Operation and Maintenance costs

JALGAON CITY MUNICIPAL CORPORATION JALGAON									
Annexure -I Statement of BULK METERS PROPOSED									
S.No.	Head	Expenditure			Proposed	Revenue income			Proposed
		2011-2012	2012-2013	2013-2014	2015-2016	2011-2012	2012-2013	2013-2014	2015-2016
1	Salary	97123945	108385797	120291320	150000000	150478850	159239889	150074260	296970000
2	Daily wages	7692484	5391070	7309062	8500000				
3	Electri Bill	43866337	61181060	43903038	95000000				
4	Water Charges Irrigation and Other (including Pending Payments)	14761827	26951555	5342710	25300000				
5	Chemicals	8570676	7146773	5657554	10000000				
6	Pipe Line Maintenance	11047467	8270348	4994314	26000000				
7	Water testing Fees				210000				
8	Machinary maintenance	46830	1668221	202249	1500000				
	Total Rs.	**183109566**	**218994824**	**187700247**	**316510000**	**150478850**	**159239889**	**150074260**	**296970000**

Water Supply Benchmarking indicators :

S.No	WATER SUPPLY INDICATOR VALUES	Unit	FY 2014-2015
1	Coverage of water supply connections	%	60
2	Per capita supply of water (At consumer end)	Lpcd	102
3	Extent of metering of water connections	%	0
4	Extent of Non Revenue Water	%	72
5	Continuity of water supply	Hours/Day	0.50
6	Efficiency in redressal of customer complaints	%	77
7	Quality of water supplied	%	100
8	Cost recovery in water supply services	%	90
9	Efficieny in collection of water supply related charges	%	75

V. Problems faced by Jalgaon Municipal Corporation

A. RAW WATER FEEDER MAIN (WTP TO ESR/GSR):

9. The existing feeder mains, ranging from 600-1500mm dia is of Pre-stressed concrete (PSC). It was laid under Waghur project in Year 1998-2008.

10. The line from WTP to Girana GSR premises is repaired in multiple locations, several times by removing the 2-3 PSC pipe at each leakage points and replacing it with MS pipe of desired length.

11. During to water crises, water supply from MBR is managed by cyclic operation of main valve at MBR, which exerts thrust in various section of pure water transmission main, and leads to bursting of line or leakages through pipe joints.

12. During to water crises, water supply from MBR is managed by cyclic operation of main valve at MBR, which exerts thrust in various section of pure water transmission main, and leads to bursting of line or leakages through pipe joints.

13. Losses in transmission Main is as asses during water audit is @ 17 to 18 %

14. The elevation difference between MBR at WTP & FSL of ESRs is much higher, except for Nityanand nagar ESR & DSP ESR. Hence whenever there is drawl for filling low level ESR, pressure in d/s of this connectivity get reduce affecting schedule of D/s ESR. **Hence it is necessary to provide suitable flow & pressure controlling mechanism (FCV & PRV) in system.**

15. There are following authorized direct tapping from feeder main for supplying to distribution network in the command area as there is no ESR.

    a. Supreme colony

b. Raymond BPS
c. MIDC ESR Tapping on line to dream land ESR
d. DSP Chowk
e. Tapping on near NH crossing to line leading Gendalal ESR

Due to this direct tapping there are frequent pressure drops in feeder main which causes problems in ESR fillings.

16. The repair work is difficult & tedious work in case of PSC pipes.

B. STORAGE RESERVOIRS

Limitation Considering Capacity

Table below indicates, Existing water distribution zones, population by 2018, water demand (considering 135 lpcd water supply + permissible losses in dist. network + fire & bulk demand) by 2018, existing capacities of ESR/ GSR linked to respective areas, storage capacity required (considering 33%), excess & deficit in storage capacity etc.

C. DISTRIBUTION SYSTEM :

i. DIRECT TAPING: Areas as mentioned in **Para 3.1.5 (7)** is served through direct tapping as there is no ESR in this command area. Such areas are required to be shifted on any nearby Existing ESR or served by proposing new ESR.

ii. OLD PIPE NETWORK: Refer Table given at Para 2.3. About 11% pipe line is of **Cast Iron** Pipe material laid (in 1981), during augmentation of Water supply scheme with Girna source. Carrying capacity of CI Pipe goes on decreasing which affects the efficiency of the distribution network. Percentage (%) **PVC pipe** laid in various decades are as under. (Source: Network developed in respective decade is demarcated by JMC authorities)

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During 1991 to 2003 Approx. 42 %
During 2004 to 2013 Approx. 27 %

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iv. BRANCHED SYSTEM: Most of the Pipe network is observed to be laid in branch pattern as per development trend in city. Hence consumer at tail end as well as located at higher elevation (within the CA) receive less water and at lower pressure

v. MATERIAL OF PIPE: About 88% of pipe length is of AC; GI, & PVC pipe material, hence physical losses are much more. **Hence JCMC vide letter No. JCMC/projects 06/2014, dt. 22-04-2014 directed to replace old PVC, AC & GI lines with new pipe material. (Copy attached Refer Annexure-4)**

vi. INSUFFICIENT PRESSURE HEAD: There is no consumer satisfaction due to, low pressure and irregular water supply at the consumers' end.

vii. NO ACCOUNTABILITY: Not possible to monitor or measured quantum of water actual used by particular consumer as there is no metering installed in system. It is also not possible to measured actual losses /theft etc.

viii. MIXED NETWORK: The distribution networks for the different ESR CA are mixed in the existing system. Due to this the operation and maintenance work becomes as it becomes difficult to detect the actual source of supply.

ix. TARRIF STRUCTURE: As the water tariff is on flat rate basis, consumer using less Water has to pay more or consumer using more water has to pay less.

x. HEAVY SYSTEM LOSSES: Refer Table given in Para 3.1.8, indicating NRW calculation in existing system works out on the basis of water audit & DMA study carried out recently by the consultant (M/s ADCC Info tech Nagpur). Losses in distribution network is @ 56 %

VI. GAP Analysis Study of Source/treatment/storage/distribution system

Gap Statement Attached Seprately.

VII. Necessity of Scheme

Sr. No.	Particulars	Observation	Recommendations
1	**SOURCE: WAGHUR DAM**	• The Existing Waghur Scheme is design for Ultimate Stage (Yr-2030) considering design population of 876700 Souls, rate of supply as 200 LPCD. Water Demand thus worked out is = 175.34 ML/Day i.e. @ 64 Mm3/Year. Water reservation accorded in Waghur Dam by Irrigation department will fulfils demand. • Augmentation scheme is design for projected population 841250 souls in Ultimate stage 2048, considering 135 LPCD. Gross demand of ultimate stage is 149 MLD i.e. 54.40 Mm3. Which is less than present reservation of 64 Mm3, hence present reservation of raw water is sufficient for ultimate stage (Yr-2048).	NIL
2	**WATER REQUIREMENT**	• Theoretical Raw water requirement of Jalgaon City for population of (2015) =	NIL

	& PRESENT SUPPLY	490320 souls with 135 lpcd rate of supply and 15% losses is works out to be @ 77.87 MLD. & for immediate stage (base year) 2018, it is @ 91 MLD considering population of 524650 souls • Present raw water lifting is @ 90-95 MLD, observed during study period of water audit, which is higher than required. • System losses were observed during study period are @ 72 %, which is much higher than 15% Permissible losses Hence consumer is getting water at lesser LPCD rate than designed i.e. Only 50-70 LPCD Ref para 2.3 • Water supply to consumer is once in 3 days	
3	**INTAKE PIPE (WAGHUR DAM TO RAW WATER PUMP HOUSE):**	• Flow meters Installed On intake Pipe line are not in working condition, needs repairing	• Periodic maintenance of electro-mechanical part will avoid deteriorating of same & reduce energy charges
4	**RAW WATER PUMP HOUSE**	• Civil structure of exiting RW pump House is @10 years old hence is in good condition. • Minor Leakages are observed through suction & delivery piping which can be rectified • Minor Crakes In wall are observed near delivery piping, which needs repair • Comments regarding electro-mechanical components are incorporated In Energy audit DPR.	
5	**RAW WATER RISING MAIN**	A photograph given below indicates the visible losses through it. • As per water audit, losses worked out through raw water rising main are @ 8.99%	• Present NRW can be reduce by minimizing physical Losses in RW piping with, proper maintenance of leaking joints, leaking valve & patrolling to check unauthorized tapping etc.
6	**WATER TREATMENT PLANT**	• It is commissioned in year 2008, Hence over all condition of plant is good • Recycling arrangement is provided and in operation to recycle quantum of back wash water generated in plant. Same is again pump to peripheral channel of	

		Aeration fountain; hence there is no wastage of backwash water from plant. • Back wash is taken in 24 Hrs cycle as per std. practice	
7	**RAW & PURE WATER PUMPING MACHINERY**	Broad observations for these components can be referred from DPR of Energy audit.	
8	**PURE WATER PIPING (MBR TO ESR)**	• The existing Transmission system from the MBR to ESR is consists of Pre stressed concrete pipe (mild steel pipes are laid at intermediate change for crossing and as repayment during repair). • Water from MBR is supplied by manually operating main control valve at MBR in cyclic order. It is to maintain the demand-supply scenario at ESR & further to consumer. • Due to frequent variation in quantum & pressure in system, there are frequent occurrences of leakages. • During time of operating of Supreme tapping, Raymond tapping, DSP on line booster & DSP tapping etc for direct distribution, the flow and pressure pattern gets affected. • As per water audit, losses worked out through PW water transmission main are @ 6.5 - 7.5% • The existing Transmission system from the MBR to ESR is consists of Pre stressed concrete pipe (mild steel pipes are laid at intermediate change for crossing and as repayment during repair). • Water from MBR is supplied by manually operating main control valve at MBR in cyclic order. It is to maintain the demand-supply scenario at ESR & further to consumer. • Due to frequent variation in quantum & pressure in system, there are frequent occurrences of leakages. • During time of operating of Supreme tapping, Raymond tapping, DSP on line booster & DSP tapping etc for direct distribution, the flow and pressure pattern gets affected. • As per water audit, losses worked out	• NRW can be reduce by reduction in physical Losses in PW piping by proper maintenance patrolling, converting unauthorized connection in legal connection & installing consumer meter to measure the quantum. • There should not be any Direct tapping from Main feeder and all existing CA / BPS connected to feeder main are proposed to shift on ESR or sump to improve the system flow & pressure • JMC should install bulk meter on these lines to measure daily consumption.

		through PW water transmission main are @ 6.5 - 7.5%	
9	**PW STORAGES & DISTRIBUTION SYSTEM**	• Water losses, in Distribution system from ESR to Consumer end is about @ 50 MLD i.e. -55.76 % (on system input) Which is much higher than permissible 10-15% • These losses are mainly due to, Old PVC piping @ 86%, Statement of pipe laid during 1978 to 2013 is attached as annexure _____. This piping needs to be replaced in phased manner as suggested in report of hydraulic modeling. • During DMA study it is also observed that, due to uncertainty of supply, most of consumer are using individual pump to draw water from water tap and not allowed to consultant to install consumer meter to record the actual consumption. The % of such consumer in each DMA is @ 60-70%. • Consultants audit team recorded the consumption of such consumer through volumetric measurement. While analyzing the DMA data it is noted that drawl by installing individual small pump is @ _____ times more than normal.	
10	**Distribution System**	Note: Rehabilitation of distribution system is address in Chapter "Hydraulic modeling". Hence cost of rehabilitation of this is considered separately. Existing AC, PVC & GI pipe network is proposed to be replaced with HDPE pipe material of suitable dia.	
11	**Metrization at Raw/ Pure water pumping stations**	Under Sujal Nirmal Abhiyan, Electromagnetic and Mechanical flow meters are provided and installed at various locations in raw and pure water transmission mains to calculate the flow accurately. Advantage of Metrization is to fix accountability of raw water put to the treatment, pure water produced, and quantum of pure water receipt in to ESR, and distribution system, quantum of pure water distribution. Flows are recorded according to the meter readings. Electromagnetic flow meter should be installed at the source which is said to be more accurate. Metrization helps to find	

		gap between raw water put in to the system,	
12	**Metrization at consumer end**	• It is therefore recommended to install the consumer meters at consumer end to accurately measure the consumption and billed accordingly on monthly basis instead of annual billing. This will increase the revenue of the council and self sustainability of the water supply system.	
13	**Replacment of House Service Connection**	• **Strategy** • 100% of the connections should be equipped with the accurate calibrated flow meter. It has been proposed to install meter boxes where they are required for security and protection purpose. • The number of connections to be equipped with a meter is based on the results of the customer survey. • 100% of the active House Service Connections shall be replaced with MDPE pipes. • The new meter should be installed near the property boundary. In these conditions, the average length of MDPE pipes from the service pipe to the meter should be kept around 5 m. • The connection of the service main shall be made with use of Saddle with strap on existing metallic pipes and new DI pipes. Ball valve from shall be installed upstream the meter of all consumers of 15 & 20 mm size connections. • HSC will be connected to the main pipe through a saddle and various diameter compression fittings. **Saddle V/s Ferrule :** • In order to reduce drastically the risk of leakage and make the house service connections more sustainable, it is proposed to use an innovative product on metallic pipes – the saddle with strap – to replace the use of the ferrule in the metallic pipes. • The several advantages of this product proven throughout the world (Casablanca– Morocco, Bucarest – Romania, France…) and In Pilot area of 24x7 project in Nagpur where the	• Easiness of installation • A single product whatever the outer diameter and nature of the pipe (PE, CI, DI…). • Good quality of materials which guarantees a life time equal to those of the pipes. • Reduced risk of leakage • Easier store management due to reduced number of different strap diameters (up to 175mm or 350mm dia). • In addition, the operator has the opinion that under 24x7 and pressurized supply, ferrule connections must be completed abandoned since there is a strong risk of leakage at the ferrule point due to the difficulties to install them properly on the pipe. • On PE pipes, it is proposed to use electro-fusion saddles which are 100% leak proof and less expensive than saddle with strap.

		replacement of HSC has resulted in to the improvement in pressure.	
14	Revised Tariff	Poor Tariff leads to poor cost recovery and inadequate budget for maintenance of assets. It results in deteriorating efficiencies. To improve the existing situation in terms of infrastructure and level of service for Malkapur Water Supply System tariff reforms shall be implemented on urgent basis. Establish the new tariff setting with a view to provide for full cost recovery of water supply operation in the town from efficient billing and collection of water charges from consumers. The existing tariff is just sufficient to meet the operating expense. To revise the old tariff for full cost recovery with minimum burden on poor, the telescopic tariff structure has to be adopted for water conservation and minimum charges to ensure the recovery of operating expenses.	The new tariff structure should be decided on the following principles. • All un-metered connection needs to metered (consumer meters are proposed) • Water Bills on monthly basis. • Consumer Category wise billing tariff • Complete Meterization need to introduce telescopic tariff structure. • Water Tariff for full cost recovery for sustainable water supply system. • Subsidized Tariff to poor and low domestic consumption up to 50 Lpcd. • Tariff at cost for domestic consumption up to 70 lpcd. • Premium Tariff for domestic consumption beyond 70 Lpcd and non domestic usage. • Tariffs are sufficient to meet Operating expenses and to improve the existing situation in terms of infrastructure and level of service.
15	**Central Monitoring System**	i. To provide continuous real time data monitoring & storing from council head office for to monitor water flows at each UGR & water inventory at Reservoirs. ii. Water flow / discharge from Raw / Pure Water to various ESRs. iii. To ensure the balance between incoming & outgoing flow at each ESR location. iv. To provide levels data each reservoirs continuously.	

		v. Residual chlorine content in water at WTP/ ESR vi. Daily flow for all ESRs / WTP location by graphics display. vii. Graphical trending diagrams of water balance (Pie Chart) for all UGRs / Reservoirs. viii. Water Audit charts ix. To provide alerts, in case of emergency, to the appropriate authorities to quickly initiate actions for disaster management. x. Sending alarm SMS messages in case emergency to council engineers to connect them with the system on 24x7 basis. xi. To generate, store and print valuable data regarding water distribution network in, easy to analyze, digital form which can be used for distribution chain optimization. xii. Generation of bulk water audit report (daily basis)	

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VIII. Proposed Schem : AMRUT

6.1. POPULATION PROJECTION:

6.1.1. AS PER CPHEEO PRACTICE

- The methods used in the projections were **Incremental Increase method, Arithmetic Increase Method & Geometric Progression as per the normal practice given in CPHEEO Manual.** However for designing the project component, the population forecast workout with average of the Incremental Increase and Arithmetic Incremental method is considered**as per the directives of Chief Engineer (MJP) Refer (For Detailed Calculation & copy of letter Refer Annexure-1)**
- The scheme is designed for next 30 years, to cater the ultimate stage (2048) prospective water demand.

Table 6.1: Projected Population

Year	Projected Population				Population Adopted (As works out by PMC)
	Incremental Increase method	**Arithmetic Increase Method**	**Average of Arithmetic Increase & Incremental Increase**	**Geometric Progression Method**	
2018	528972	520238	524605	581512	**524650**
2033	700498	648832	674665	959935	**674700**
2048	905051	777425	841238	1584619	**841250**

6.1.2. POPULATION APPROVED BY JMC & PMC

The population fore cast Calculation as mentioned above was discussed with in-charge of JMC & PMC in **Joint meeting dt. 13-11-2014** and same was approved by them. Copy of MoM is attached herewith as **Annexure No. 5**

6.1.3. POPULATION OF FRINGE VILLAGES:

Table 6.2: Projected Population

NAME OF VILLAGE	POP'N 2011	POP'N 2018	POP'N 2033	POP'N 2048	INCLUDED IN:
Savkhedekh. &bh.	4840	6340	10334	16534	PIMPRALA ESR
Mohadi	4102	5415	8826	13504	NITYANAND ESR
Kusumbhe	7674	9593	14677	21282	SUPREME ESR
Total	**16616**	**21348**	**33837**	**51320**	
Note :-1) 2011popn. is taken as per the data form web site of census dept. www.censusindia.gov.in 2)Population Projected is works out for these villages as per the growth of adjoining wards in JMC area					

Note: The water demand of the fringe population is considered directly on the ESR's.

6.2. LAND USE PATTERN (DP PLAN):

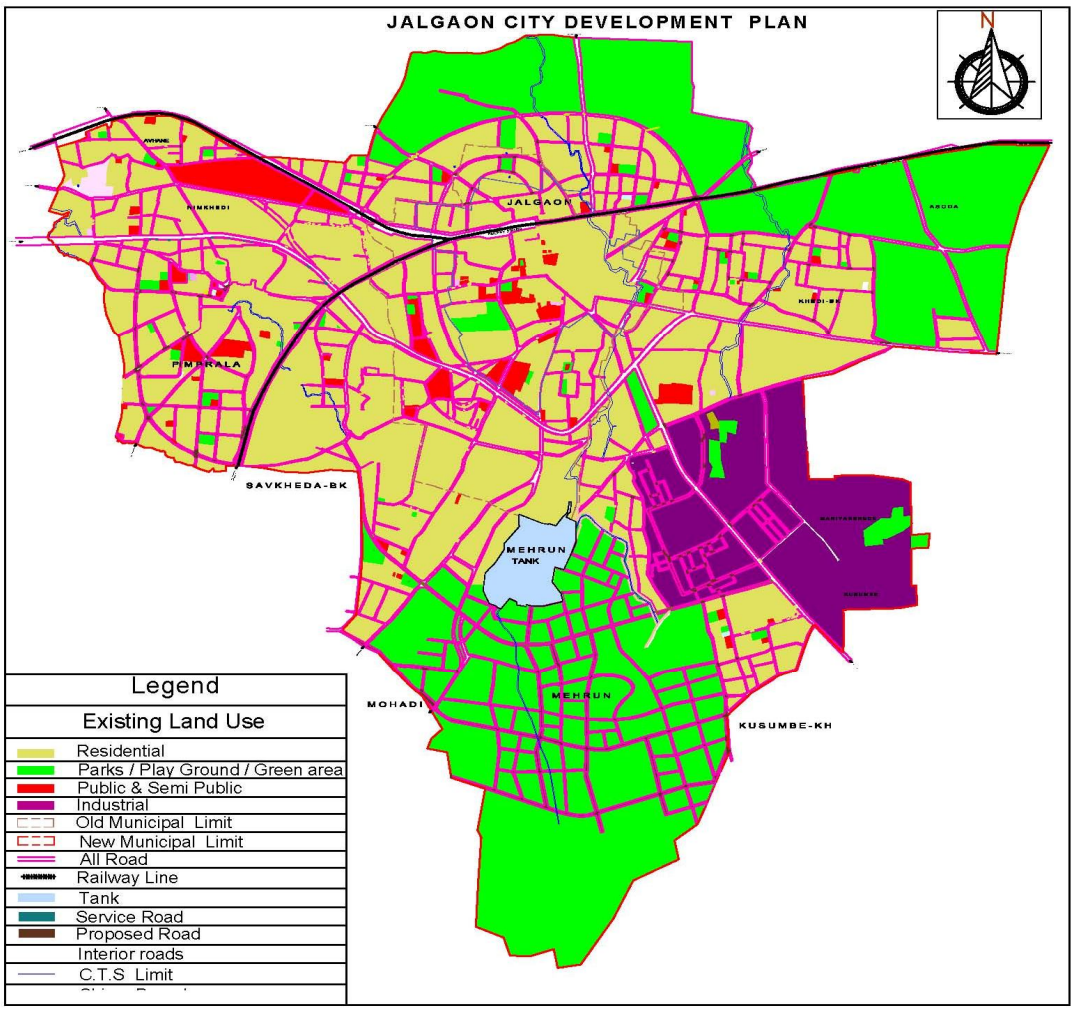

Fig 6.1: DP showing Proposed Land Use 2011

Table 6.3: Proposed Land Use 2011

Land Use	DP plan 1993 (Old Municipal limit – 1983)		Proposed land use 2011	
Land Use Type	Area (A-1) in hectares	%	Area (A-2) in hectares	%
Residential	164.97	14.14	2847.12	50.1355
Commercial	19.01	1.63	53.45	0.94121
Industrials	693.27	59.41	799	14.0698
Public Semi – Public	84.73	7.26	173.61	3.05713
Public utility	8.22	0.7	34.36	0.60505
Transport & Communication	196.75	16.86		
i)Roads			444.49	7.82711
ii)Railways			37.37	0.65806
Park, open space & Playgrounds			102.21	1.79984
Total development area			4491.61	
Water Bodies			100.62	1.77184
Agriculture Land			1086.62	19.1345
Total	**1166.95**	**100**	**5678.85**	**100**
Grand Total (A-1) +(A-2)	**6845.80**			

6.3. LPCD Rate [Adopted For Different User]

LPCD Rate Adopted for Different User is as per Para 2.8.3 of CPHEEO Manual

Table 6.4: LPCD Rate for Different User

USER	LPCD rate
Residential	135 Lpcd
Commercial & Institutional	
1. Schools/colleges	45
2. Cinema Theatre	15
3. Offices	45
4. Hospital (not exceeding 100 bed)	340
5. Lodge	180
6. Restaurants	70
7.Hostels	135
Industrial	45
Railway	As per actual provided by JMC

IX.

5.5. SUMMARY OF WATER DEMAND:

Table 6.5: Prospective water Demand

Particulars	%	Immediate stage	Intermediate stage	Ultimate stage	Unit
Design year		**2018**	**2033**	**2048**	
Population (Jalgaon City)		**524848**	**675088**	**841687**	**souls**
Population (3 nos of Fringe Village)		**-**	**33837**	**51320**	**souls**
Demand calculations					
City Water demand @135 lpcd rate		70.85	91.14	113.63	MLD
Fringe Village demand @70 lpcd rate			2.37	3.59	MLD
Fire demand		2.29	2.60	2.90	MLD
Bulk demand		4.21	5.34	6.65	MLD
Railway demand		0.41	0.49	0.59	MLD
Net demand		**77.76**	**101.94**	**127.36**	**MLD**
Losses calculations					
Distribuition Losses	10%	8.64	11.32	14.15	MLD
Total demand at consumer end		**86.40**	**113.26**	**141.51**	**MLD**
Transmission Losses	2%	1.76	2.31	2.89	MLD
Total demand at Storage reservoir		**88.16**	**115.57**	**144.40**	**MLD**
WTP (process) Losses	2%	1.80	2.36	2.95	MLD
Total demand at WTP		**89.96**	**117.93**	**147.35**	**MLD**
Raw water Losses	1%	0.91	1.19	1.49	MLD
Total Raw water demand		**90.87**	**119.12**	**148.84**	**MLD**
Say		**91.00**	**120.00**	**149.00**	

Notes: 1) Fire demand is calculated as per formula given in CPHEEO Manual 1999

FD (In KL**) = 100(P)$^{0.5}$;**whereP = population in thousands

2) Demand of minor commercial, institutional & industrial consumer is considered to be included in 135lpcdrates; however demand for Identified bulk consumer (commercial, institutional &industrial)is taken separately on the basis of data of consumer survey data

3) Demand of railway is taken as letter Recd. From Rly. to JMC [copy attached as Annexure 6)

5.6. PROPOSED COMPONENTS:

5.6.1. SOURCE & RAW WATER INTAKE:

Refer Para 3.1.1 & 3.1.2. Existing system, structure and capacities are sufficient to cater prospective demand till 2033 & 2048.

5.6.2. RAW WATER PUMPING MACHINERY:

Refer Para 3.1.3 Existing pumping machinery can cater the prospective water demand up to 2033, by running the existing 4 pumps for additional hrs.

To cater ultimate pumping demand, it is necessary to replace the existing pumping machinery with new pumps of higher design head.

5.6.3. RAW WATER PUMPING MAIN:

Refer Para 3.1.4, Ext. pumping main can be utilized to cater the prospective water demand up to 2048.

Pumps of higher head as proposed to take care of additional frictional losses develop due to increased prospective demand.

5.6.4. WATER TREATMENT PLANT:

Exiting design capacity of WTP is 130 MLD. Design capacity required for prospective demand by 2048 is 150 MLD.

Hence WTP capacity is required to enhance by 20 MLD during ultimate phase (2033-2048). This can be done as follows,

a) Either by augmentation inofexisting filter plant, clarifier and related componentswith**Modern technology** to enhance its capacity

b) Or by introducing New Conventional unit of filter plant, clarifier and related components of 20 MLD capacities, in parallel to existing units.

5.6.5. FEEDER MAIN, STORAGE RESERVOIR & DISTRIBUTION SYSTEM:

Existing system is analyzed for the present as wellas prospective requirement and suitable rehabilitation &augmentation for above components is proposed considering following aspects,

- Restricting of command area & isolation of network which can be cater the prospective demand with utilization exiting components to the maximum extent.

- Rehabilitation & strengthening of existing components to increase their service life,
- Rationalization of pumping stations & pumping capacity machinery
- Rehabilitation / replacement proposed to reduce present NRW
- Few components proposed to discard,which area not suitable,either due to design constraints or their deteriorating condition or those completedtheir useful life,
- Augmentation proposed to cater the prospective demand by 2018, 2033 & 2048
- Augmentation proposed for proper monitoring & equitable distribution
- Enhancement of distribution network in un-covered portion (for 100% coverage as per service level bench Mark of MoUD)
- Ultimately,modification suggested considering requirement for switching over, from intermittent supply to 24x7 water supply,

xi. Main Features of the Scheme :

S.No.	Heading	Details
1	Name of the Scheme	Jalgaon Water Supply Scheme Under AMRUT ABHIYAN
2	Taluka	Jalgaon Dist Jalgaon
3	District	Jalgaon
4	Constituencies	Jalgaon Parliamentry
5	Population in Person as per 2011	460000
6	Population in Person as per 2018	524650
7	Population in Person as per 2033	674700
8	Population in Person as per 2048	841250
9	Rate of Water Supply	135 LPCD
10	Daily Rate of Water Supply (2033)	91.08 MLD
11	Rate of Pumping	20 Hours
12	Cost of the Scheme as per DSR 2014-2015	12417.49 Lakh
13	Per Capita Cost of Scheme	1829.42

Principal Features
showing technical information
of the Scheme

6. Principal Features showing technical information of the Scheme

JALGAON CITY MUNICIPAL CORPORATION JALGAON
Annexure -F PURE WATER GRAVITY LEADING MAINS AND PUMPING MAIN DETAILS

S.No.	Name of feeder main	Gravity / pumping	Type	Dia of Proposed Feeder Main	Length in M
1	proposed Gravity main from Existing 1500 mm dia PSC pipe line tapping point @ parle factory to Supreme ESR -1	Gravity main	Ductile Iron K-9	500 mm	930
2	pumping main from supreme 1 proposed to supreme 2 ESR	pumping main	DI	400 mm	3175
3	Gravity Feeder main from Existing 1200 mm mehrun Pipe line to Raymond ESR New	Gravity main	DI	400mm	636
4	1200 mm dia MS pipe line from hotel Kasturi to Shirsoli Naka	Gravity main	DI	1200mm	3008
5	DSP chowk to DSP sump	Gravity main	DI	600 mm	133
6	DSP chowk junction connction to existing Pipe line	Gravity main	DI	450 mm	18
7	DSP Existing ESR Feeder main from 1200 mm dia pipe line	Gravity main	DI	450 mm	171
8	DSP new ESR connection at pumping house	pumping main	DI	450 mm	54
9	DSP new ESR connection at pumping house	pumping main	DI	600 mm	20
10	feeder main from Existing 457 mm dia pipe line to Samta Nagar ESR New	pumping main	DI	250 mm	279
11	feeder main from nityanand Nagar Existing ESR to nityanand Nagar New ESR	pumping main	DI	400 mm	1623
12	Girna ESR to Khajamiya Junction	Gravity main	DI	800 mm	2234
13	khajamiya Junction to Gendalal ESR Road	Gravity main	DI	800 mm	1627

14	khajamiya Junction to Shamaprasad ESR	Gravity main	DI	400 mm	1757
15	Gendalal Existing ESR connection	Gravity main	DI	450 mm	88
16	Gendalal mill New ESR Connection	Gravity main	DI	500 mm	90
17	Girna ESR Connection from 1000 mm pipe line	Gravity main	DI	450 mm	66
18	Girna Bridge to Khanderao Nagar ESR	Gravity main	DI	800 mm	1228
19	khanderao Existing ESR to Pimprala Existing ESR	Gravity main	DI	800 mm	1687
20	pimprala ESR Junction to Pimprala ESR Sump	Gravity main	DI	400 mm	158
21	Pimprala Sump to Nimkhedi Proposed ESR	pumping main	DI	400 mm	1085
22	Feeder main from 1000 mm MIDC KK Can PL to MIDC proposed ESR New @ Shanti niketan Society	Gravity main	DI	500 mm	1227
23	DSP Chowk to Girna ESR	Gravity main	DI	1000 mm	886
					22180

JALGAON CITY MUNICIPAL CORPORATION JALGAON

Annexure -E PUMPING DETAILS

Sr. No	Name of Intermediate PW Pumping station	Demand [Yr.2018] in MLD	Pump Details				Prop. No's of working Hours / pump
			Des. Disc. (m3/ hr.) per pump	Head (m)	HP	Working /stand by	
1	**Raymond :** ForDirect distribution	BPS at Raymond (75 HP), Online BPS at DSP chowk (75HP) BPS at Girna premises (50 HP) **are proposed to be discard**					
2	**GIRNA PS** [To feed ESR at Collector Bunglow]						
3	**DSP Chowk** [to Feed DSP New and Nityanad ESR]	8.35	382	34	**75 HP** Existing	1W+1S	21.9
4	**GIRNA :** For feeding Girna	5.36	375	25	**75 HP** Existing	1W+1S	14.3
5	**GIRNA** [For feeding DSP ESR-1]	7.74	475	26	**80 HP** Existing	1W+1S	16.4
6	**Supreme New PS** [for Feeding Prop ESR-1]	3.33	140	30	**30 HP** [Prop.]	1W+1S	24

Pump Details for Year 2033

1	**GIRNA :** For feeding Girna	Proposed to discard as ESR are shifted to fed through gravity flow					
2	**GIRNA** [For feeding DSP ESR-1]						
3	**Supreme New PS** [for Feeding Prop ESR-1]	2.61	140	30	**30 HP** [Prop.]	1W+1S	18.7
4	**DSP Chowk ESR Premises: New PS** [For Nityanamd ESR & Prop sump]	13.85	485	38	**100 HP** [Prop.]	2W+1S	14.25
5	**Nimkhedi New PS**	3.36	120	23	**15 HP** [Prop.]	2W+1S	14.9
6	**Supreme New PS** [for feeding Prop ESR -2]	2.96	125	70	**50 HP** [Prop.]	1W+1S	23.8
7	**Nityanand New PS**	2.98	245	30	**40 HP** [Prop.]	1W+1S	12.2

Pump Details for Year 2048

1	**Supreme New PS** [for Feeding Prop ESR-1]	3.74	140	30	**30 HP** [Prop.]	2W+1S	13.5
2	**DSP Chowk ESR Premises: New PS** [For Nityanamd ESR & Prop sump]	20.33	485	38	**100 HP** [Prop.] [Prop.]	2W+1S	20.95
3	**Supreme New PS** [for feeding Prop ESR -2]	4.29	125	70	**50 HP** [Prop.]	2W+1S	18.1
4	**Nityanand New PS**	4.33	245	30	**40 HP** [Prop.]	1W+1S	17.7

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JALGAON CITY MUNICIPAL CORPORATION JALGAON									
Annexure - C EXISTING AND PROPOSED RESERVIORS AND THEIR CAPACITIES									
S.No	Name of ESR	Cap. In ML	Level as per TS Survey				Year of Construction	Existing / Proposed	STATUS
			GL (m)	LWL (m)	FSL (m)	St. Ht. (m)			
1	Gendalal Mill	2.00	210.00	222.50	228.50	12.50	1981	Existing	Rehabilitation Proposed
2	Akashwani	2.50	231.00	246.50	253.50	15.50	1981	Existing	Rehabilitation Proposed
3	DSP Chowk (New)	2.80	241.00	262.00	267.00	21.00	2006	Existing	
4	DSP Chowk (old)	2.80	241.00	253.50	260.50	12.50	1981	Existing	Rehabilitation Proposed
5	Nityanand Nagar	2.80	254.00	266.50	273.50	12.50	2001	Existing	
6	Sindhi Colony	3.90	223.00	238.00	245.00	15.00	2005	Existing	
7	Khanderao Nagar	2.80	214.00	226.50	233.50	12.50	2004	Existing	
8	Pimprala Shivar	2.80	213.00	224.50	230.50	11.50	2005	Existing	
9	Nimkhedi Shivar	2.80	209.00	221.00	228.00	12.00	2005	Existing	
10	Girna Takki premises	2.80	238.00	250.50	257.50	12.50	2005	Existing	
11	Shyama Prasad	2.80	214.00	226.50	233.50	12.50	2006	Existing	
12	Dreamland	2.80	215.00	227.50	234.50	12.50	2009	Existing	
13	Girna Taki GSR No.1 & 2	2.25	234.46	234.00			1930	Existing	Proposed to Discard
14	Girna Taki GSR No.3	4.50	234.46	234.00			1960	Existing	Proposed to Discard
15	Girana Taki GSR No.4	3.50	234.46	235.00			1996	Existing	
16	MBR at Umale	26.00	278.50	278.00			2007	Existing	
17	Samta Nagar	0.50	248.85	260.85	265.85	12.00	2015	Existing	
	Total Capacity (ML)	**70.35**							
18	Supreme ESR -1	1.50	254.00	275.00	280.00	21.00		Proposed	Immediate Stage 2018
19	Supreme ESR - 2	1.50	297.00	315.00	320.00	18.00		Proposed	Intermediate Stage

									2033
20	Raymond ESR	3.00	230.00	251.00	256.00	21.00		Proposed	Immediate Stage 2018
21	MIDC ESR	2.50	229.00	250.00	255.00	21.00		Proposed	Intermediate Stage 2033
22	Gendalal Mill ESR - 2	2.00	210.00	222.50	228.50	12.50		Proposed	Intermediate Stage 2033
23	Nityanand Nagar ESR - 2	1.50	268.00	289.00	294.00	21.00		Proposed	Immediate Stage 2018
24	Nimhedi ESR - 2	1.50	211.00	229.00	234.00	18.00		Proposed	Immediate Stage 2018
	Total Capacity (ML)	**13.50**							

JALGAON WATER SUPPLY SCHEME **HYD. MODELING REPORT (R0)**

Material	Diameter											Total
	91.6	133.6	167	209	250	300	350	400	450	500	600	
Cast iron												
Zone - E						1113		878	146			**2137**
Ductile Iron												
Zone - N2018						84	109	1683			1447	**3323**
Zone - N2033					3138	9577	3871	2412	1569			**20567**
Zone - R2033					1654	10358	6068	4500	376	145		**23101**
Zone - R2048			77		2207	5300	1316	955	860	76	178	**10969**
HDPE												
Zone - N2018	382	845	643									**1870**
Zone - N2033	93057	16943	6329	8361								**124690**
Zone - R2018	5668	905	86									**6659**
Zone - R2033	234309	56471	13812	10398		61						**315051**
Zone - R2048	102836	18625	9193	7483								**138137**
Zone -R2018	91											**91**
Total	**436343**	**93789**	**30140**	**26242**	**6999**	**26493**	**11364**	**10428**	**2951**	**221**	**1625**	**646595**

A. Zone wise summary of distribution network:

1. **Gendhalal Mill ESR Zone:**

Material	Diameter								Total
	91.6	133.6	167	209	300	350	400	450	
Ductile Iron									
N2033					1960	1561	1840	38	5399
R2033					37				37
R2048					429			77	506
HDPE									
N2033	9193	2447	1145	380					13165
R2033	15146	2449	530	1528					19653
R2048	7233	1940	2374	1248					12795
Total	31572	6836	4049	3156	2426	1561	1840	115	51555

2. **Akashwani ESR Zone:**

Material	Diameter								Total
	91.6	133.6	167	209	300	350	400	450	
Cast iron									
Zone - E							878	116	994
Ductile Iron									
Zone - N2033							565		565
Zone - R2033					406	439	1620		2465
Zone - R2048								16	16
HDPE									
Zone - N2033	4812	985	17	9					5823
Zone - R2018	75								75

Zone - R2033	26529	6118	2107	317					**35071**
Zone - R2048	786	902	184	17					**1889**
Total	**32202**	**8005**	**2308**	**343**	**406**	**439**	**3063**	**132**	**46898**

3. DSP ESR Zone:

Material	**Diameter**											**Total**
	91.6	**133.6**	**167**	**209**	**250**	**300**	**350**	**400**	**450**	**500**	**600**	
Ductile Iron												
N2018							98	1252				**1350**
N2033					1415	675	288		21			**2399**
R2033					9	272	131	955	218	128		**1713**
R2048					1331	2872	606	901			57	**5767**
HDPE												
N2018		6										**6**
N2033	17759	2155	811	1452								**22177**
R2018	478		25									**503**
R2033	36831	10518	1499	568								**49416**
R2048	8285	1847	413	776								**11321**
Total	**63353**	**14526**	**2748**	**2796**	**2755**	**3819**	**1123**	**3108**	**239**	**128**	**57**	**94652**

4. NityanandESR Zone:

Material	**Diameter**								**Total**
	91.6	**133.6**	**167**	**209**	**300**	**350**	**400**	**450**	
Ductile Iron									
N2033					273				**273**
R2033					1565	144	171		**1880**

R2048					717			44	**761**
HDPE									
N2033	4439	163	323	905					**5830**
R2033	11859	1880	1155	1018					**15912**
R2048	7894	1545	786						**10225**
Total	**24192**	**3588**	**2264**	**1923**	**2555**	**144**	**171**	**44**	**34881**

5. Sindhi Colony ESR Zone:

Material	**Diameter**										**Total**
	91.6	**133.6**	**167**	**209**	**300**	**350**	**400**	**450**	**500**	**600**	
Ductile Iron											
Zone - N2033					1391	308		1109			**2808**
Zone - R2033					895	1046	320				**2261**
Zone - R2048			77		382	323			20	53	**855**
HDPE											
Zone - N2018	151	198									**349**
Zone - N2033	6771	2412	342								**9525**
Zone - R2018	2258	67									**2325**
Zone - R2033	23517	6456	1724	232							**31929**
Zone - R2048	5753	1196	866	224							**8039**
Total	**38450**	**10329**	**3009**	**456**	**2668**	**1677**	**320**	**1109**	**20**	**53**	**58091**

6. Khanderao ESR Zone:

Material	**Diameter**										**Total**
	91.6	**133.6**	**167**	**209**	**250**	**300**	**350**	**400**	**500**	**600**	
Ductile Iron											

N2033					870						**870**
R2033					497	578	576	259		44	**1954**
R2048									2	24	**26**
HDPE											
N2033	2143	296	593	1428							**4460**
R2018	2115		61								**2176**
R2033	13437	4650	736	1393							**20216**
Total	**17695**	**4946**	**1390**	**2821**	**1367**	**578**	**576**	**259**	**2**	**68**	**29702**

7. Pimparala ESR Zone:

Material	**Diameter**								**Total**
	91.6	**133.6**	**167**	**209**	**300**	**350**	**450**	**500**	
DI									
N2033					1713				**1713**
R2033					346	1239	158		**1743**
R2048								31	**31**
HDPE									
N2033	2954	818	490	289					**4551**
R2033	14036	2883	593	1666					**19178**
R2048	5182	926	229						**6337**
Total	**22172**	**4627**	**1312**	**1955**	**2059**	**1239**	**158**	**31**	**33553**

8. Nimkhedi ESR Zone:

Material	**Diameter**							**Total**
	91.6	**133.6**	**167**	**209**	**300**	**350**	**400**	**450**	
Cast iron									

E								30	**30**
Ductile Iron									
N2033					396				**396**
R2048					754	382	54		**1190**
HDPE									
N2018	30								**30**
N2033	7158	712	196	573					**8639**
R2033	2356	852							**3208**
R2048	17859	3474	2651	3836					**27820**
Total	**27403**	**5038**	**2847**	**4409**	**1150**	**382**	**54**	**30**	**41313**

9. Proposed Nimkhedi ESR Zone:

Material	**Diameter**						**Total**
	91.6	**133.6**	**167**	**209**	**300**	**400**	
Ductile Iron							
N2018						431	**431**
N2033					775		**775**
HDPE							
N2018	201	38	16				**255**
N2033	1446	94					**1540**
R2033	10411	3013	1341	243			**15008**
R2048	4405	433	443	739			**6020**
Total	**16463**	**3578**	**1800**	**982**	**775**	**431**	**24029**

10. Girna ESR Zone:

Material	Diameter								Total
	91.6	133.6	167	209	300	350	400	500	
Ductile Iron									
N2033					827	236			1063
R2033					1524	1452	192	17	3185
HDPE									
N2018		603	627						1230
N2033	6021	1147	2085	985					10238
R2033	25647	4970	905	449					31971
R2048	2563	1253	9						3825
Total	34231	7973	3626	1434	2351	1688	192	17	51512

11. Shyamaprasad ESR Zone:

Material	Diameter										Total
	91.6	133.6	167	209	250	300	350	400	450	500	
Ductile Iron											
Zone - N2033					387		1026		401		1814
Zone - R2033					286	499	432	247			1464
Zone - R2048					820				723	23	1566
HDPE											
Zone - N2033	7643	1446	76	716							9881
Zone - R2018	648	838									1486
Zone - R2033	11696	2375	830	3							14904
Zone - R2048	7907	2010	104								10021
Total	27894	6669	1010	719	1493	499	1458	247	1124	23	41136

12. Dreamland ESR Zone:

Material	Diameter							Total
	91.6	133.6	167	209	300	350	400	
DI								
N2033					549			**549**
R2033					3034	208	98	**3340**
HDPE								
N2033	8867	1172		1418				**11457**
R2018	91							**91**
R2033	11415	3084	570	492	13			**15574**
R2048	10395	769						**11164**
Total	**30768**	**5025**	**570**	**1910**	**3596**	**208**	**98**	**42175**

13. MIDC ESR Zone:

Material	Diameter									Total
	91.6	133.6	167	209	250	300	350	400	600	
Ductile Iron										
Zone - N2018									582	**582**
Zone - R2033					684	265	401	638		**1988**
Zone - R2048					56					**56**
HDPE										
Zone - N2033	5134	608	67							**5809**
Zone - R2018	94									**94**
Zone - R2033	10151	1677	198	1134						**13160**
Zone - R2048	6570	1085	153	350						**8158**
Total	**21949**	**3370**	**418**	**1484**	**740**	**265**	**401**	**638**	**582**	**29847**

14. Raymond ESR Zone:

Material	Diameter									Total
	91.6	133.6	167	209	250	300	350	400	600	
Cast iron										
E						1113				**1113**
Ductile Iron										
N2018									865	**865**
N2033					466	4	452	7		**929**
R2033					178	723				**901**
HDPE										
N2033	3929	1525	184	204						**5842**
R2033	19763	4551	1619	1059						**26992**
R2048	4970	240	339							**5549**
Total	**28662**	**6316**	**2142**	**1263**	**644**	**1840**	**452**	**7**	**865**	**42191**

15. Supreme ESR Zone:

Material	Diameter						Total
	91.6	133.6	167	209	300	350	
DI							
Zone - N2018					84	11	**95**
Zone - N2033					919		**919**
Zone - R2048					45	5	**50**
HDPE							
Zone - N2033	3982	948					**4930**
Zone - R2048	7821	943	642	293			**9699**
Total	**11803**	**1891**	**642**	**293**	**1048**	**16**	**15693**

16. Samta Nagar ESR Zone:

Material	Diameter					Total
	91.6	133.6	167	209	300	
DI						
Zone - N2033					95	**95**
Zone - R2033					214	**214**
Zone - R2048					101	**101**
HDPE						
Zone - N2033	748	15		2		**765**
Zone - R2033	1573	921	5	296	48	**2843**
Zone - R2048	5213	136				**5349**
Total	**7534**	**1072**	**5**	**298**	**458**	**9367**

i. PERMISSIONS REQUIRED FROM OTHER CONCERN DEPARTMENT:

Most of proposed lines under project are propose to be lay along the roads belong to PWD department of JalgaonMunicipal Corporation.

Permissions /clearances required from other concern departments for laying proposed pipe lines, along roads or crossing the roads, belongs to respective department is as mentioned below.

Table No. 6.20:

Components	ESR Command Area	Dia	Material	LENGTH ALONG NH-6	Proposed in Yr.	Authority
Distribution line along Road	Nimkhedi Prop.	400	DI	305	2018	NH-6
		167	HDPE	18	2018	NH-6
	Dreamland	209	HDPE	1195	2033	NH-6
		133.6	HDPE	479	2033	NH-6
		91.6	HDPE	405	2033	NH-6
		167	HDPE	265	2033	NH-6
	DSP	133.6	HDPE	190	2033	NH-6
	GIRNA	300	DI	505	2033	NH-6
	PIMPRALA	167	HDPE	135	2033	NH-6
		91.6	HDPE	500	2033	NH-6
		167	HDPE	40	2033	NH-6
	Nimkhedi Prop.	300	DI	335	2033	NH-6
	Nimkhedi Exist	167	HDPE	1307	2048	NH-6
		209	HDPE	1045	2048	NH-6
	Nimkhedi Prop.	209	HDPE	470	2048	NH-6

Components	Command Area	Clearances required for Crossing	Authority	Remarks
Water Pipeline	SHYAMAPRASAD UDYAN EXISTING	Laying across land under Railway	Central Railway	300mm D.I. @ 30 M
	GIRNA C.A.	Laying across NH-6	NH-6	300mm @ 30 M
	DRAMLAND C.A.	Laying across NH-6	NH-6	300mm @ 30 M

i. HOUSE SERVICE CONNECTION:

- One of the reason for higher NRW is leakages through HSC, theft etc. In order to reduce the same and to achieve the SLB, 100% replacement of existing house service connection is proposed.
- DI strap saddle is consider for making connection from DI & CI pipe material & electro fusion tee connection is consider for making connection from HDPE pipe
- 100% consumer metering is proposed for accountability, monitoring system.
- Consumer meters proposed should be of multi jet type with AMR compactable & EEC approval.

The Summary of Ext.+ prospective connection by year 2018 is as follows,

Table No. 6.20: House Service Connection

Connection size (mm)	Existing Connection		Proposed Increased during till 2018		Total connection in Yr.2018
	Domestic	Commercial	Domestic 30.01%	Commercial 30.01%	
15	66515	306	86476	398	86874
20	233	72	303	94	397
25	132	10	172	13	185
40	0		0	0	1
50	5	2	7	3	10
80	2	2	3	3	6
100	0	1	0	1	1
150	0	0	0	0	0
200	0	0	0	0	0
Total	**66887**	**393**	**86961**	**512**	**87473**

Population	2018	524838	
Considering 6 person / house , total connection In city by 2018 =			87473

X. Repair Works Proposed

S.No	Subwork	Repairs Proposed
	Raw water Pumping Machinary	Over Haulling of Pumps Plastering
	Raw water rising mains	*a) Lekages Repair* *b) Air Valve Repair*
	Water Treatment Plant	*a) Grouting* b) windows repairs c) Valve Repairs.
	ESR	*Colouring*

XI. Annual M & R

JALGAON CITY MUNICIPAL CORPORATION JALGAON
Annexure -I Statement of BULK METERS PROPOSED

S.No.	Head	Expenditure			Proposed	Revenue income			Proposed
		2011-2012	2012-2013	2013-2014	2015-2016	2011-2012	2012-2013	2013-2014	2015-2016
1	Salary	97123945	108385797	120291320	150000000	150478850	159239889	150074260	296970000
2	Daily wages	7692484	5391070	7309062	8500000				
3	Electri Bill	43866337	61181060	43903038	95000000				
4	Water Charges Irrigation and Other (including Pending Payments)	14761827	26951555	5342710	25300000				
5	Chemicals	8570676	7146773	5657554	10000000				
6	Pipe Line Maintenance	11047467	8270348	4994314	26000000				
7	Water testing Fees				210000				
8	Machinary maintenance	46830	1668221	202249	1500000				
	Total Rs.	**183109566**	**218994824**	**187700247**	**316510000**	**150478850**	**159239889**	**150074260**	**296970000**

A. Population Forecast :

FINAL POPULATION FORECAST (R-2) 21/07/2014 **Annex- I**

NAME OF SCHEME: JALGAON WATER SUPPLY

CENSUS FIGURES (As per Table No.3 CDP)		
DECADE-YEAR	POPULATIO	INCREASE In %
1971	117312	
1981	165507	41.08
1991	242193	46.33
2001	368000	51.94
2011	460228	25.06
	Average	41.11

As per current census data

BASE YEAR : 2018
INTERMEDIATE STAGE : 2033
ULTIMATE STAGE : 2048

1. ARITHMETIC INCREASE METHOD

POPULATION IN THE YEAR	2011		=	460228
POPULATION IN THE YEAR	1971		=	117312
INCREASE IN	4 DECADES			**342916**
AVERAGE INCREASE PER DECADE			=	342916 / 4
AVERAGE INCREASE PER DECADE			=	85729
BASE YEAR POPULATION FOR THE YEAR		2018	=	
DIFFERENCE IN DECADE-WITH REF.TO THE DECADE		2011	=	0.7
HENCE				
BASE YEAR POPULATION FOR THE YEAR		2018	=	POP (2011)+0.7x85729
			=	460228+0.7x85729
			=	520238
INTERMEDIATE POPULATION FOR THE YEAR		2033	=	
DIFFERENCE IN DECADE WITH REF.TO THE DECADE		2011	=	2.2
HENCE				
INTERMEDIATE POPULATION FOR THE YEAR		2033	=	POP (2011)+2.2x85729
			=	460228+2.2x85729
			=	648832
ULTIMATE POPULATION FOR THE YEAR		2048		
DIFFERENCE IN DECADE WITH REF.TO THE DECADE		2011	=	3.7
HENCE				
ULTIMATE POPULATION FOR THE YEAR		2048	=	POP (2011)+3.7x648831.8
			=	460228+3.7x85729
			=	777425

Year	Projected population	% increase
2018	520238	-
2033	648832	16.48
2048	777425	13.21

2. INCREMENTAL INCREASE METHOD

YEAR	POPULATION	INCREASE (X)	INCREMENTAL
1951			
1961			
1971	117312		
1981	165507	48195	
1991	242193	76686	28491
2001	368000	125807	49121
2011	460228	92228	-33579
TOTAL INCREASE / INC. INCREASE		**342916**	**44033**

NUMBER OF INCREASE = 4

NUMBER OF INC.INCREASE = 3

AVERAGE OF X = 342916 / 4 = 85729

AVERAGE OF Y = 44033 / 3 = 14678

INT. POPULATION FOR THE YEAR 2018

DIFF. IN DECADE WITH REF.TO THE YEAR 2011 = 0.7

HENCE

INTERMEDIATE POPN FOR THE YEAR 2018

POP (2011)+0.7x (Ave.X) +0.7x(0.7+1)/2)x (Ave.Y)

460228 + 0.7 x 85729 + 0.6 x 14678

528972

INT. POPULATION FOR THE YEAR 2033

DIFF. IN DECADE WITH REF.TO THE YEAR 2011 2.2

HENCE

INTERMEDIATE POPN FOR THE YEAR 2033

POP (2011)+2.2x (Ave.X) +2.2x(2.2+1)/2)x (Ave.Y)

460228 + 2.2 x 85729 + 3.52 x 14678

700498

ULTIMATE POPULATION FOR THE YEAR 2048

DIFF. IN DECADE WITH REF.TO THE YEAR 2011 3.7

HENCE

INTERMEDIATE POPN FOR THE YEAR 2048

POP (2011)+3.7x (Ave.X) +3.7x(3.7+1)/2)x (Ave.Y)

460228 + 3.7 x 85729 + 8.7 x 14678

905051

Year	Projected population	% increase
2018	**528972**	**-**
2033	**700498**	**21.62**
2048	**905051**	**19.47**

Average Population As per Above Two MethodS

Year	ARITHMETIC INCREASE METHOD	INCREMENTAL INCREASE METHOD	Average	Avg. as calculated By PMC MJP
2018	520238	528972	**524606**	524650
2033	648832	700498	**674665**	674700
2048	777425	905051	**841239**	841250

ANNEXURE No. 2

DAILY DEMAND

	Particular			Presant Stage 2018		Immediate Stage 2033		Ultimate Stage 2048	
A)	**Domestic Water Demand**								
	1. Population			524848	Souls	675088	Souls	841687	Souls
	2. Rate of Water Supply			135	Lpcd	135	Lpcd	135	Lpcd
	3. Daily Net Domestic Demand			70.854	ML	91.137	ML	113.628	ML
A1)	**Gross Domestic demand @ E.S.R.**			78.727	ML	101.26	ML	126.253	ML
A2)	**Gross Domestic demand @ T.P. Sump**			81.441	ML	104.755	ML	130.607	ML
A3)	**GrossDomestic demand @ Jack well**			83.358	ML	107.220	ML	133.680	ML
B)	**Institutional Demand**								
	1. Schools/colleges	54408	students	2.659	ML	3.420	ML	4.263	ML
	2. Cinema Theatre	0	seats	0.000	ML	0.000	ML	0.000	ML
	3. Offices	4357	employees	0.213	ML	0.274	ML	0.341	ML
	4. Hospital	1247	beds	0.460	ML	0.592	ML	0.738	ML
	5. Lodge	701	beds	0.137	ML	0.176	ML	0.219	ML
	6. Restaurants	5544	tables	0.421	ML	0.542	ML	0.676	ML
	7.Hostels	691	beds	0.101	ML	0.130	ML	0.162	ML
	Total Daily Net Institutional Demand			3.991	ML	5.134	ML	6.399	ML
B1)	**Gross Institutional demand @ E.S.R.**			4.435	ML	5.704	ML	7.11	ML
B2)	**Gross Institutional demand @ T.P. Sump**			4.587	ML	5.901	ML	7.355	ML
B3)	**Gross Institutional demand @ Jack well**			4.695	ML	6.040	ML	7.528	ML
C)	**Industrial Demand**								
	1. Factory / industry			0.127	ML	0.163	ML	0.204	ML
	1. Railway			0.410	ML	0.492	ML	0.590	ML
	Total Daily Net Industrial Demand			0.537	ML	0.655	ML	0.794	ML
C1)	**Gross Industrial demand @ E.S.R.**			0.597	ML	0.728	ML	0.883	ML
C2)	**Gross Industrial demand @ T.P. Sump**			0.617	ML	0.753	ML	0.913	ML
C3)	**Gross Industrial demand @ Jack well**			0.632	ML	0.771	ML	0.935	ML
D)	**Fire Demand Q=(100p$^{0.5}$)**								
	Total Daily Net Fire Demand			2.291	ML	2.598	ML	2.901	ML
D1)	**Gross Fire demand @ E.S.R.**			2.546	ML	2.887	ML	3.223	ML
D2)	**Gross Fire demand @ T.P. Sump**			2.633	ML	2.986	ML	3.334	ML
D3)	**Gross Fire demand @ Jack well**			2.695	ML	3.056	ML	3.413	ML
E)	**Fringe village**								
	1. Population			-		33837	Souls	51320	Souls
	2. Rate of Water Supply			-		70	Lpcd	70	Lpcd
	3. Daily Net Domestic Demand			-		2.369	ML	3.592	ML
E1)	**Gross Domestic demand @ E.S.R.**				ML	2.632	ML	3.991	ML
E2)	**Gross Domestic demand @ T.P. Sump**				ML	2.723	ML	4.129	ML
E3)	**GrossDomestic demand @ Jack well**				ML	2.787	ML	4.226	ML
F)	**Total Gross Demand (A+B+C+D)**								
G)	**Gross demand @ E.S.R.**			86.305	ML	113.214	ML	141.46	ML
H)	**Gross demand @ T.P. Sump**			89.278	ML	117.118	ML	146.338	ML
I)	**Gross demand @ Jack well**			91.380	ML	119.874	ML	149.782	ML

Particulars	%	Immediate stage	Intermediate stage	Ultimate stage	Unit
Design year		**2018**	**2033**	**2048**	
Population (Jalgaon City)		**524848**	**675088**	**841687**	**souls**
Population (3 nos of Fringe Village)		**-**	**33837**	**51320**	**souls**
Demand calculations					
City Water demand @135 lpcd rate		70.85	91.14	113.63	MLD
Fringe Village demand @70 lpcd rate			2.37	3.59	MLD
Fire demand		2.29	2.60	2.90	MLD
Bulk demand		4.21	5.34	6.65	MLD
Railway demand		0.41	0.49	0.59	MLD
Net demand		**77.76**	**101.94**	**127.36**	**MLD**
Losses calculations					
Distribuition Losses	10%	8.64	11.32	14.15	MLD
Total demand at consumer end		**86.40**	**113.26**	**141.51**	**MLD**
Transmission Losses	2%	1.76	2.31	2.89	MLD
Total demand at Storage reservoir		**88.16**	**115.57**	**144.40**	**MLD**
WTP (process) Losses	2%	1.80	2.36	2.95	MLD
Total demand at WTP		**89.96**	**117.93**	**147.35**	**MLD**
Raw water Losses	1%	0.91	1.19	1.49	MLD
Total Raw water demand		**90.87**	**119.12**	**148.84**	**MLD**
Say		**91.00**	**120.00**	**149.00**	

STATEMENT

OF

AREA,POPULATION& WATER DEMAND

AS PER RESTRUCTURING

OF

ESR COMMAND AREA

Sr. no	Particulars	Existing			Phase	Replace			Discard			Remarks
		Dia. (mm)	MOC	Length (m)		Dia. (mm)	MOC	Length (m)	Dia. (mm)	MOC	Length (m)	
Phase-1 (2018 to 2033)												
1	Trunk Main from Kasturi Hotel to Girna GSR premises.	1200	PSC	3894	Proposed to Replace In Ph-1 (2018-33)	1200	MS	3894	-	-	-	Existing pipe has multiple intervention due to leakages and most of patches are repaired by replacing it with MS pipes.
2	Trunk main from Pimprala road (after railway crossing) up to branch to Pimprala ESR.	600	PSC	2915		800	DI	2915	-	-	-	Existing pipe is insufficient to serve the projected demand.
3	Trunk main from Girna premises to branch point (Mahavir jining factory) of Gendalal ESR.	450	PSC	4046		800	DI	4046	-	-	-	Existing pipe is insufficient to serve the projected demand.
8	Trunk main from DSP chowk up to DSP SUMP.	200	MS	140	Diascard & replace	-	-	-	600	DI	140	Existing pipe is insufficient to serve the projected demand.
4	Branch pipe for Girna existing ESR	450	CI	78	Discard	-	-	-	450	CI	78	**Sump & Pump house at Girna Is proposed to discard.** New connectivity prop. to fed ESR from 1000mm dia Gr. Pipe line passing near ESR premises.
5	Branch pipe for DSP-1 existing ESR form Girna premises.	450	MS	1060	Part length Discarded	-	-	-	450	MS	889	**Sump & Pump house at Girna Is proposed to discard.** New connectivity prop. to fed ESR from 1200mm dia Gr. Pipe line passing near ESR premises.
6	Inlet pipe of Girna-2 MBR.	350	CI	22	Discard	-	-	-	350	CI	22	Girna-2 MBR proposed to discard.
7	Outlet pipe of Girna-2 MBR to Girna sump.	375	CI	43		-	-	-	375	CI	43	Girna-2 MBR Proposed to discard.
	Total	4075	0	**12198**		2800	0	**10855**	2225	0	**1172**	

Sr. no	Particulars	Phase	Dia. (mm)	MOC	Length (m)
1	Branch pipe for Raymond Prop. ESR. (tapping point near Raymond Ext. BPS).	Phase-1 (2018-33)	600	DI	1615
2	Branch pipe for Supreme Prop sump.	Phase-1 (2018-33)	500	DI	997
3	Branch pipe from Supreme Prop. sump to Supreme Prop ESR-1.	Phase-1 (2018-33)	300	DI	40
4	Branch for MIDC Prop ESR-1 from br. point of Dreamland ESR.	Phase-1 (2018-33)	500	DI	270
5	Branch from Budhwar Bazar road to Pimprala ESR for Nimkhedi prop sump.	Phase-1 (2018-33)	400	DI	210
6	Branch pipe from Nimkhedi prop sump to Nimkhedi prop ESR.	Phase-1 (2018-33)	400	DI	735
7	Branch pipe from Supreme Prop Sump to Supreme Prop ESR-2.	Phase-1 (2018-33)	400	DI	3079
8	Branch pipe from Nityanand Ext. ESR Branch to Nityanand Prop. ESR (along Mohadi Road).	Phase-1 (2018-33)	400	DI	1654
9	Branch pipe for Gendalal Prop ESR from Mahavir jining factory.	Phase-1 (2018-33)	500	DI	95
10	Connectivity for Shyamaprasad ESR branch line to shift it from Girna GSR-2 to Girna GSR -3	Phase-1 (2018-33)	500	DI	26
11	Connectivity to transfer Girna ESR to feed through 1000mm dia Pipe line passing near ESR	Phase-1 (2018-33)	450	DI	93
12	Connectivity to transfer DSP-1 ESR to feed through 1200mm dia Gr. Pipe line passing from DSP chouk.	Phase-1 (2018-33)	450	MS	10
13	Connectivity to feed DSP-2 ESR from pump arrangement at DSP premises	Phase-1 (2018-33)	600	DI	10
14	Branch pipe for Gendalal+shyamaprasad Prop ESR from Mahavir jining factory.	Phase-2 (2033-48)	500	DI	2513
15	Branch pipe for MIDC Prop ESR-2 from branch point of Dreamland ESR along MIDC road.	Phase-2 (2033-48)	400	DI	3172

SCENARIO:- 2018

Design Junction Report Existing and Proposed Feeder System Yr. 2018				
Label	**Elevation (m)**	**Demand (MLD)**	**Hydraulic Grade (m)**	**Pressure (m)**
J-2	238	0	270.63	32.6
J-3	232.13	0	269.93	37.7
J-4	238	0	269.5	31.4
J-5	238.9	0	269.79	30.8
J-6	238	0	269.51	31.4
J-7	199.35	0	269.28	69.8
J-8	206.72	0	268.31	61.5
J-12	240.14	0	275.25	35
J-15	227	0	269.31	42.2
J-18	227.15	0	270.62	43.4
J-24	238	0	238.98	1
J-26	238	0	268.95	30.9
J-28	204.31	0	268.71	64.3
J-32	247.78	0	270.94	23.1
J-34	234.39	0	270.7	36.2
J-38	268.73	0	275.05	6.3
J-41	241	0	275.25	34.2
J-42	240.5	0	275.25	34.7
J-45	256.91	0	266.4	9.5
J-46	236	0	238.96	3
J-47	236	0	237.6	1.6
J-48	239.05	0	259.55	20.5
J-49	228.7	0	236.16	7.4

J-54	237	0	237.61	0.6
T- AKASHWANI ESR	253.5	6.51	257.9	4.4
T- RAYMOND ESR	256	7.9	259.73	3.7
T- SUPREME SUMP	253.5	0	255.92	2.4
T-DREAMLAND ESR	234.5	2.19	238.98	4.5
T-DSP NEW ESR	267	3.56	275.24	8.2
T-DSP OLD ESR	260.5	7.82	266.19	5.7
T-GENDALAL EXIST.ESR	228.5	8.51	236.09	7.6
T-GIRNA ESR	257.5	5.48	262.83	5.3
T-GIRNA SUMP	234	0	235.02	1
T-GIRNA-2	237	0	237.75	0.7
T-GIRNA-3	238	0	238.98	1
T-KHANDERAO ESR	233.5	4.18	238	4.5
T-MIDC PROP ESR-1	255	5.31	259.96	4.9
T-NIMKHDI ESR	228	3.11	232.96	5
T-NIMKHEDI PROP SUMP	214	0	217.97	4
T-NIMKHEDI PROP. ESR	234	2.82	235.67	1.7
T-NITYANAND ESR	273.5	4.98	275.02	1.5
T-PIMPRALA ESR	230.5	3.77	236	5.5
T-SHAMAPRASAD	233.5	7.41	236.24	2.7
T-SINDHI COLONY ESR	245	11.45	249.62	4.6
T-SUPREME PROP ESR-1	280	3.41	282.64	2.6

PIPE DESIGN REPORT

Design Pipe Report of Existing and Proposed Feeder System Yr. 2018										
Label	**Length (m)**	**Start Node**	**Stop Node**	**Diameter (mm)**	**Material**	**Hazen-Williams C**	**Flow (MLD)**	**Velocity (m/s)**	**HfGradient (m/km)**	**Notes**
P-5	2,236	J-2	J-3	1,200.00	PSC	140.00	69.70	0.71	0.31	E
P-6	772	J-3	J-5	1,200.00	PSC	140.00	51.74	0.53	0.18	E
P-7	886	J-5	J-6	1,000.00	PSC	140.00	43.20	0.64	0.31	E
P-8	19	J-6	J-4	1,000.00	Steel	100.00	29.32	0.43	0.29	E
P-9	2,051	J-6	J-7	800.00	PSC	140.00	13.88	0.32	0.11	E
P-23	30	J-42	T-DSP NEW ESR	500.00	Cast iron	100.00	3.56	0.21	0.17	E
P-17	442	J-3	J-15	600.00	Steel	100.00	17.96	0.74	1.38	E
P-4	743	J-2	J-18	1,000.00	PSC	140.00	7.50	0.11	0.01	E
P-25	69	T-GIRNA-3	J-24	750	Cast iron	100.00	8.51	0.22	0.12	E
P-27	22	J-4	J-26	350	Cast iron	100.00	20.81	2.50	25.11	E

P-10	1,228	J-7	J-28	600	PSC	140.00	13.88	0.57	0.46	E
P-11	1,687	J-28	J-8	600	PSC	140.00	9.70	0.40	0.24	E
P-2	1,548	J-32	J-34	1,500.00	PSC	140.00	85.10	0.56	0.15	E
P-3	595	J-34	J-2	1,500.00	PSC	140.00	77.20	0.51	0.13	E
P-1	9,525	R-1	J-32	1,500.00	PSC	140.00	88.51	0.58	0.16	E
P-20	139	J-5	J-48	200	Steel	100.00	8.54	3.15	73.68	E
P-52	256	J-38	T-NITYANAND ESR	600	Steel	100.00	4.98	0.20	0.13	E
P-56	1,506	J-41	J-38	600	Steel	100.00	4.98	0.20	0.13	E
P-57	10	J-12	J-42	600	Steel	100.00	8.54	0.35	0.35	E
P-58	10	J-42	J-41	600	Steel	100.00	4.98	0.20	0.13	E
P-59	10	J-48	PRV-1	600	Steel	100.00	8.54	0.35	0.35	E
P-61	5	PRV-1	PMP-1	600	Steel	100.00	8.54	0.35	0.35	E

P-62	5	PMP-1	J-12	600	Steel	100.00	8.54	0.35	0.35	E
P-75	171	J-45	T-DSP OLD ESR	450	Steel	100.00	7.92	0.58	1.23	E
P-78	15	J-24	J-46	450	PSC	140.00	8.51	0.62	0.76	E
P-80	9	J-54	J-47	500	PSC	140.00	7.41	0.44	0.35	E
P-81	3,891	J-47	T-SHAMAPRASAD	500	PSC	140.00	7.41	0.44	0.35	E
P-83	3,715	J-46	J-49	450	PSC	140.00	8.51	0.62	0.76	E
P-86	93	J-49	T-GENDALAL EXIST.ESR	450	PSC	140.00	8.51	0.62	0.76	E
P-92	5	T-GIRNA SUMP	PMP-10	450	Cast iron	100.00	5.48	0.40	0.62	E
P-93	73	PMP-10	T-GIRNA ESR	450	Cast iron	100.00	5.48	0.40	0.62	E
P-94	5	T-GIRNA SUMP	PMP-11	450	Steel	100.00	7.92	0.58	1.23	E
P-95	884	PMP-11	J-45	450	Steel	100.00	7.92	0.58	1.23	E
P-96	8	T-GIRNA-2	J-54	375	Cast iron	100.00	20.81	2.18	17.94	E
P-99	4	J-54	PRV-2	375	Cast iron	100.00	13.40	1.40	7.94	E
P-100	3	PRV-2	T-GIRNA SUMP	375	Cast iron	100.00	13.40	1.40	7.94	E

P-101	40	J-4	PRV-3	550	Steel	100.00	8.51	0.41	0.53	E
P-102	32	PRV-3	T-GIRNA-3	550	Steel	100.00	8.51	0.41	0.53	E
P-103	14	J-26	PRV-4	375	Cast iron	100.00	20.81	2.18	17.94	E
P-104	14	PRV-4	T-GIRNA-2	375	Cast iron	100.00	20.81	2.18	17.95	E
P-109	7	J-8	PRV-7	600	PSC	140.00	3.11	0.13	0.03	E
P-110	1,673	PRV-7	T-NIMKHDI ESR	600	PSC	140.00	3.11	0.13	0.03	E
P-111	10	J-28	PRV-8	600	PSC	140.00	4.18	0.17	0.05	E
P-112	176	PRV-8	T-KHANDERAO ESR	600	PSC	140.00	4.18	0.17	0.05	E
P-113	8	J-8	PRV-9	600	PSC	140.00	3.77	0.15	0.04	E
P-114	179	PRV-9	T-PIMPRALA ESR	600	PSC	140.00	3.77	0.15	0.04	E
P-	6	J-18	PRV-10	600	PSC	140.00	2.19	0.09	0.02	E

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P-116	1,717	PRV-10	T-DREAMLAND ESR	600	PSC	140.00	2.19	0.09	0.02	E
P-119	23	J-15	PRV-12	600	Steel	100.00	6.51	0.27	0.21	E
P-120	504	PRV-12	T- AKASHWANI ESR	600	Steel	100.00	6.51	0.27	0.21	E
P-121	5	J-15	PRV-13	600	Steel	100.00	11.45	0.47	0.60	E
P-122	645	PRV-13	T-SINDHI COLONY ESR	600	Steel	100.00	11.45	0.47	0.60	E
P-68	30	PMP-6	T-SUPREME PROP ESR-1	300	Ductile Iron	135.00	3.41	0.56	1.07	N2018
P-91	735	PMP-9	T-NIMKHEDI PROP. ESR	400	Ductile Iron	135.00	2.82	0.26	0.19	N2018
P-105	6	T- SUPREME SUMP	PRV-5	300	Ductile Iron	135.00	3.41	0.56	1.07	N2018
P-106	4	PRV-5	PMP-6	300	Ductile Iron	135.00	3.41	0.56	1.07	N2018
P-107	2	T-NIMKHEDI PROP SUMP	PRV-6	400	Ductile Iron	135.00	2.82	0.26	0.19	N2018

P-108	8	PRV-6	PMP-9	400	Ductile Iron	135.00	2.82	0.26	0.19	N2018
P-117	9	J-18	PRV-11	500	Ductile Iron	135.00	5.31	0.31	0.20	N2018
P-118	261	PRV-11	T-MIDC PROP ESR-1	500	Ductile Iron	135.00	5.31	0.31	0.20	N2018
P-123	17	J-34	PRV-14	600	Ductile Iron	135.00	7.90	0.32	0.17	N2018
P-124	1,598	PRV-14	T- RAYMOND ESR	600	Ductile Iron	135.00	7.90	0.32	0.17	N2018
P-125	14	J-32	PRV-15	500	Ductile Iron	135.00	3.41	0.20	0.09	N2018
P-126	983	PRV-15	T- SUPREME SUMP	500.00	Ductile Iron	135.00	3.41	0.20	0.09	N2018
P-127	23	J-8	PRV-16	400.00	Ductile Iron	135.00	2.82	0.26	0.19	N2018
P-128	177	PRV-16	T-NIMKHEDI PROP SUMP	400.00	Ductile Iron	135.00	2.82	0.26	0.19	N2018

SCENARIO:-2033

Design Junction Report of Existing and Proposed Feeder System Yr. 2033				
Label	**Elevation (m)**	**Demand (MLD)**	**Hydraulic Grade (m)**	**Pressure (m)**
J-2	238	0	269.43	31.4
J-3	232.13	0	268.28	36.1
J-4	238	0	267.88	29.8
J-5	238.9	0	268.03	29.1
J-6	238	0	267.89	29.8
J-7	199.35	0	267.43	67.9
J-8	206.72	0	266.92	60.1
J-12	240.14	0	278.5	38.3
J-15	227	0	267.56	40.5
J-18	227.15	0	269.41	42.2
J-24	236	0	238.89	2.9
J-28	204.31	0	267.13	62.7
J-32	247.78	0	269.93	22.1
J-34	234.39	0	269.55	35.1
J-38	268.73	0	277.98	9.2
J-41	241	0	278.49	37.4
J-42	240.5	0	278.49	37.9
J-45	256.91	0	264.09	7.2
J-46	236	0	238.89	2.9
J-47	236	0	238.87	2.9

J-49	228.7	0	238.51	9.8
T- AKASHWANI ESR	253.5	7.41	256.87	3.4
T- DSP SUMP	241	0	244.93	3.9
T- RAYMOND ESR	256	8.76	259.67	3.7
T- SUPREME SUMP	253.5	0	256.78	3.3
T-DREAMLAND ESR	234.5	3.11	238.95	4.4
T-DSP NEW ESR	267	5.78	278.48	11.5
T-DSP OLD ESR	260.5	9	263.83	3.3
T-GENDALAL EXIST.ESR	228.5	6.22	231.96	3.5
T-GENDALAL PROP.ESR	228.5	5.92	231.98	3.5
T-GIRNA ESR	257.5	7.45	260.97	3.5
T-GIRNA-3	238	0	238.93	0.9
T-KHANDERAO ESR	233.5	5.94	236.99	3.5
T-MIDC PROP ESR-1	255	7.09	258.92	3.9
T-NIMKHDI ESR	228	4.47	231.91	3.9
T-NIMKHEDI PROP SUMP	213	0	216.95	3.9
T-NIMKHEDI PROP. ESR	234	3.43	236.22	2.2
T-NITYANAND ESR	273.5	5.33	277.95	4.4
T-NITYANAND PROP. ESR	294	3.05	299.46	5.4

T-NITYANAND PROP.SUMP	268	0	277.63	9.6
T-PIMPRALA ESR	230.5	6.18	233.99	3.5
T-SHAMAPRASAD	233.5	8.81	237	3.5
T-SINDHI COLONY ESR	245	12.22	248.57	3.6
T-SUPREME PROP ESR-1	280	2.67	283.16	3.1
T-SUPREME PROP ESR-2	320	3.02	322.33	2.3

Design Pipe Report of Existing and Proposed Feeder System Yr. 2033										
Label	**Length (m)**	**Start Node**	**Stop Node**	**Diameter (mm)**	**Material**	**Hazen-Williams C**	**Flow (MLD)**	**Velocity (m/s)**	**Hf Gradient (m/km)**	**Notes**
P-8	19	J-6	J-4	1000	PSC	140.00	20.85	0.31	0.08	E
P-9	2,051	J-6	J-7	800	PSC	140.00	20.02	0.46	0.22	E
P-17	442	J-3	J-15	600	Steel	100.00	19.63	0.80	1.63	E
P-4	743	J-2	J-18	1000	PSC	140.00	10.20	0.15	0.02	E
P-2	1,548	J-32	J-34	1500	PSC	140.00	110.04	0.72	0.25	E
P-3	595	J-34	J-2	1500	PSC	140.00	101.28	0.66	0.21	E
P-1	9,525	R-1	J-32	1500	PSC	140.00	115.73	0.76	0.27	E
P-56	1,506	J-41	J-38	600	Steel	100.00	8.38	0.34	0.34	E
P-58	10	J-42	J-41	600	Steel	100.00	8.38	0.34	0.34	E
P-59	10	T- DSP SUMP	PRV-1	600	Steel	100.00	14.28	0.58	0.90	E
P-75	171	J-45	T-DSP OLD ESR	450	Steel	100.00	8.85	0.64	1.52	E
P-81	3,891	J-47	T-SHAMAPRASAD	500	PSC	140.00	8.81	0.52	0.48	E
P-105	256	J-38	T-NITYANAND ESR	600	Steel	100.00	5.33	0.22	0.15	E

P-107	30	J-42	T-DSP NEW ESR	500	Cast iron	100.00	5.90	0.35	0.43	E
P-108	5	J-28	PRV-10	600	PSC	140.00	5.94	0.24	0.10	E
P-109	181	PRV-10	T-KHANDERAO ESR	600	PSC	140.00	5.94	0.24	0.10	E
P-110	5	J-8	PRV-11	600	PSC	140.00	6.18	0.25	0.10	E
P-111	181	PRV-11	T-PIMPRALA ESR	600	PSC	140.00	6.18	0.25	0.10	E
P-112	5	J-8	PRV-14	600	PSC	140.00	4.47	0.18	0.06	E
P-113	1,675	PRV-14	T-NIMKHDI ESR	600	PSC	140.00	4.47	0.18	0.06	E
P-115	69	T-GIRNA-3	J-24	750	Cast iron	100.00	20.85	0.55	0.62	E
P-116	48	J-4	PRV-16	550	Steel	100.00	20.85	1.02	2.79	E
P-117	24	PRV-16	T-GIRNA-3	550	Steel	100.00	20.85	1.02	2.79	E
P-120	7	J-15	PRV-18	600	Steel	100.00	12.22	0.50	0.68	E

P-121	643	PRV-18	T-SINDHI COLONY ESR	600	Steel	100.00	12.22	0.50	0.68	E
P-126	7	J-15	PRV-21	600	Steel	100.00	7.41	0.30	0.27	E
P-127	520	PRV-21	T- AKASHWANI ESR	600	Steel	100.00	7.41	0.30	0.27	E
P-130	8	J-18	PRV-23	600	PSC	140.00	3.11	0.13	0.03	E
P-131	1,716	PRV-23	T-DREAMLAND ESR	600	PSC	140.00	3.11	0.13	0.03	E
P-138	5	J-49	PRV-27	450	PSC	140.00	6.22	0.45	0.42	E
P-139	88	PRV-27	T-GENDALAL EXIST.ESR	450	PSC	140.00	6.22	0.45	0.42	E
P-68	30	PMP-6	T-SUPREME PROP ESR-1	300	Ductile Iron	135.00	2.67	0.44	0.68	N2018
P-91	735	PMP-9	T-NIMKHEDI PROP. ESR	400	Ductile Iron	135.00	3.43	0.32	0.27	N2018
P-94	5	T- SUPREME SUMP	PRV-3	300	Ductile Iron	135.00	2.67	0.44	0.68	N2018
P-95	5	PRV-3	PMP-6	300	Ductile Iron	135.00	2.67	0.44	0.68	N2018

P-98	3	T-NIMKHEDI PROP SUMP	PRV-5	400	Ductile Iron	135.00	3.43	0.32	0.27	N2018
P-99	7	PRV-5	PMP-9	400	Ductile Iron	135.00	3.43	0.32	0.27	N2018
P-100	11	J-34	PRV-6	600	Ductile Iron	135.00	8.76	0.36	0.21	N2018
P-101	1,604	PRV-6	T- RAYMOND ESR	600	Ductile Iron	135.00	8.76	0.36	0.21	N2018
P-118	17	J-8	PRV-17	400	Ductile Iron	135.00	3.43	0.32	0.27	N2018
P-119	183	PRV-17	T-NIMKHEDI PROP SUMP	400	Ductile Iron	135.00	3.43	0.32	0.27	N2018
P-128	6	J-18	PRV-22	500	Ductile Iron	135.00	7.09	0.42	0.34	N2018
P-129	264	PRV-22	T-MIDC PROP ESR-1	500	Ductile Iron	135.00	7.09	0.42	0.35	N2018
P-136	10	J-32	PRV-26	500	Ductile Iron	135.00	5.69	0.34	0.23	N2018
P-137	986	PRV-26	T- SUPREME SUMP	500	Ductile Iron	135.00	5.69	0.34	0.23	N2018
P-57	10	J-12	J-42	600	Ductile Iron	135.00	14.28	0.58	0.52	N2033

P-61	5	PRV-1	PMP-1	450	Ductile Iron	135.00	1.22	0.09	0.02	N2033
P-62	5	PMP-1	J-12	450	Ductile Iron	135.00	1.22	0.09	0.02	N2033
P-64	5	PRV-1	PMP-2	450	Ductile Iron	135.00	13.06	0.95	1.79	N2033
P-65	5	PMP-2	J-12	450	Ductile Iron	135.00	13.06	0.95	1.79	N2033
P-71	3,069	PMP-7	T-SUPREME PROP ESR-2	400	Ductile Iron	135.00	3.02	0.28	0.21	N2033
P-73	10	PMP-8	T-NITYANAND PROP. ESR	400	Ductile Iron	135.00	3.05	0.28	0.21	N2033
P-82	26	J-46	J-47	500	Ductile Iron	135.00	8.81	0.52	0.52	N2033
P-92	2	T-NITYANAND PROP.SUMP	PRV-2	400	Ductile Iron	135.00	3.05	0.28	0.21	N2033
P-93	3	PRV-2	PMP-8	400	Ductile Iron	135.00	3.05	0.28	0.22	N2033
P-96	3	T- SUPREME SUMP	PRV-4	400	Ductile Iron	135.00	3.02	0.28	0.21	N2033
P-97	7	PRV-4	PMP-7	400	Ductile Iron	135.00	3.02	0.28	0.21	N2033

P-103	1,639	J-38	T-NITYANAND PROP.SUMP	400	Ductile Iron	135.00	3.05	0.28	0.22	N2033
P-134	7	J-6	PRV-25	450	Ductile Iron	135.00	7.45	0.54	0.63	N2033
P-135	66	PRV-25	T-GIRNA ESR	450	Ductile Iron	135.00	7.45	0.54	0.63	N2033
P-140	5	J-49	PRV-28	500	Ductile Iron	135.00	5.82	0.34	0.24	N2033
P-141	90	PRV-28	T-GENDALAL PROP.ESR	500	Ductile Iron	135.00	5.82	0.34	0.24	N2033
P-142	4	J-5	PRV-31	450	Steel	140.00	8.85	0.64	0.81	N2033
P-143	6	PRV-31	J-45	450	Steel	140.00	8.85	0.64	0.81	N2033
P-5	2,236	J-2	J-3	1200	Steel	140.00	91.08	0.93	0.51	R2033
P-6	772	J-3	J-5	1200	Steel	140.00	71.45	0.73	0.33	R2033
P-7	886	J-5	J-6	1200	Steel	140.00	48.32	0.49	0.16	R2033
P-10	1,228	J-7	J-28	800	Ductile Iron	135.00	20.02	0.46	0.24	R2033
P-11	1,687	J-28	J-8	800	Ductile Iron	135.00	14.08	0.32	0.13	R2033

P-78	15	J-24	J-46	800	Ductile Iron	135.00	20.85	0.48	0.26	R2033
P-83	4,046	J-46	J-49	800	Ductile Iron	135.00	12.04	0.28	0.09	R2033
P-132	6	J-5	PRV-24	600	Ductile Iron	135.00	14.28	0.58	0.52	R2033
P-133	133	PRV-24	T- DSP SUMP	600	Ductile Iron	135.00	14.28	0.58	0.52	R2033

SCENARIO:- 2048

Design Junction Report of Existing and Proposed Feeder System Yr. 2048				
Label	**Elevation (m)**	**Demand (MLD)**	**Hydraulic Grade (m)**	**Pressure (m O)**
J-2	238	0	267.86	29.8
J-3	232.13	0	266.12	33.9
J-4	238	0	265.48	27.4
J-5	238.9	0	265.71	26.8
J-6	238	0	265.48	27.4
J-7	199.35	0	264.68	65.2
J-8	206.72	0	263.81	57
J-12	240.14	0	279.1	38.9
J-15	227	0	265.3	38.2
J-18	227.15	0	267.83	40.6
J-24	236	0	238.82	2.8
J-28	204.31	0	264.17	59.7
J-32	247.78	0	268.62	20.8
J-34	234.39	0	268.05	33.6
J-38	268.73	0	278.14	9.4
J-41	241	0	279.08	38
J-42	240.5	0	279.09	38.5
J-45	256.91	0	264	7.1
J-46	236	0	238.82	2.8
J-47	236	0	238.8	2.8

J-48	229.36	0	237.83	8.5
J-49	228.7	0	237.94	9.2
T- AKASHWANI ESR	253.5	8.19	256.84	3.3
T- DSP SUMP	241	0	244.86	3.9
T- RAYMOND ESR	256	9.42	259.62	3.6
T- SUPREME SUMP	253.5	0	256.56	3
T-DREAMLAND ESR	234.5	3.88	238.93	4.4
T-DSP NEW ESR	267	9.13	279.06	12
T-DSP OLD ESR	260.5	9.13	263.73	3.2
T-GENDALAL EXIST.ESR	228.5	6.22	231.96	3.5
T-GENDALAL PROP.ESR	228.5	5.6	231.98	3.5
T-GENDALAL+SHYAMPRASAD PROP.ESR	227	7.17	230.23	3.2
T-GIRNA ESR	257.5	8.86	260.95	3.4
T-GIRNA-3	238	0	238.89	0.9
T-KHANDERAO ESR	233.5	8.32	236.98	3.5
T-MIDC PROP ESR-1	255	6.22	258.94	3.9
T-MIDC PROP ESR-2	251	3	254.35	3.3
T-NIMKHDI ESR	228	6.32	231.83	3.8
T-NIMKHEDI PROP SUMP	213	0	216.94	3.9
T-NIMKHEDI PROP. ESR	234	3.92	236.46	2.5
T-NITYANAND ESR	273.5	7.24	278.08	4.6
T-NITYANAND PROP. ESR	294	4.43	297.79	3.8

T-NITYANAND PROP.SUMP	268	0	277.44	9.4
T-PIMPRALA ESR	230.5	8.47	233.98	3.5
T-SHAMAPRASAD	233.5	8.14	237.18	3.7
T-SINDHI COLONY ESR	245	12.83	248.53	3.5
T-SUPREME PROP ESR-1	280	3.83	283.43	3.4
T-SUPREME PROP ESR-2	320	4.39	323	3

Design Pipe Report of Existing and Proposed Feeder System Yr. 2048										
Label	**Length (m)**	**Start Node**	**Stop Node**	**Diameter (mm)**	**Material**	**Hazen-Williams C**	**Flow (MLD)**	**Velocity (m/s)**	**Hf Gradient (m/km)**	**Notes**
P-8	19	J-6	J-4	1,000.00	PSC	140.00	27.13	0.40	0.13	E
P-9	2,051	J-6	J-7	800.00	PSC	140.00	27.03	0.62	0.39	E
P-17	442	J-3	J-15	600.00	Steel	100.00	21.02	0.86	1.85	E
P-4	743	J-2	J-18	1,000.00	PSC	140.00	13.10	0.19	0.03	E
P-2	1,548	J-32	J-34	1,500.00	PSC	140.00	136.49	0.89	0.37	E
P-3	595	J-34	J-2	1,500.00	PSC	140.00	127.07	0.83	0.32	E
P-1	9,525	R-1	J-32	1,500.00	PSC	140.00	144.71	0.95	0.41	E
P-56	1,506	J-41	J-38	600.00	Steel	100.00	11.67	0.48	0.62	E
P-58	10	J-42	J-41	600	Steel	100.00	11.67	0.48	0.62	E
P-59	10	T- DSP SUMP	PRV-1	600	Steel	100.00	20.80	0.85	1.82	E
P-75	171	J-45	T-DSP OLD ESR	450	Steel	100.00	9.13	0.66	1.61	E
P-81	3,891	J-47	T-SHAMAPRASAD	500	PSC	140.00	8.14	0.48	0.42	E
P-105	256	J-38	T-NITYANAND ESR	600.00	Steel	100.00	7.24	0.30	0.26	E
P-107	30	J-42	T-DSP NEW ESR	500.00	Cast iron	100.00	9.13	0.54	0.96	E

P-108	5	J-28	PRV-10	600.00	PSC	140.00	8.32	0.34	0.18	E
P-109	181	PRV-10	T-KHANDERAO ESR	600	PSC	140.00	8.32	0.34	0.18	E
P-110	5	J-8	PRV-11	600	PSC	140.00	8.47	0.35	0.19	E
P-111	181	PRV-11	T-PIMPRALA ESR	600	PSC	140.00	8.47	0.35	0.18	E
P-112	5	J-8	PRV-14	600	PSC	140.00	6.32	0.26	0.11	E
P-113	1,675	PRV-14	T-NIMKHDI ESR	600	PSC	140.00	6.32	0.26	0.11	E
P-115	69	T-GIRNA-3	J-24	750	Cast iron	100.00	27.13	0.71	1.00	E
P-116	48	J-4	PRV-16	550	Steel	100.00	27.13	1.32	4.54	E
P-117	24	PRV-16	T-GIRNA-3	550	Steel	100.00	27.13	1.32	4.54	E
P-120	7	J-15	PRV-18	600	Steel	100.00	12.83	0.53	0.74	E
P-121	643	PRV-18	T-SINDHI COLONY ESR	600	Steel	100.00	12.83	0.53	0.74	E
P-126	7	J-15	PRV-21	600	Steel	100.00	8.19	0.34	0.32	E
P-127	520	PRV-21	T- AKASHWANI ESR	600	Steel	100.00	8.19	0.34	0.32	E
P-130	8	J-18	PRV-23	600	PSC	140.00	3.88	0.16	0.04	E
P-131	1,716	PRV-23	T-DREAMLAND ESR	600	PSC	140.00	3.88	0.16	0.04	E
P-144	5	J-49	PRV-29	450	PSC	140.00	6.22	0.45	0.42	E

P-145	88	PRV-29	T-GENDALAL EXIST.ESR	450	PSC	140.00	6.22	0.45	0.42	E
P-68	30	PMP-6	T-SUPREME PROP ESR-1	300	Ductile Iron	135.00	3.83	0.63	1.33	N2018
P-91	735	PMP-9	T-NIMKHEDI PROP. ESR	400	Ductile Iron	135.00	3.92	0.36	0.34	N2018
P-94	5	T- SUPREME SUMP	PRV-3	300	Ductile Iron	135.00	3.83	0.63	1.33	N2018
P-95	5	PRV-3	PMP-6	300	Ductile Iron	135.00	3.83	0.63	1.33	N2018
P-98	3	T-NIMKHEDI PROP SUMP	PRV-5	400	Ductile Iron	135.00	3.92	0.36	0.34	N2018
P-99	7	PRV-5	PMP-9	400	Ductile Iron	135.00	3.92	0.36	0.34	N2018
P-100	11	J-34	PRV-6	600	Ductile Iron	135.00	9.42	0.39	0.24	N2018
P-101	1,604	PRV-6	T- RAYMOND ESR	600	Ductile Iron	135.00	9.42	0.39	0.24	N2018
P-118	17	J-8	PRV-17	400	Ductile Iron	135.00	3.92	0.36	0.34	N2018
P-119	183	PRV-17	T-NIMKHEDI PROP SUMP	400	Ductile Iron	135.00	3.92	0.36	0.34	N2018

P-128	6	J-18	PRV-22	500	Ductile Iron	135.00	6.22	0.37	0.27	N2018
P-129	264	PRV-22	T-MIDC PROP ESR-1	500	Ductile Iron	135.00	6.22	0.37	0.27	N2018
P-136	10	J-32	PRV-26	500	Ductile Iron	135.00	8.22	0.48	0.45	N2018
P-137	986	PRV-26	T- SUPREME SUMP	500	Ductile Iron	135.00	8.22	0.48	0.45	N2018
P-57	10	J-12	J-42	600	Ductile Iron	135.00	20.80	0.85	1.04	N2033
P-61	5	PRV-1	PMP-1	450	Ductile Iron	135.00	8.24	0.60	0.76	N2033
P-62	5	PMP-1	J-12	450	Ductile Iron	135.00	8.24	0.60	0.76	N2033
P-64	5	PRV-1	PMP-2	450	Ductile Iron	135.00	12.56	0.91	1.66	N2033
P-65	5	PMP-2	J-12	450	Ductile Iron	135.00	12.56	0.91	1.66	N2033
P-71	3,069	PMP-7	T-SUPREME PROP ESR-2	400	Ductile Iron	135.00	4.39	0.40	0.42	N2033
P-73	10	PMP-8	T-NITYANAND PROP. ESR	400	Ductile Iron	135.00	4.43	0.41	0.43	N2033

P-82	26	J-46	J-47	500	Ductile Iron	135.00	8.14	0.48	0.45	N2033
P-92	2	T-NITYANAND PROP.SUMP	PRV-2	400	Ductile Iron	135.00	4.43	0.41	0.43	N2033
P-93	3	PRV-2	PMP-8	400	Ductile Iron	135.00	4.43	0.41	0.43	N2033
P-96	3	T- SUPREME SUMP	PRV-4	400	Ductile Iron	135.00	4.39	0.40	0.42	N2033
P-97	7	PRV-4	PMP-7	400	Ductile Iron	135.00	4.39	0.40	0.42	N2033
P-103	1,639	J-38	T-NITYANAND PROP.SUMP	400	Ductile Iron	135.00	4.43	0.41	0.43	N2033
P-134	7	J-6	PRV-25	450	Ductile Iron	135.00	8.86	0.64	0.87	N2033
P-135	66	PRV-25	T-GIRNA ESR	450	Ductile Iron	135.00	8.86	0.64	0.87	N2033
P-142	5	J-49	PRV-28	500	Ductile Iron	135.00	5.60	0.33	0.22	N2033
P-143	90	PRV-28	T-GENDALAL PROP.ESR	500	Ductile Iron	135.00	5.60	0.33	0.22	N2033
P-150	5	J-5	PRV-31	450	Steel	140.00	9.13	0.66	0.86	N2033

P-151	5	PRV-31	J-45	450.00	Steel	140.00	9.13	0.66	0.86	N2033
P-140	5	J-48	PRV-27	500.00	Ductile Iron	135.00	7.17	0.42	0.35	N2048
P-141	2,196	PRV-27	T-GENDALAL+SHYAM PRASAD PROP.ESR	500.00	Ductile Iron	135.00	7.17	0.42	0.35	N2048
P-146	5	J-18	PRV-30	400	Ductile Iron	135.00	3.00	0.28	0.21	N2048
P-147	3,167	PRV-30	T-MIDC PROP ESR-2	400.00	Ductile Iron	135.00	3.00	0.28	0.21	N2048
P-5	2,236	J-2	J-3	1,200.00	Steel	140.00	113.97	1.17	0.78	R2033
P-6	772	J-3	J-5	1,200.00	Steel	140.00	92.95	0.95	0.53	R2033
P-7	886	J-5	J-6	1,200.00	Steel	140.00	63.02	0.64	0.26	R2033
P-10	1,228	J-7	J-28	800	Ductile Iron	135.00	27.03	0.62	0.42	R2033
P-11	1,687	J-28	J-8	800	Ductile Iron	135.00	18.71	0.43	0.21	R2033
P-78	15	J-24	J-46	800	Ductile Iron	135.00	27.13	0.62	0.42	R2033
P-83	4,046	J-46	J-49	800	Ductile Iron	135.00	18.99	0.44	0.22	R2033

P-85	313	J-48	J-49	500	Ductile Iron	135.00	-7.17	0.42	0.35	R2033
P-132	6	J-5	PRV-24	600	Ductile Iron	135.00	20.80	0.85	1.04	R2033
P-133	133	PRV-24	T- DSP SUMP	600	Ductile Iron	135.00	20.80	0.85	1.04	R2033

MASS BALANCE CALCULATION

FOR ESR CAPACITY

Zone 1:- GENDALAL ESR Command Area

Name of ESR:-GENDALAL EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**8.32 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**surplus/deficit**
0(initial storage)	2000	2000		0	0	2000
1	0	2000		0	0	2000
2	0	2000		0	0	2000
3	0	2000		0	0	2000
4	0	2000		0	0	2000
5	0	2000		0	0	2000
6	0	2000	3.00	936.249	936.249	1063.75
7	796.23	2796.23	3.00	936.249	1872.498	923.732
8	796.23	3592.46	3.00	936.249	2808.747	783.713
9	712.89	4305.35	3.00	936.249	3744.996	560.354
10	712.89	5018.24		0	3744.996	1273.24
11	796.23	5814.47		0	3744.996	2069.47
12	0	5814.47		0	3744.996	2069.47

13	0	5814.47		0	3744.996	2069.47
14	0	5814.47		0	3744.996	2069.47
15	0	5814.47		0	3744.996	2069.47
16	0	5814.47	3.00	936.249	4681.245	1133.23
17	796.23	6610.7	3.00	936.249	5617.494	993.206
18	800	7410.7	3.00	936.249	6553.743	856.957
19	700.55	8111.25	3.00	936.249	7489.992	621.258
20	700.89	8812.14		0	7489.992	1322.15
21	678.32	9490.46		0	7489.992	2000.47
22	0	9490.46		0	7489.992	2000.47
23	0	9490.46		0	7489.992	2000.47
24	0	9490.46		0	7489.992	2000.47

	Required Capacity		**2069.47**	**Cum**	
	Existing Capacity		**2000**	**Cum**	**Sufficient**
	Proposed Cap. for 2033		**0**	**Cum**	
	Balance Capacity		**69.474**	**Cum**	**Negligible**

Name of ESR:- GENDALAL EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	**6.08 ML** [inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1170	1170	0.0	0	0	1170
1	0	1170	0.2	48.656	48.656	1121.344
2	0	1170	0.2	48.656	97.312	1072.688
3	0	1170	0.2	48.656	145.968	1024.032
4	0	1170	0.2	48.656	194.624	975.376
5	0	1170	0.4	103.394	298.018	871.982
6	0	1170	1.0	255.444	553.462	616.538
7	0	1170	2.0	504.806	1058.268	111.732
8	881.64	2051.64	2.5	632.528	1690.796	360.844
9	881.64	2933.28	2.5	632.528	2323.324	609.956
10	881.64	3814.92	2.0	504.806	2828.13	986.79
11	881.64	4696.56	1.5	383.166	3211.296	1485.264
12	0	4696.56	1.5	383.166	3594.462	1102.098
13	0	4696.56	0.8	200.706	3795.168	901.392

14	0	4696.56	0.6	152.05	3947.218	749.342
15	0	4696.56	0.6	152.05	4099.268	597.292
16	0	4696.56	1.3	328.428	4427.696	268.864
17	881.64	5578.2	1.5	383.166	4810.862	767.338
18	881.64	6459.84	1.5	383.166	5194.028	1265.812
19	0	6459.84	1.2	304.1	5498.128	961.712
20	0	6459.84	0.7	176.378	5674.506	785.334
21	0	6459.84	0.6	152.05	5826.556	633.284
22	0	6459.84	0.4	103.394	5929.95	529.89
23	0	6459.84	0.4	103.394	6033.344	426.496
24	881.64	7341.48	0.2	48.656	6082	1259.48

	Required Capacity	**1485.26**	**cum**	
	Existing Capacity	**2000**	**cum**	**> Reqd.**
	Proposed Cap. for 2033	**0**	**cum**	
	Balance Capacity	**-514.736**	**cum**	

Name of ESR:-GENDALAL PROP. ESR (24x7 water supply)	**2033**
Demand 2033:-	**5.69 ML** [inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1770	1770	0.0	0	0	1770
1	0	1770	0.2	47.42	47.42	1722.6
2	0	1770	0.2	47.42	94.83	1675.2
3	0	1770	0.2	47.42	142.25	1627.8
4	0	1770	0.2	47.42	189.67	1580.3
5	0	1770	0.4	94.83	284.50	1485.5
6	0	1770	1.0	237.08	521.58	1248.4
7	0	1770	2.0	474.17	995.75	774.3
8	0	1770	2.5	592.71	1588.46	181.5
9	783.68	2553.68	2.5	592.71	2181.17	372.5
10	783.68	3337.36	2.0	474.17	2655.33	682.0
11	783.68	4121.04	1.5	355.63	3010.96	1110.1
12	783.68	4904.72	1.5	355.63	3366.58	1538.1
13	700.2	5604.92	0.8	189.67	3556.25	2048.7

14	0	5604.92	0.6	142.25	3698.50	1906.4
15	0	5604.92	0.6	142.25	3840.75	1764.2
16	0	5604.92	1.3	308.21	4148.96	1456.0
17	0	5604.92	1.5	355.63	4504.58	1100.3
18	0	5604.92	1.5	355.63	4860.21	744.7
19	0	5604.92	1.2	284.50	5144.71	460.2
20	783.68	6388.6	0.7	165.96	5310.67	1077.9
21	783.68	7172.28	0.6	142.25	5452.92	1719.4
22	0	7172.28	0.4	94.83	5547.75	1624.5
23	0	7172.28	0.4	94.83	5642.58	1529.7
24	0	7172.28	0.2	47.42	5690.00	1482.28

	Required Capacity		**2048.67**	**cum**	
	Existing Capacity		**0**	**cum**	**Sufficient**
	Proposed Cap. for 2033		**2000**	**cum**	
	Balance Capacity		**48.67**	**cum**	**Negligible**

Name of ESR:GENDALAL EXISTING ESR (24x7 water supply)	2048
Demand 2048:-	**6.081 ML[inclusive of fire demand and @ 10% distribution]**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/ deficit
0(initial storage)	1530	1530	0.0	0	0	1530
1	0	1530	0.2	48.648	48.648	1481.352
2	0	1530	0.2	48.648	97.296	1432.704
3	0	1530	0.2	48.648	145.944	1384.056
4	0	1530	0.2	48.648	194.592	1335.408
5	0	1530	0.4	103.377	297.969	1232.031
6	0	1530	1.0	255.402	553.371	976.629
7	0	1530	2.0	504.723	1058.094	471.906
8	826.4	2356.4	2.5	632.424	1690.518	665.882
9	846.2	3202.6	2.5	632.424	2322.942	879.658
10	846.2	4048.8	2.0	504.723	2827.665	1221.135
11	846.2	4895	1.5	383.103	3210.768	1684.232
12	0	4895	1.5	383.103	3593.871	1301.129

13	0	4895	0.8	200.673	3794.544	1100.456
14	0	4895	0.6	152.025	3946.569	948.431
15	0	4895	0.6	152.025	4098.594	796.406
16	0	4895	1.3	328.374	4426.968	468.032
17	0	4895	1.5	383.103	4810.071	84.929
18	846.2	5741.2	1.5	383.103	5193.174	548.026
19	846.2	6587.4	1.2	304.05	5497.224	1090.176
20	846.2	7433.6	0.7	176.349	5673.573	1760.027
21	0	7433.6	0.6	152.025	5825.598	1608.002
22	0	7433.6	0.4	103.377	5928.975	1504.625
23	0	7433.6	0.4	103.377	6032.352	1401.248
24	0	7433.6	0.2	48.648	6081	1352.6

	Required Capacity	**1760.03**	**Cum**
	Existing Capacity	**2000**	**Cum> Required**
	Proposed Cap. for 2033	**0**	**Cum**
	Balance Capacity	**-239.973**	**Cum**

Name of ESR:- GENDALAL PROP. ESR (24x7 water supply)	2048
Demand 2048:-	5.6 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24 hrs

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	1770	1770	0.0	0	0	1770
1	0	1770	0.2	43.8	43.8	1726.2
2	0	1770	0.2	43.8	87.6	1682.4
3	0	1770	0.2	43.8	131.4	1638.6
4	0	1770	0.2	43.8	175.2	1594.8
5	0	1770	0.4	93.075	268.275	1501.725
6	0	1770	1.0	229.95	498.225	1271.775
7	0	1770	2.0	454.425	952.65	817.35
8	0	1770	2.5	569.4	1522.05	247.95
9	783.68	2553.68	2.5	569.4	2091.45	462.23
10	783.68	3337.36	2.0	454.425	2545.875	791.485
11	783.68	4121.04	1.5	344.925	2890.8	1230.24

12	783.68	4904.72	1.5	344.925	3235.725	1668.995
13	500.23	5404.95	0.8	180.675	3416.4	1988.55
14	0	5404.95	0.6	136.875	3553.275	1851.675
15	0	5404.95	0.6	136.875	3690.15	1714.8
16	0	5404.95	1.3	295.65	3985.8	1419.15
17	0	5404.95	1.5	344.925	4330.725	1074.225
18	0	5404.95	1.5	344.925	4675.65	729.3
19	0	5404.95	1.2	273.75	4949.4	455.55
20	783.68	6188.63	0.7	158.775	5108.175	1080.455
21	783.68	6972.31	0.6	136.875	5245.05	1727.26
22	0	6972.31	0.4	93.075	5338.125	1634.185
23	0	6972.31	0.4	93.075	5431.2	1541.11
24	0	6972.31	0.2	43.8	5475	1497.31

	Required Capacity	**1988.55**	**Cum**	
	Existing Capacity	**0**	**Cum**	
	Proposed Capacity for 2033	**2000**	**Cum**	**Sufficient**
	Balance Capacity	**-11.45**	**Cum**	

Zone 2:- AAKASHWANI ESR Command Area

Name of ESR:-AAKASHWANI EXISTING ESR (Intermittent water supply)	2018
Demand 2018:-	**6.37 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	2500	2500		0	0	2500
1	0	2500		0	0	2500
2	0	2500		0	0	2500
3	0	2500		0	0	2500
4	0	2500		0	0	2500
5	0	2500		0	0	2500
6	0	2500	3.00	796.25	796.25	1703.75
7	0	2500	3.00	796.25	1592.5	907.5
8	0	2500	3.00	796.25	2388.75	111.25
9	1470	3970	3.00	796.25	3185	785
10	1470	5440		0	3185	2255

11	0	5440		0	3185	2255
12	0	5440		0	3185	2255
13	0	5440		0	3185	2255
14	0	5440		0	3185	2255
15	0	5440		0	3185	2255
16	0	5440	3.00	796.25	3981.25	1458.75
17	0	5440	3.00	796.25	4777.5	662.5
18	995.8	6435.8	3.00	796.25	5573.75	862.05
19	995.8	7431.6	3.00	796.25	6370	1061.6
20	1470	8901.6		0	6370	2531.6
21	0	8901.6		0	6370	2531.6
22	0	8901.6		0	6370	2531.6
23	0	8901.6		0	6370	2531.6
24	0	8901.6		0	6370	2531.6

Required Capacity	**2531.6**	**cum**	
Existing Capacity	**2500**	**cum**	**Sufficient**
Prop. Cap. for 2018	**0**	**cum**	
Balance Capacity	**31.6**	**cum**	**Negligible**

Name of ESR:-AAKASHWANI EXISTING ESR (24x7 water supply)	2033
Demand 2033:-	**7.24 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	surplus/ deficit
0(initial storage)	2360	2360	0.0	0	0	2360
1	0	2360	0.2	57.92	57.92	2302.08
2	0	2360	0.2	57.92	115.84	2244.16
3	0	2360	0.2	57.92	173.76	2186.24
4	0	2360	0.2	57.92	231.68	2128.32
5	0	2360	0.4	123.08	354.76	2005.24
6	0	2360	1.0	304.08	658.84	1701.16
7	0	2360	2.0	600.92	1259.76	1100.24
8	0	2360	2.5	752.96	2012.72	347.28
9	1077.55	3437.55	2.5	752.96	2765.68	671.87102
10	1077.55	4515.10	2.0	600.92	3366.6	1148.502
11	0	4515.10	1.5	456.12	3822.72	692.38204

12	1077.55	5592.65	1.5	456.12	4278.84	1313.8131
13	0	5592.65	0.8	238.92	4517.76	1074.8931
14	1077.55	6670.20	0.6	181	4698.76	1971.4431
15	700.23	7370.43	0.6	181	4879.76	2490.6731
16	0	7370.43	1.3	390.96	5270.72	2099.7131
17	0	7370.43	1.5	456.12	5726.84	1643.5931
18	0	7370.43	1.5	456.12	6182.96	1187.4731
19	0	7370.43	1.2	362	6544.96	825.47306
20	0	7370.43	0.7	209.96	6754.92	615.51306
21	0	7370.43	0.6	181	6935.92	434.51306
22	0	7370.43	0.4	123.08	7059	311.43306
23	1077.55	8447.98	0.4	123.08	7182.08	1265.9041
24	1077.55	9525.53	0.2	57.92	7240	2285.5341

Required Capacity	**2490.67**	**cum**	
Existing Capacity	**2500**	**cum**	**> Reqd.**
Proposed Cap. for 2033	**0**	**cum**	
Balance Capacity	**-9.32694**	**cum**	

Name of ESR:-AAKASHWANI EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**8.01 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	2110	2110	0.0	0	0	2110
1	0	2110	0.2	64.08	64.08	2045.92
2	0	2110	0.2	64.08	128.16	1981.84
3	0	2110	0.2	64.08	192.24	1917.76
4	0	2110	0.2	64.08	256.32	1853.68
5	0	2110	0.4	136.17	392.49	1717.51
6	0	2110	1.0	336.42	728.91	1381.09
7	0	2110	2.0	664.83	1393.74	716.26
8	1077.56	3187.56	2.5	833.04	2226.78	960.78
9	1077.56	4265.12	2.5	833.04	3059.82	1205.3
10	1077.56	5342.68	2.0	664.83	3724.65	1618.03

11	0	5342.68	1.5	504.63	4229.28	1113.4
12	0	5342.68	1.5	504.63	4733.91	608.77
13	1077.56	6420.24	0.8	264.33	4998.24	1422
14	1077.56	7497.8	0.6	200.25	5198.49	2299.31
15	0	7497.8	0.6	200.25	5398.74	2099.06
16	0	7497.8	1.3	432.54	5831.28	1666.52
17	0	7497.8	1.5	504.63	6335.91	1161.89
18	0	7497.8	1.5	504.63	6840.54	657.26
19	0	7497.8	1.2	400.5	7241.04	256.76
20	1077.56	8575.36	0.7	232.29	7473.33	1102.03
21	1077.56	9652.92	0.6	200.25	7673.58	1979.34
22	600.56	10253.48	0.4	136.17	7809.75	2443.73
23	0	10253.48	0.4	136.17	7945.92	2307.56
24	0	10253.48	0.2	64.08	8010	2243.48

Required Capacity	**2443.73**	**cum**	
Existing Capacity	**2500**	**cum**	**> Required**
Proposed Cap. for 2033	**0**	**cum**	
Balance Capacity	**-56.27**	**cum**	

Zone 3:- DSP Existing ESR Command Area

Name of ESR:-DSP-1 EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**7.74ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1180	1180		0	0	1180
1	375.23	1555.23		0	0	1555.23
2	375.23	1930.46		0	0	1930.46
3	375.23	2305.69		0	0	2305.69
4	375.23	2680.92		0	0	2680.92
5	0	2680.92		0	0	2680.92
6	0	2680.92	3.00	967.5	967.5	1713.42
7	397.23	3078.15	3.00	967.5	1935	1143.15
8	397.23	3475.38	3.00	967.5	2902.5	572.88
9	397.23	3872.61	3.00	967.5	3870	2.61
10	389.23	4261.84		0	3870	391.84
11	389.23	4651.07		0	3870	781.07

12	389.23	5040.3		0	3870	1170.3
13	389.23	5429.53		0	3870	1559.53
14	389.23	5818.76		0	3870	1948.76
15	389.23	6207.99		0	3870	2337.99
16	375.23	6583.22	3.00	967.5	4837.5	1745.72
17	389.23	6972.45	3.00	967.5	5805	1167.45
18	389.23	7361.68	3.00	967.5	6772.5	589.18
19	389.23	7750.91	3.00	967.5	7740	10.91
20	350.73	8101.64		0	7740	361.64
21	350.73	8452.37		0	7740	712.37
22	350.73	8803.1		0	7740	1063.1
23	350.73	9153.83		0	7740	1413.83
24	0	9153.83		0	7740	1413.83

	Required Capacity	**2680.92**	**cum**	
	Existing Capacity	**2800**	**cum**	**Sufficient**
	Proposed Capacity for 2018	**0**	**cum**	
	Balance Capacity	**-119.08**	**cum**	

Name of ESR:- DSP-2 EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**3.48 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**surplus/ deficit**
0(initial storage)	2800	2800		0	0	2800
1	0	2800		0	0	2800
2	0	2800		0	0	2800
3	0	2800		0	0	2800
4	0	2800		0	0	2800
5	0	2800		0	0	2800
6	0	2800	3.00	435	435	2365
7	0	2800	3.00	435	870	1930
8	0	2800	3.00	435	1305	1495
9	0	2800	3.00	435	1740	1060
10	0	2800		0	1740	1060
11	0	2800		0	1740	1060
12	0	2800		0	1740	1060

13	0	2800		0	1740	1060
14	0	2800		0	1740	1060
15	0	2800		0	1740	1060
16	0	2800	3.00	435	2175	625
17	626.48	3426.48	3.00	435	2610	816.48
18	614.47	4040.95	3.00	435	3045	995.95
19	480.81	4521.76	3.00	435	3480	1041.76
20	571.42	5093.18		0	3480	1613.18
21	505.53	5598.71		0	3480	2118.71
22	596.19	6194.9		0	3480	2714.9
23	0	6194.9		0	3480	2714.9
24	0	6194.9		0	3480	2714.9

	Required Capacity	**2800**	**cum**	
	Existing Capacity	**2800**	**cum**	**sufficient**
	Proposed Cap. 2018	**0**	**cum**	
	Balance Capacity	**0**	**cum**	

Name of ESR:-DSP-1 EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	**8.8 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**surplus/ deficit**
0(initial storage)	1160	1160	0.00	0	0	1160
1	1100.00	2260	0.20	73.33	73.33	2186.67
2	0.00	2260	0.20	73.33	146.67	2113.33
3	0.00	2260	0.20	73.33	220.00	2040.00
4	0.00	2260	0.20	73.33	293.33	1966.67
5	0.00	2260	0.40	146.67	440.00	1820.00
6	0.00	2260	1.00	366.67	806.67	1453.33
7	0.00	2260	2.00	733.33	1540.00	720.00
8	1100.00	3360	2.50	916.67	2456.67	903.33
9	1100.00	4460	2.50	916.67	3373.33	1086.67
10	0.00	4460	2.00	733.33	4106.67	353.33

11	1100.00	5560	1.50	550.00	4656.67	903.33
12	0.00	5560	1.50	550.00	5206.67	353.33
13	0.00	5560	0.80	293.33	5500.00	60.00
14	1100.00	6660	0.60	220.00	5720.00	940.00
15	1100.00	7760	0.60	220.00	5940.00	1820.00
16	1100.00	8860	1.30	476.67	6416.67	2443.33
17	0.00	8860	1.50	550.00	6966.67	1893.33
18	0.00	8860	1.50	550.00	7516.67	1343.33
19	0.00	8860	1.20	440.00	7956.67	903.33
20	0	8860	0.70	256.67	8213.33	646.67
21	0	8860	0.60	220.00	8433.33	426.67
22	0	8860	0.40	146.67	8580.00	280.00
23	1100.00	9960	0.40	146.67	8726.67	1233.33
24	0.00	9960	0.20	73.33	8800.00	1160.00

Required Capacity	**2443.33**	**cum**	
Existing Capacity	**2800**	**cum**	> reqd.
Proposed Capacity for 2033	**0**	**cum**	
Balance Capacity	**-356.667**	**cum**	

Name of ESR:-DSP-2 EXISTING ESR (24x7 water supply)	2033
Demand 2033:-	**5.66 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**24hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	1960	1960	0.0	0	0	1960
1	900.15	2860.15	0.2	45.28	45.28	2814.87
2	0	2860.15	0.2	45.28	90.56	2769.59
3	0	2860.15	0.2	45.28	135.84	2724.31
4	0	2860.15	0.2	45.28	181.12	2679.03
5	0	2860.15	0.4	96.22	277.34	2582.81
6	0	2860.15	1.0	237.72	515.06	2345.09
7	0	2860.15	2.0	469.78	984.84	1875.31
8	0	2860.15	2.5	588.64	1573.48	1286.67
9	0	2860.15	2.5	588.64	2162.12	698.03
10	0	2860.15	2.0	469.78	2631.9	228.25
11	1253.2	4113.35	1.5	356.58	2988.48	1124.87
12	1253.2	5366.55	1.5	356.58	3345.06	2021.49

13	0	5366.55	0.8	186.78	3531.84	1834.71
14	0	5366.55	0.6	141.5	3673.34	1693.21
15	0	5366.55	0.6	141.5	3814.84	1551.71
16	0	5366.55	1.3	305.64	4120.48	1246.07
17	0	5366.55	1.5	356.58	4477.06	889.49
18	1253.2	6619.75	1.5	356.58	4833.64	1786.11
19	1253.2	7872.95	1.2	283	5116.64	2756.31
20	0	7872.95	0.7	164.14	5280.78	2592.17
21	0	7872.95	0.6	141.5	5422.28	2450.67
22	0	7872.95	0.4	96.22	5518.5	2354.45
23	0	7872.95	0.4	96.22	5614.72	2258.23
24	0	7872.95	0.2	45.28	5660	2212.95

Required Capacity	**2814.87**	**cum**	
Existing Capacity	**2800**	**cum**	Sufficient
Proposed Capacity for 2033	**0**	**cum**	
Balance Capacity	**14.87**	**cum**	

Name of ESR:-DSP-1 EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**8.897 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	2600	2600	0.00	0	0	2600
1	0	2600	0.20	74.14	74.14	2525.86
2	0	2600	0.20	74.14	148.28	2451.72
3	0	2600	0.20	74.14	222.43	2377.58
4	0	2600	0.20	74.14	296.57	2303.43
5	0	2600	0.40	148.28	444.85	2155.15
6	0	2600	1.00	370.71	815.56	1784.44
7	0	2600	2.00	741.42	1556.98	1043.03
8	1800	4400	2.50	926.77	2483.75	1916.25
9	1800	6200	2.50	926.77	3410.52	2789.48
10	0	6200	2.00	741.42	4151.93	2048.07
11	0	6200	1.50	556.06	4708.00	1492.00
12	0	6200	1.50	556.06	5264.06	935.94

13	0	6200	0.80	296.57	5560.63	639.38
14	682.97	6882.97	0.60	222.43	5783.05	1099.92
15	682.97	7565.94	0.60	222.43	6005.48	1560.47
16	594.18	8160.12	1.30	481.92	6487.40	1672.72
17	682.97	8843.09	1.50	556.06	7043.46	1799.63
18	1556.62	10399.71	1.50	556.06	7599.52	2800.19
19	0	10399.71	1.20	444.85	8044.37	2355.34
20	0	10399.71	0.70	259.50	8303.87	2095.84
21	0	10399.71	0.60	222.43	8526.29	1873.42
22	0	10399.71	0.40	148.28	8674.58	1725.14
23	682.97	11082.68	0.40	148.28	8822.86	2259.82
24	428.7	11511.38	0.20	74.14	8897.00	2614.38

	Required Capacity	**2800.19**	**cum**	
	Existing Capacity	**2800**	**cum**	Sufficient
	Proposed Cap. for 2048	**0**	**cum**	
	Balance Capacity	**0.18917**	**cum**	

Name of ESR:-DSP-2 EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**8.92 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	1900	1900	0.0	0	0	1900
1	1010.85	2910.85	0.2	71.416	71.416	2839.434
2	0	2910.85	0.2	71.416	142.832	2768.018
3	0	2910.85	0.2	71.416	214.248	2696.602
4	0	2910.85	0.2	71.416	285.664	2625.186
5	0	2910.85	0.4	151.759	437.423	2473.427
6	0	2910.85	1.0	374.934	812.357	2098.493
7	0	2910.85	2.0	740.941	1553.298	1357.552
8	0	2910.85	2.5	928.408	2481.706	429.144
9	1150.2	4061.05	2.5	928.408	3410.114	650.936
10	1150.2	5211.25	2.0	740.941	4151.055	1060.195
11	1247.13	6458.38	1.5	562.401	4713.456	1744.924
12	0	6458.38	1.5	562.401	5275.857	1182.523

13	0	6458.38	0.8	294.591	5570.448	887.932
14	0	6458.38	0.6	223.175	5793.623	664.757
15	1247.12	7705.5	0.6	223.175	6016.798	1688.702
16	0	7705.5	1.3	482.058	6498.856	1206.644
17	0	7705.5	1.5	562.401	7061.257	644.243
18	0	7705.5	1.5	562.401	7623.658	81.842
19	1150.2	8855.7	1.2	446.35	8070.008	785.692
20	0	8855.7	0.7	258.883	8328.891	526.809
21	1150.2	10005.9	0.6	223.175	8552.066	1453.834
22	0	10005.9	0.4	151.759	8703.825	1302.075
23	1150.2	11156.1	0.4	151.759	8855.584	2300.516
24	0	11156.1	0.2	71.416	8927	2229.1

Required Capacity	**2839.43**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Cap. for 2048	**0**	**cum**
Balance Capacity	**39.434**	**cum**

Zone 4:- Nityanand Existing ESR Command Area

Name of ESR:-NITYANAND EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**4.87 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1078	1078		0	0	1078
1	537.28	1615.28		0	0	1615.28
2	543.06	2158.34		0	0	2158.34
3	548.19	2706.53		0	0	2706.53
4	0	2706.53		0	0	2706.53
5	0	2706.53		0	0	2706.53
6	0	2706.53	3.00	608.75	608.75	2097.78
7	0	2706.53	3.00	608.75	1217.5	1489.03
8	0	2706.53	3.00	608.75	1826.25	880.28
9	0	2706.53	3.00	608.75	2435	271.53
10	476.14	3182.67		0	2435	747.67

11	415.19	3597.86		0	2435	1162.86
12	550.45	4148.31		0	2435	1713.31
13	504.97	4653.28		0	2435	2218.28
14	554.06	5207.34		0	2435	2772.34
15	0	5207.34		0	2435	2772.34
16	0	5207.34	3.00	608.75	3043.75	2163.59
17	0	5207.34	3.00	608.75	3652.5	1554.84
18	0	5207.34	3.00	608.75	4261.25	946.09
19	0	5207.34	3.00	608.75	4870	337.34
20	0	5207.34		0	4870	337.34
21	0	5207.34		0	4870	337.34
22	0	5207.34		0	4870	337.34
23	0	5207.34		0	4870	337.34
24	486.32	5693.66		0	4870	823.66

	Required Capacity	**2772.34**	**Cum**	
	Existing Capacity	**2800**	**Cum**	**Sufficient**
	Proposed Cap. for 2018	**0**	**cum**	
	Balance Capacity	**-27.66**	**cum**	

Name of ESR:-NITYANAND EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	5.21 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	1080	1080	0.0	0	0	1080
1	574.65	1654.65	0.2	41.84	41.84	1612.81
2	584.06	2238.71	0.2	41.84	83.68	2155.03
3	584.06	2822.77	0.2	41.84	125.52	2697.25
4	0	2822.77	0.2	41.84	167.36	2655.41
5	0	2822.77	0.4	88.91	256.27	2566.5
6	0	2822.77	1.0	219.66	475.93	2346.84
7	0	2822.77	2.0	434.09	910.02	1912.75
8	0	2822.77	2.5	543.92	1453.94	1368.83
9	0	2822.77	2.5	543.92	1997.86	824.91
10	963.08	3785.85	2.0	434.09	2431.95	1353.9
11	0	3785.85	1.5	329.49	2761.44	1024.41

12	0	3785.85	1.5	329.49	3090.93	694.92
13	548.16	4334.01	0.8	172.59	3263.52	1070.49
14	560.87	4894.88	0.6	130.75	3394.27	1500.61
15	571.98	5466.86	0.6	130.75	3525.02	1941.84
16	987.13	6453.99	1.3	282.42	3807.44	2646.55
17	0	6453.99	1.5	329.49	4136.93	2317.06
18	0	6453.99	1.5	329.49	4466.42	1987.57
19	0	6453.99	1.2	261.5	4727.92	1726.07
20	0	6453.99	0.7	151.67	4879.59	1574.4
21	0	6453.99	0.6	130.75	5010.34	1443.65
22	0	6453.99	0.4	88.91	5099.25	1354.74
23	0	6453.99	0.4	88.91	5188.16	1265.83
24	0	6453.99	0.2	41.84	5230	1223.99

	Required Capacity	**2697.25**	**cum**	
	Existing Capacity	**2800**	**cum**	**> Sufficient**
	Proposed Capacity for 2033	**0**	**cum**	
	Balance Capacity	**-102.75**	**cum**	

Name of ESR:-NITYANAND PROP. ESR (24x7 water supply)	**2033**
Demand 2033:-	**2.98 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	1190	1190	0.0	0	0	1190
1	235.21	1425.21	0.2	23.84	23.84	1401.37
2	0	1425.21	0.2	23.84	47.68	1377.53
3	0	1425.21	0.2	23.84	71.52	1353.69
4	0	1425.21	0.2	23.84	95.36	1329.85
5	0	1425.21	0.4	50.66	146.02	1279.19
6	0	1425.21	1.0	125.16	271.18	1154.03
7	0	1425.21	2.0	247.34	518.52	906.69
8	0	1425.21	2.5	309.92	828.44	596.77
9	0	1425.21	2.5	309.92	1138.36	286.85
10	0	1425.21	2.0	247.34	1385.7	39.51
11	247.59	1672.8	1.5	187.74	1573.44	99.36

12	234.26	1907.06	1.5	187.74	1761.18	145.88
13	240	2147.06	0.8	98.34	1859.52	287.54
14	249.2	2396.26	0.6	74.5	1934.02	462.24
15	257.21	2653.47	0.6	74.5	2008.52	644.95
16	246.26	2899.73	1.3	160.92	2169.44	730.29
17	241.19	3140.92	1.5	187.74	2357.18	783.74
18	254.85	3395.77	1.5	187.74	2544.92	850.85
19	242.22	3637.99	1.2	149	2693.92	944.07
20	241.3	3879.29	0.7	86.42	2780.34	1098.95
21	254.93	4134.22	0.6	74.5	2854.84	1279.38
22	242.33	4376.55	0.4	50.66	2905.5	1471.05
23	0	4376.55	0.4	50.66	2956.16	1420.39
24	0	4376.55	0.2	23.84	2980	1396.55

	Required Capacity	**1471.05**	**cum**	
	Existing Capacity	**0**	**cum**	
	Proposed Capacity for 2033	**1500**	**cum**	**Sufficient**
	Balance Capacity	**-28.95**	**cum**	

Name of ESR:-NITYANAND EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**7.08 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	1800	1800	0.0	0	0	1800
1	426.99	2226.99	0.2	56.64	56.64	2170.35
2	447.11	2674.1	0.2	56.64	113.28	2560.82
3	0	2674.1	0.2	56.64	169.92	2504.18
4	0	2674.1	0.2	56.64	226.56	2447.54
5	0	2674.1	0.4	120.36	346.92	2327.18
6	0	2674.1	1.0	297.36	644.28	2029.82
7	0	2674.1	2.0	587.64	1231.92	1442.18
8	953.43	3627.53	2.5	736.32	1968.24	1659.29
9	0	3627.53	2.5	736.32	2704.56	922.97
10	0	3627.53	2.0	587.64	3292.2	335.33

11	541.25	4168.78	1.5	446.04	3738.24	430.54
12	546.75	4715.53	1.5	446.04	4184.28	531.25
13	545.37	5260.9	0.8	233.64	4417.92	842.98
14	0	5260.9	0.6	177	4594.92	665.98
15	0	5260.9	0.6	177	4771.92	488.98
16	955.37	6216.27	1.3	382.32	5154.24	1062.03
17	545.29	6761.56	1.5	446.04	5600.28	1161.28
18	545.29	7306.85	1.5	446.04	6046.32	1260.53
19	0	7306.85	1.2	354	6400.32	906.53
20	543.45	7850.3	0.7	205.32	6605.64	1244.66
21	0	7850.3	0.6	177	6782.64	1067.66
22	542.56	8392.86	0.4	120.36	6903	1489.86
23	0	8392.86	0.4	120.36	7023.36	1369.5
24	544.88	8937.74	0.2	56.64	7080	1857.74

	Required Capacity	**2560.82**	**cum**	
	Existing Capacity	**2800**	**cum**	**Sufficient**
	Proposed Capacity for 2048	**0**	**cum**	
	Balance Capacity	**-239.18**	**cum**	

Name of ESR:-NITYANAND PROP. ESR (24x7 water supply)	**2048**
Demand 2048:-	**4.33 ML**[inclusive of fire demand and @ 10% distribution[
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1130	1130	0.0	0	0	1130
1	231.83	1361.83	0.2	34.64	34.64	1327.19
2	245.03	1606.86	0.2	34.64	69.28	1537.58
3	0	1606.86	0.2	34.64	103.92	1502.94
4	0	1606.86	0.2	34.64	138.56	1468.3
5	0	1606.86	0.4	73.61	212.17	1394.69
6	0	1606.86	1.0	181.86	394.03	1212.83
7	0	1606.86	2.0	359.39	753.42	853.44
8	0	1606.86	2.5	450.32	1203.74	403.12
9	257.27	1864.13	2.5	450.32	1654.06	210.07
10	257.27	2121.4	2.0	359.39	2013.45	107.95

11	257.27	2378.67	1.5	272.79	2286.24	92.43
12	245.03	2623.7	1.5	272.79	2559.03	64.67
13	245.03	2868.73	0.8	142.89	2701.92	166.81
14	245.03	3113.76	0.6	108.25	2810.17	303.59
15	245.03	3358.79	0.6	108.25	2918.42	440.37
16	245.03	3603.82	1.3	233.82	3152.24	451.58
17	245.03	3848.85	1.5	272.79	3425.03	423.82
18	245.03	4093.88	1.5	272.79	3697.82	396.06
19	245.03	4338.91	1.2	216.5	3914.32	424.59
20	245.03	4583.94	0.7	125.57	4039.89	544.05
21	245.03	4828.97	0.6	108.25	4148.14	680.83
22	245.03	5074	0.4	73.61	4221.75	852.25
23	245.03	5319.03	0.4	73.61	4295.36	1023.67
24	0	5319.03	0.2	34.64	4330	989.03

	Required Capacity	**1537.58**	**cum**	
	Existing Capacity	**1500**	**cum**	**Sufficient**
	Proposed Capacity for 2048	**0**	**cum**	
	Balance Capacity	**37.58**	**cum**	**negligible**

Zone 5:- Sindhi colony Existing ESR Command Area

Name of ESR:-SINDHI COLONY EXISTING ESR (Intermittent water supply) **2018**	
Demand 2018:-	**11.2 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	3900	3900		0	0	3900
1	0	3900		0	0	3900
2	0	3900		0	0	3900
3	0	3900		0	0	3900
4	0	3900		0	0	3900
5	0	3900		0	0	3900
6	794.2	4694.2	3.00	1400	1400	3294.2
7	794.2	5488.4	3.00	1400	2800	2688.4
8	794.2	6282.6	3.00	1400	4200	2082.6
9	794.2	7076.8	3.00	1400	5600	1476.8
10	794.2	7871		0	5600	2271

11	794.2	8665.2		0	5600	3065.2
12	794.2	9459.4		0	5600	3859.4
13	0	9459.4		0	5600	3859.4
14	0	9459.4		0	5600	3859.4
15	0	9459.4		0	5600	3859.4
16	0	9459.4	3.00	1400	7000	2459.4
17	794.2	10253.6	3.00	1400	8400	1853.6
18	794.2	11047.8	3.00	1400	9800	1247.8
19	794.2	11842	3.00	1400	11200	642
20	794.2	12636.2		0	11200	1436.2
21	794.2	13430.4		0	11200	2230.4
22	794.2	14224.6		0	11200	3024.6
23	550	14774.6		0	11200	3574.6
24	0	14774.6		0	11200	3574.6

	Required Capacity	**3900**	**cum**	
	Existing Capacity	**3900**	**cum**	**Sufficient**
	Proposed Cap for 2018	**0**	**cum**	
	Balance Capacity	**0**	**cum**	

Name of ESR:-SINDHI COLONY EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	**11.94 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	3680	3680	0.0	0	0	3680
1	0	3680	0.2	95.52	95.52	3584.48
2	0	3680	0.2	95.52	191.04	3488.96
3	0	3680	0.2	95.52	286.56	3393.44
4	0	3680	0.2	95.52	382.08	3297.92
5	0	3680	0.4	202.98	585.06	3094.94
6	0	3680	1.0	501.48	1086.54	2593.46
7	0	3680	2.0	991.02	2077.56	1602.44

8	790.3	4470.3	2.5	1241.76	3319.32	1150.98
9	790.3	5260.6	2.5	1241.76	4561.08	699.52
10	790.3	6050.9	2.0	991.02	5552.1	498.8
11	790.3	6841.2	1.5	752.22	6304.32	536.88
12	790.3	7631.5	1.5	752.22	7056.54	574.96
13	790.3	8421.8	0.8	394.02	7450.56	971.24
14	790.3	9212.1	0.6	298.5	7749.06	1463.04
15	790.3	10002.4	0.6	298.5	8047.56	1954.84
16	790.3	10792.7	1.3	644.76	8692.32	2100.38
17	790.3	11583	1.5	752.22	9444.54	2138.46
18	790.3	12373.3	1.5	752.22	10196.76	2176.54
19	790.3	13163.6	1.2	597	10793.76	2369.84
20	790.3	13953.9	0.7	346.26	11140.02	2813.88
21	790.3	14744.2	0.6	298.5	11438.52	3305.68
22	790.3	15534.5	0.4	202.98	11641.5	3893
23	0	15534.5	0.4	202.98	11844.48	3690.02
24	0	15534.5	0.2	95.52	11940	3594.5

Required Capacity	**3893**	**cum**
Existing Capacity	**3900**	**cum**
Proposed Cap. for 2018	**0**	**cum**
Balance Capacity	**-7**	**cum**

Name of ESR:-SINDHI COLONY EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**12.54 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	3370	3370	0.0	0	0	3370
1	610.3	3980.3	0.2	100.32	100.32	3879.98
2	0	3980.3	0.2	100.32	200.64	3779.66
3	0	3980.3	0.2	100.32	300.96	3679.34
4	0	3980.3	0.2	100.32	401.28	3579.02
5	0	3980.3	0.4	213.18	614.46	3365.84
6	0	3980.3	1.0	526.68	1141.14	2839.16
7	0	3980.3	2.0	1040.82	2181.96	1798.34

8	652.3	4632.6	2.5	1304.16	3486.12	1146.48
9	652.3	5284.9	2.5	1304.16	4790.28	494.62
10	786.52	6071.42	2.0	1040.82	5831.1	240.32
11	786.52	6857.94	1.5	790.02	6621.12	236.82
12	786.52	7644.46	1.5	790.02	7411.14	233.32
13	786.52	8430.98	0.8	413.82	7824.96	606.02
14	786.52	9217.5	0.6	313.5	8138.46	1079.04
15	786.52	10004.02	0.6	313.5	8451.96	1552.06
16	786.52	10790.54	1.3	677.16	9129.12	1661.42
17	786.52	11577.06	1.5	790.02	9919.14	1657.92
18	786.52	12363.58	1.5	790.02	10709.16	1654.42
19	786.52	13150.1	1.2	627	11336.16	1813.94
20	786.52	13936.62	0.7	363.66	11699.82	2236.8
21	786.52	14723.14	0.6	313.5	12013.32	2709.82
22	652.3	15375.44	0.4	213.18	12226.5	3148.94
23	652.3	16027.74	0.4	213.18	12439.68	3588.06
24	0	16027.74	0.2	100.32	12540	3487.74

Maximum surplus	**3879.98**	**cum**
Existing Capacity	**3900**	**cum**
Proposed Cap. for 2018	**0**	**cum**
Balance Capacity	**-20.02**	**cum**

Zone 6:- Khanderao Nagar Existing ESR Command Area

Name of ESR:-KHANDERAO EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**4.09 ML**[inclusive of fire demand and @ 10% distribution]
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	2800	2800		0	0	2800
1	0	2800		0	0	2800
2	0	2800		0	0	2800
3	0	2800		0	0	2800
4	0	2800		0	0	2800
5	0	2800		0	0	2800
6	0	2800	3.00	511.25	511.25	2288.75
7	0	2800	3.00	511.25	1022.5	1777.5
8	0	2800	3.00	511.25	1533.75	1266.25
9	0	2800	3.00	511.25	2045	755
10	0	2800		0	2045	755

11	0	2800		0	2045	755
12	0	2800		0	2045	755
13	0	2800		0	2045	755
14	0	2800		0	2045	755
15	0	2800		0	2045	755
16	0	2800	3.00	511.25	2556.25	243.75
17	685.71	3485.71	3.00	511.25	3067.5	418.21
18	685.71	4171.42	3.00	511.25	3578.75	592.67
19	685.71	4857.13	3.00	511.25	4090	767.13
20	685.71	5542.84		0	4090	1452.84
21	685.71	6228.55		0	4090	2138.55
22	685.71	6914.26		0	4090	2824.26
23	0	6914.26		0	4090	2824.26
24	0	6914.26		0	4090	2824.26

Required Capacity	**2824.26**	**cum**	
Existing Capacity	**2800**	**cum**	**sufficient**
Proposed Capacity for 2018	**0**	**cum**	
Balance Capacity	**24.26**	**cum**	**negligible**

Name of ESR:-KHANDERAO EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	5.82 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	800	800	0.0	0	0	800
1	861.6	1661.6	0.2	46.56	46.56	1615.04
2	861.6	2523.2	0.2	46.56	93.12	2430.08
3	0	2523.2	0.2	46.56	139.68	2383.52
4	0	2523.2	0.2	46.56	186.24	2336.96
5	0	2523.2	0.4	98.94	285.18	2238.02
6	0	2523.2	1.0	244.44	529.62	1993.58
7	0	2523.2	2.0	483.06	1012.68	1510.52
8	0	2523.2	2.5	605.28	1617.96	905.24

9	0	2523.2	2.5	605.28	2223.24	299.96
10	861.6	3384.8	2.0	483.06	2706.3	678.5
11	861.6	4246.4	1.5	366.66	3072.96	1173.44
12	861.6	5108	1.5	366.66	3439.62	1668.38
13	861.6	5969.6	0.8	192.06	3631.68	2337.92
14	511.8	6481.4	0.6	145.5	3777.18	2704.22
15	0	6481.4	0.6	145.5	3922.68	2558.72
16	0	6481.4	1.3	314.28	4236.96	2244.44
17	0	6481.4	1.5	366.66	4603.62	1877.78
18	0	6481.4	1.5	366.66	4970.28	1511.12
19	0	6481.4	1.2	291	5261.28	1220.12
20	0	6481.4	0.7	168.78	5430.06	1051.34
21	0	6481.4	0.6	145.5	5575.56	905.84
22	0	6481.4	0.4	98.94	5674.5	806.9
23	0	6481.4	0.4	98.94	5773.44	707.96
24	0	6481.4	0.2	46.56	5820	661.4

Required Capacity	**2704.22**	**cum**

Existing Capacity	**2800**	**cum**
Proposed Capacity for 2033	**0**	**cum**
Balance capacity	**-95.78**	**cum**

Name of ESR:-KHANDERAO EXISTING ESR (24x7 water supply)	2048
Demand 2048:-	**8.12 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	600	600	0.0	0	0	600
1	832.6	1432.6	0.2	64.96	64.96	1367.64
2	832.6	2265.2	0.2	64.96	129.92	2135.28
3	732.5	2997.7	0.2	64.96	194.88	2802.82
4	0	2997.7	0.2	64.96	259.84	2737.86
5	0	2997.7	0.4	138.04	397.88	2599.82
6	0	2997.7	1.0	341.04	738.92	2258.78
7	0	2997.7	2.0	673.96	1412.88	1584.82

8	0	2997.7	2.5	844.48	2257.36	740.34
9	832.6	3830.3	2.5	844.48	3101.84	728.46
10	832.6	4662.9	2.0	673.96	3775.8	887.1
11	832.6	5495.5	1.5	511.56	4287.36	1208.14
12	832.6	6328.1	1.5	511.56	4798.92	1529.18
13	832.6	7160.7	0.8	267.96	5066.88	2093.82
14	832.6	7993.3	0.6	203	5269.88	2723.42
15	0	7993.3	0.6	203	5472.88	2520.42
16	0	7993.3	1.3	438.48	5911.36	2081.94
17	0	7993.3	1.5	511.56	6422.92	1570.38
18	0	7993.3	1.5	511.56	6934.48	1058.82
19	0	7993.3	1.2	406	7340.48	652.82
20	0	7993.3	0.7	235.48	7575.96	417.34
21	0	7993.3	0.6	203	7778.96	214.34
22	0	7993.3	0.4	138.04	7917	76.3
23	832.6	8825.9	0.4	138.04	8055.04	770.86
24	0	8825.9	0.2	64.96	8120	705.9

Required Capacity	**2802.82**	**cum**

Existing Capacity	**2800**	**cum**
Proposed Capacity for 2018	**0**	**cum**
Balance Capacity	**2.82**	**cum**

Zone 7:- Pimprala Existing ESR Command Area

Name of ESR:-PIMPRALA EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**3.91 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	2570	2570		0	0	2570
1	0	2570		0	0	2570
2	0	2570		0	0	2570
3	0	2570		0	0	2570
4	0	2570		0	0	2570
5	0	2570		0	0	2570
6	0	2570	3.00	461.25	461.25	2108.75
7	0	2570	3.00	461.25	922.5	1647.5
8	0	2570	3.00	461.25	1383.75	1186.25

9	0	2570	3.00	461.25	1845	725
10	0	2570		0	1845	725
11	0	2570		0	1845	725
12	0	2570		0	1845	725
13	0	2570		0	1845	725
14	0	2570		0	1845	725
15	0	2570		0	1845	725
16	0	2570	3.00	461.25	2306.25	263.75
17	587.75	3157.75	3.00	461.25	2767.5	390.25
18	587.75	3745.5	3.00	461.25	3228.75	516.75
19	587.75	4333.25	3.00	461.25	3690	643.25
20	587.75	4921		0	3690	1231
21	587.75	5508.75		0	3690	1818.75
22	587.75	6096.5		0	3690	2406.5
23	0	6096.5		0	3690	2406.5
24	0	6096.5		0	3690	2406.5

	Required Capacity	**2570**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2018	**0**	**cum**
	Balance Capacity	**-230**	**cum**

Name of ESR:-PIMPRALA EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	**6.04 ML**inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	1540	1540	0.0	0	0	1540
1	587.75	2127.75	0.2	48.32	48.32	2079.43
2	587.75	2715.5	0.2	48.32	96.64	2618.86
3	0	2715.5	0.2	48.32	144.96	2570.54
4	0	2715.5	0.2	48.32	193.28	2522.22
5	0	2715.5	0.4	102.68	295.96	2419.54
6	0	2715.5	1.0	253.68	549.64	2165.86
7	0	2715.5	2.0	501.32	1050.96	1664.54
8	0	2715.5	2.5	628.16	1679.12	1036.38
9	0	2715.5	2.5	628.16	2307.28	408.22
10	587.75	3303.25	2.0	501.32	2808.6	494.65
11	587.75	3891	1.5	380.52	3189.12	701.88
12	587.75	4478.75	1.5	380.52	3569.64	909.11

13	587.75	5066.5	0.8	199.32	3768.96	1297.54
14	587.75	5654.25	0.6	151	3919.96	1734.29
15	587.75	6242	0.6	151	4070.96	2171.04
16	587.75	6829.75	1.3	326.16	4397.12	2432.63
17	587.75	7417.5	1.5	380.52	4777.64	2639.86
18	0	7417.5	1.5	380.52	5158.16	2259.34
19	0	7417.5	1.2	302	5460.16	1957.34
20	0	7417.5	0.7	175.16	5635.32	1782.18
21	0	7417.5	0.6	151	5786.32	1631.18
22	0	7417.5	0.4	102.68	5889	1528.5
23	0	7417.5	0.4	102.68	5991.68	1425.82
24	0	7417.5	0.2	48.32	6040	1377.5

	Required Capacity	**2639.86**	**cum**	
	Existing Capacity	**2800**	**cum**	**Sufficient**
	Proposed Cap. for 2033	**0**	**cum**	
	Balance Capacity	**-160.14**	**cum**	

Name of ESR:-PIMPRALA EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	8.28 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24 hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	2710	2710	0.0	0	0	2710
1	0	2710	0.2	66.24	66.24	2643.76
2	0	2710	0.2	66.24	132.48	2577.52
3	0	2710	0.2	66.24	198.72	2511.28
4	0	2710	0.2	66.24	264.96	2445.04
5	0	2710	0.4	140.76	405.72	2304.28
6	0	2710	1.0	347.76	753.48	1956.52
7	0	2710	2.0	687.24	1440.72	1269.28
8	0	2710	2.5	861.12	2301.84	408.16
9	587.5	3297.5	2.5	861.12	3162.96	134.54
10	587.5	3885	2.0	687.24	3850.2	34.8
11	587.5	4472.5	1.5	521.64	4371.84	100.66

12	587.5	5060	1.5	521.64	4893.48	166.52
13	587.5	5647.5	0.8	273.24	5166.72	480.78
14	587.5	6235	0.6	207	5373.72	861.28
15	587.5	6822.5	0.6	207	5580.72	1241.78
16	587.5	7410	1.3	447.12	6027.84	1382.16
17	587.5	7997.5	1.5	521.64	6549.48	1448.02
18	587.5	8585	1.5	521.64	7071.12	1513.88
19	587.5	9172.5	1.2	414	7485.12	1687.38
20	587.5	9760	0.7	240.12	7725.24	2034.76
21	587.5	10347.5	0.6	207	7932.24	2415.26
22	587.5	10935	0.4	140.76	8073	2862
23	0	10935	0.4	140.76	8213.76	2721.24
24	0	10935	0.2	66.24	8280	2655

	Required Capacity	**2862**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**62**	**cum**

Zone 8:- NimkhediShivar Existing ESR Command Area

Name of ESR:-NIMKHEDI EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**3.1 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	2400	2400		0	0	2400
1	0	2400		0	0	2400
2	0	2400		0	0	2400
3	0	2400		0	0	2400
4	0	2400		0	0	2400
5	0	2400		0	0	2400
6	0	2400	3.00	380	380	2020
7	0	2400	3.00	387.5	767.5	1632.5
8	0	2400	3.00	387.5	1155	1245
9	0	2400	3.00	380	1535	865

10	0	2400		0	1535	865
11	0	2400		0	1535	865
12	0	2400		0	1535	865
13	0	2400		0	1535	865
14	0	2400		0	1535	865
15	0	2400		0	1535	865
16	0	2400	3.00	380	1915	485
17	0	2400	3.00	380	2295	105
18	793.68	3193.68	3.00	380	2675	518.68
19	793.68	3987.36	3.00	380	3055	932.36
20	793.68	4781.04		0	3055	1726.04
21	793.68	5574.72		0	3055	2519.72
22	0	5574.72		0	3055	2519.72
23	0	5574.72		0	3055	2519.72
24	0	5574.72		0	3055	2519.72

Required Capacity	**2519.72**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Capacity for 2018	**0**	**cum**
Balance Capacity	**-280.28**	**cum**

Name of ESR:-NIMKHEDI PROP. ESR (Intermittent water supply)	2018
Demand 2018:-	**2.76 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	300	300		0	0	300
1	145.51	445.51		0	0	445.51
2	146.96	592.47		0	0	592.47
3	146.23	738.7		0	0	738.7
4	142.19	880.89		0	0	880.89
5	139.97	1020.86		0	0	1020.86
6	139.01	1159.87	3.00	345	345	814.87
7	142.99	1302.86	3.00	345	690	612.86
8	145.9	1448.76	3.00	345	1035	413.76
9	148.39	1597.15	3.00	345	1380	217.15
10	148.39	1745.54		0	1380	365.54

11	149.17	1894.71		0	1380	514.71
12	115.13	2009.84		0	1380	629.84
13	115.13	2124.97		0	1380	744.97
14	115.13	2240.1		0	1380	860.1
15	115.13	2355.23		0	1380	975.23
16	138.25	2493.48	3.00	345	1725	768.48
17	141.12	2634.6	3.00	345	2070	564.6
18	144.94	2779.54	3.00	345	2415	364.54
19	148.02	2927.56	3.00	345	2760	167.56
20	150.78	3078.34		0	2760	318.34
21	148.77	3227.11		0	2760	467.11
22	0	3227.11		0	2760	467.11
23	0	3227.11		0	2760	467.11
24	0	3227.11		0	2760	467.11

	Required Capacity	**1020.86**	**cum**
	Existing Capacity	0	**cum**
	Proposed Capacity for 2018	**1500**	**cum**
	Balance Capacity	**-479.14**	**cum**

Name of ESR:-NIMKHEDI EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	4.37 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	1200	1200	0.0	0	0	1200
1	645.1	1845.1	0.2	34.96	34.96	1810.14
2	645.1	2490.2	0.2	34.96	69.92	2420.28
3	0	2490.2	0.2	34.96	104.88	2385.32
4	0	2490.2	0.2	34.96	139.84	2350.36
5	0	2490.2	0.4	74.29	214.13	2276.07
6	0	2490.2	1.0	183.54	397.67	2092.53
7	0	2490.2	2.0	362.71	760.38	1729.82

8	0	2490.2	2.5	454.48	1214.86	1275.34
9	0	2490.2	2.5	454.48	1669.34	820.86
10	0	2490.2	2.0	362.71	2032.05	458.15
11	783.68	3273.88	1.5	275.31	2307.36	966.52
12	783.68	4057.56	1.5	275.31	2582.67	1474.89
13	783.68	4841.24	0.8	144.21	2726.88	2114.36
14	783.68	5624.92	0.6	109.25	2836.13	2788.79
15	0	5624.92	0.6	109.25	2945.38	2679.54
16	0	5624.92	1.3	235.98	3181.36	2443.56
17	0	5624.92	1.5	275.31	3456.67	2168.25
18	0	5624.92	1.5	275.31	3731.98	1892.94
19	0	5624.92	1.2	218.5	3950.48	1674.44
20	0	5624.92	0.7	126.73	4077.21	1547.71
21	0	5624.92	0.6	109.25	4186.46	1438.46
22	0	5624.92	0.4	74.29	4260.75	1364.17
23	0	5624.92	0.4	74.29	4335.04	1289.88

24	0	5624.92	0.2	34.96	4370	1254.92

	Required Capacity	**2788.79**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2033	**0**	**cum**
	Balance Capacity	**-11.21**	**cum**

Name of ESR:--NIMKHEDI PROP. ESR (24x7 water supply)	2033
Demand 2033:-	**3.36 ML** inclusive of fire demand and @ 10% distribution
Hours of supply:-	**24hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	1190	1190	0.0	0	0	1190
1	245.54	1435.54	0.2	26.88	26.88	1408.66
2	0	1435.54	0.2	26.88	53.76	1381.78
3	0	1435.54	0.2	26.88	80.64	1354.9
4	0	1435.54	0.2	26.88	107.52	1328.02
5	0	1435.54	0.4	57.12	164.64	1270.9
6	0	1435.54	1.0	141.12	305.76	1129.78
7	0	1435.54	2.0	278.88	584.64	850.9
8	0	1435.54	2.5	349.44	934.08	501.46
9	0	1435.54	2.5	349.44	1283.52	152.02

10	240.69	1676.23	2.0	278.88	1562.4	113.83
11	240.69	1916.92	1.5	211.68	1774.08	142.84
12	240.69	2157.61	1.5	211.68	1985.76	171.85
13	240.69	2398.3	0.8	110.88	2096.64	301.66
14	240.69	2638.99	0.6	84	2180.64	458.35
15	240.69	2879.68	0.6	84	2264.64	615.04
16	240.69	3120.37	1.3	181.44	2446.08	674.29
17	240.69	3361.06	1.5	211.68	2657.76	703.3
18	240.69	3601.75	1.5	211.68	2869.44	732.31
19	248.69	3850.44	1.2	168	3037.44	813
20	258.79	4109.23	0.7	97.44	3134.88	974.35
21	248.69	4357.92	0.6	84	3218.88	1139.04
22	0	4357.92	0.4	57.12	3276	1081.92
23	248.69	4606.61	0.4	57.12	3333.12	1273.49
24	248.69	4855.3	0.2	26.88	3360	1495.3

	Required Capacity	**1495.3**	**cum**
	Existing Capacity	**1500**	**cum**
	Proposed Capacity for 2018	**0**	**cum**
	Balance Capacity	**-4.7**	**cum**

Name of ESR:-NIMKHEDI EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	6.18 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24 hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	2240	2240	0.0	0	0	2240
1	650.3	2890.3	0.2	49.44	49.44	2840.86
2	0	2890.3	0.2	49.44	98.88	2791.42
3	0	2890.3	0.2	49.44	148.32	2741.98
4	0	2890.3	0.2	49.44	197.76	2692.54
5	0	2890.3	0.4	105.06	302.82	2587.48
6	0	2890.3	1.0	259.56	562.38	2327.92
7	0	2890.3	2.0	512.94	1075.32	1814.98
8	0	2890.3	2.5	642.72	1718.04	1172.26
9	0	2890.3	2.5	642.72	2360.76	529.54
10	783.68	3673.98	2.0	512.94	2873.7	800.28
11	783.68	4457.66	1.5	389.34	3263.04	1194.62
12	783.68	5241.34	1.5	389.34	3652.38	1588.96

13	783.68	6025.02	0.8	203.94	3856.32	2168.7
14	701.68	6726.7	0.6	154.5	4010.82	2715.88
15	0	6726.7	0.6	154.5	4165.32	2561.38
16	0	6726.7	1.3	333.72	4499.04	2227.66
17	0	6726.7	1.5	389.34	4888.38	1838.32
18	0	6726.7	1.5	389.34	5277.72	1448.98
19	0	6726.7	1.2	309	5586.72	1139.98
20	0	6726.7	0.7	179.22	5765.94	960.76
21	0	6726.7	0.6	154.5	5920.44	806.26
22	783.68	7510.38	0.4	105.06	6025.5	1484.88
23	783.68	8294.06	0.4	105.06	6130.56	2163.5
24	0	8294.06	0.2	49.44	6180	2114.06

	Required Capacity	**2840.86**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**40.86**	**cum**

Name of ESR:--NIMKHEDI PROP. ESR (24x7 water supply)	2048
Demand 2048:-	**3.83 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	1050	1050	0.00	0	0	1050
1	260.87	1310.87	0.20	31.52	31.52	1279.35
2	260.87	1571.74	0.20	31.52	63.04	1508.7
3	0	1571.74	0.20	31.52	94.56	1477.18
4	0	1571.74	0.20	31.52	126.08	1445.66
5	0	1571.74	0.40	66.98	193.06	1378.68
6	0	1571.74	1.00	165.48	358.54	1213.2
7	0	1571.74	2.00	327.02	685.56	886.18
8	0	1571.74	2.50	409.76	1095.32	476.42
9	0	1571.74	2.50	409.76	1505.08	66.66
10	260.87	1832.61	2.00	327.02	1832.1	0.51
11	261.24	2093.85	1.50	248.22	2080.32	13.53
12	261.07	2354.92	1.50	248.22	2328.54	26.38

13	261.09	2616.01	0.80	130.02	2458.56	157.45
14	260.87	2876.88	0.60	98.5	2557.06	319.82
15	260.36	3137.24	0.60	98.5	2655.56	481.68
16	260.73	3397.97	1.30	212.76	2868.32	529.65
17	261.05	3659.02	1.50	248.22	3116.54	542.48
18	260.8	3919.82	1.50	248.22	3364.76	555.06
19	261.18	4181	1.20	197	3561.76	619.24
20	260.75	4441.75	0.70	114.26	3676.02	765.73
21	260.5	4702.25	0.60	98.5	3774.52	927.73
22	259.78	4962.03	0.40	66.98	3841.5	1120.53
23	254.54	5216.57	0.40	66.98	3908.48	1308.09
24	254.54	5471.11	0.20	31.52	3940	1531.11

	Required Capacity	**1531.11**	**cum**
	Existing Capacity	**1500**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**31.11**	**cum**

Zone 9:- Girna Existing ESR Command Area

Name of ESR:-GINRNA EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**5.36 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	2800	2800		0	0	2800
1	0	2800		0	0	2800
2	0	2800		0	0	2800
3	0	2800		0	0	2800
4	0	2800		0	0	2800
5	0	2800		0	0	2800
6	0	2800	3.00	670	670	2130
7	465.894	3265.894	3.00	670	1340	1925.894
8	456.664	3722.558	3.00	670	2010	1712.558
9	421.214	4143.772	3.00	670	2680	1463.772
10	410.114	4553.886		0	2680	1873.886
11	410.114	4964		0	2680	2284

12	415.154	5379.154		0	2680	2699.154
13	0	5379.154		0	2680	2699.154
14	0	5379.154		0	2680	2699.154
15	0	5379.154		0	2680	2699.154
16	0	5379.154	3.00	670	3350	2029.154
17	400.12	5779.274	3.00	670	4020	1759.274
18	400.12	6179.394	3.00	670	4690	1489.394
19	400.12	6579.514	3.00	670	5360	1219.514
20	400.12	6979.634		0	5360	1619.634
21	400.12	7379.754		0	5360	2019.754
22	395.12	7774.874		0	5360	2414.874
23	395.12	8169.994		0	5360	2809.994
24	0	8169.994		0	5360	2809.994

	Required Capacity	**2809.99**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Cap for 2018	**0**	**cum**
	Balance Capacity	**9.994**	**cum**

Name of ESR:-GINRNA EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	7.29 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**surplus/ deficit**
0(initial storage)	1000	1000	0.0	0	0	1000
1	950.2	1950.2	0.2	58.32	58.32	1891.88
2	950.2	2900.4	0.2	58.32	116.64	2783.76
3	0	2900.4	0.2	58.32	174.96	2725.44
4	0	2900.4	0.2	58.32	233.28	2667.12
5	0	2900.4	0.4	123.93	357.21	2543.19
6	0	2900.4	1.0	306.18	663.39	2237.01
7	0	2900.4	2.0	605.07	1268.46	1631.94
8	0	2900.4	2.5	758.16	2026.62	873.78
9	0	2900.4	2.5	758.16	2784.78	115.62
10	996.23	3896.63	2.0	605.07	3389.85	506.78
11	0	3896.63	1.5	459.27	3849.12	47.51
12	996.23	4892.86	1.5	459.27	4308.39	584.47

13	0	4892.86	0.8	240.57	4548.96	343.9
14	996.23	5889.09	0.6	182.25	4731.21	1157.88
15	996.23	6885.32	0.6	182.25	4913.46	1971.86
16	996.23	7881.55	1.3	393.66	5307.12	2574.43
17	0	7881.55	1.5	459.27	5766.39	2115.16
18	0	7881.55	1.5	459.27	6225.66	1655.89
19	0	7881.55	1.2	364.5	6590.16	1291.39
20	0	7881.55	0.7	211.41	6801.57	1079.98
21	0	7881.55	0.6	182.25	6983.82	897.73
22	0	7881.55	0.4	123.93	7107.75	773.8
23	0	7881.55	0.4	123.93	7231.68	649.87
24	526.3	8407.85	0.2	58.32	7290	1117.85

	Required Capacity	**2783.76**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2033	**0**	**cum**
	Balance Capacity	**-16.24**	**cum**

Name of ESR:-GINRNA EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	8.67 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24 hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	1000	1000	0.0	0	0	1000
1	440.2	1440.2	0.2	69.36	69.36	1370.84
2	440.2	1880.4	0.2	69.36	138.72	1741.68
3	440.2	2320.6	0.2	69.36	208.08	2112.52
4	440.2	2760.8	0.2	69.36	277.44	2483.36
5	440.2	3201	0.4	147.39	424.83	2776.17
6	0	3201	1.0	364.14	788.97	2412.03
7	0	3201	2.0	719.61	1508.58	1692.42
8	440.2	3641.2	2.5	901.68	2410.26	1230.94
9	440.2	4081.4	2.5	901.68	3311.94	769.46
10	440.2	4521.6	2.0	719.61	4031.55	490.05
11	440.2	4961.8	1.5	546.21	4577.76	384.04

12	440.2	5402	1.5	546.21	5123.97	278.03
13	440.2	5842.2	0.8	286.11	5410.08	432.12
14	440.2	6282.4	0.6	216.75	5626.83	655.57
15	440.2	6722.6	0.6	216.75	5843.58	879.02
16	440.2	7162.8	1.3	468.18	6311.76	851.04
17	140.2	7303	1.5	546.21	6857.97	445.03
18	440.2	7743.2	1.5	546.21	7404.18	339.02
19	440.2	8183.4	1.2	433.5	7837.68	345.72
20	440.2	8623.6	0.7	251.43	8089.11	534.49
21	440.2	9063.8	0.6	216.75	8305.86	757.94
22	0	9063.8	0.4	147.39	8453.25	610.55
23	440.2	9504	0.4	147.39	8600.64	903.36
24	440.2	9944.2	0.2	69.36	8670	1274.2

	Required Capacity	**2776.17**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**-23.83**	**cum**

Zone 10:- ShyamaprasadUdyan Existing ESR Command Area

Name of ESR:-SHYAMAPRASAD EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	7.24 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	8 hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	2800	2800		0	0	2800
1	0	2800		0	0	2800
2	0	2800		0	0	2800
3	0	2800		0	0	2800
4	0	2800		0	0	2800
5	0	2800		0	0	2800
6	0	2800	3.00	905	905	1895
7	0	2800	3.00	905	1810	990
8	540.56	3340.56	3.00	905	2715	625.56
9	540.56	3881.12	3.00	905	3620	261.12

10	540.56	4421.68		0	3620	801.68
11	540.56	4962.24		0	3620	1342.24
12	541.2	5503.44		0	3620	1883.44
13	541.2	6044.64		0	3620	2424.64
14	0	6044.64		0	3620	2424.64
15	0	6044.64		0	3620	2424.64
16	0	6044.64	3.00	905	4525	1519.64
17	0	6044.64	3.00	905	5430	614.64
18	668.33	6712.97	3.00	905	6335	377.97
19	668.33	7381.3	3.00	905	7240	141.3
20	692.37	8073.67		0	7240	833.67
21	636.37	8710.04		0	7240	1470.04
22	671.16	9381.2		0	7240	2141.2
23	668.33	10049.53		0	7240	2809.53
24	0	10049.53		0	7240	2809.53

	Required Capacity	**2809.53**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2018	**0**	**cum**
	Balance Capacity	**9.53**	**cum**

Name of ESR:-SHYAMAPRASAD EXISTING ESR (24x7 water supply)	2033
Demand 2033:-	8.61 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24hrs

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	2230	2230	0.0	0	0	2230
1	632	2862	0.2	68.88	68.88	2793.12
2	0	2862	0.2	68.88	137.76	2724.24
3	0	2862	0.2	68.88	206.64	2655.36
4	0	2862	0.2	68.88	275.52	2586.48
5	0	2862	0.4	146.37	421.89	2440.11
6	0	2862	1.0	361.62	783.51	2078.49
7	0	2862	2.0	714.63	1498.14	1363.86
8	0	2862	2.5	895.44	2393.58	468.42
9	641.02	3503.02	2.5	895.44	3289.02	214
10	687.65	4190.67	2.0	714.63	4003.65	187.02
11	642.21	4832.88	1.5	542.43	4546.08	286.8

12	653	5485.88	1.5	542.43	5088.51	397.37
13	706.83	6192.71	0.8	284.13	5372.64	820.07
14	706.83	6899.54	0.6	215.25	5587.89	1311.65
15	656.61	7556.15	0.6	215.25	5803.14	1753.01
16	646.65	8202.8	1.3	464.94	6268.08	1934.72
17	645.52	8848.32	1.5	542.43	6810.51	2037.81
18	545.6	9393.92	1.5	542.43	7352.94	2040.98
19	545.6	9939.52	1.2	430.5	7783.44	2156.08
20	545.6	10485.12	0.7	249.69	8033.13	2451.99
21	545.6	11030.72	0.6	215.25	8248.38	2782.34
22	0	11030.72	0.4	146.37	8394.75	2635.97
23	0	11030.72	0.4	146.37	8541.12	2489.6
24	0	11030.72	0.2	68.88	8610	2420.72

Required Capacity	**2793.12**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Capacity for 2033	**0**	**cum**
Balance Capacity	**-6.88**	**cum**

Name of ESR:-SHYAMAPRASAD EXISTING ESR (24x7 water supply)	2048
Demand 2048:-	7.96 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24hrs

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	2600	2600	0.0	0	0	2600
1	0	2600	0.2	63.68	63.68	2536.32
2	0	2600	0.2	63.68	127.36	2472.64
3	0	2600	0.2	63.68	191.04	2408.96
4	0	2600	0.2	63.68	254.72	2345.28
5	0	2600	0.4	135.32	390.04	2209.96
6	0	2600	1.0	334.32	724.36	1875.64
7	0	2600	2.0	660.68	1385.04	1214.96
8	0	2600	2.5	827.84	2212.88	387.12
9	667.51	3267.51	2.5	827.84	3040.72	226.79
10	569.4	3836.91	2.0	660.68	3701.4	135.51
11	533.04	4369.95	1.5	501.48	4202.88	167.07

12	498.09	4868.04	1.5	501.48	4704.36	163.68
13	508.47	5376.51	0.8	262.68	4967.04	409.47
14	561.39	5937.9	0.6	199	5166.04	771.86
15	607.23	6545.13	0.6	199	5365.04	1180.09
16	662.25	7207.38	1.3	429.84	5794.88	1412.5
17	727.52	7934.9	1.5	501.48	6296.36	1638.54
18	697.89	8632.79	1.5	501.48	6797.84	1834.95
19	630.03	9262.82	1.2	398	7195.84	2066.98
20	610.69	9873.51	0.7	230.84	7426.68	2446.83
21	533.04	10406.55	0.6	199	7625.68	2780.87
22	0	10406.55	0.4	135.32	7761	2645.55
23	0	10406.55	0.4	135.32	7896.32	2510.23
24	0	10406.55	0.2	63.68	7960	2446.55

Required Capacity	**2780.87**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Capacity for 2048	**0**	**cum**
Balance Capacity	**-19.13**	**cum**

Name of ESR:-GENDALAL+SHYAMAPRASAD PROP. ESR (24x7 water supply)	**2048**
Demand 2048:-	7.17 ML inclusive of fire demand and @ 10% distribution
Hours of supply:-	24hrs

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	2000	2000	0.0	0	0	2000
1	500	2500	0.2	56.08	56.08	2443.92
2	0	2500	0.2	56.08	112.16	2387.84
3	0	2500	0.2	56.08	168.24	2331.76
4	0	2500	0.2	56.08	224.32	2275.68
5	0	2500	0.4	119.17	343.49	2156.51
6	0	2500	1.0	294.42	637.91	1862.09
7	0	2500	2.0	581.83	1219.74	1280.26
8	0	2500	2.5	729.04	1948.78	551.22
9	694.71	3194.71	2.5	729.04	2677.82	516.89
10	694.71	3889.42	2.0	581.83	3259.65	629.77
11	694.71	4584.13	1.5	441.63	3701.28	882.85
12	664.81	5248.94	1.5	441.63	4142.91	1106.03

13	632.81	5881.75	0.8	231.33	4374.24	1507.51
14	632.81	6514.56	0.6	175.25	4549.49	1965.07
15	632.81	7147.37	0.6	175.25	4724.74	2422.63
16	0	7147.37	1.3	378.54	5103.28	2044.09
17	0	7147.37	1.5	441.63	5544.91	1602.46
18	0	7147.37	1.5	441.63	5986.54	1160.83
19	0	7147.37	1.2	350.5	6337.04	810.33
20	0	7147.37	0.7	203.29	6540.33	607.04
21	664.81	7812.18	0.6	175.25	6715.58	1096.6
22	664.81	8476.99	0.4	119.17	6834.75	1642.24
23	664.81	9141.8	0.4	119.17	6953.92	2187.88
24	0	9141.8	0.2	56.08	7010	2131.8

Required Capacity	**2443.92**	**cum**
Existing Capacity	0	**cum**
Proposed Capacity for 2048	**2500**	**cum**
Balance Capacity	**-56.08**	**cum**

Zone 11:- Dreamland Existing ESR Command Area

Name of ESR:-DREAMLAND EXISTING ESR (Intermittent water supply)	**2018**
Demand 2018:-	**2.14 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/ deficit
0(initial storage)	2800	2800		0	0	2800
1	0	2800		0	0	2800
2	0	2800		0	0	2800
3	0	2800		0	0	2800
4	0	2800		0	0	2800
5	0	2800		0	0	2800
6	0	2800	3.00	267.5	267.5	2532.5
7	0	2800	3.00	267.5	535	2265
8	0	2800	3.00	267.5	802.5	1997.5
9	0	2800	3.00	267.5	1070	1730
10	0	2800		0	1070	1730
11	0	2800		0	1070	1730

12	0	2800		0	1070	1730
13	0	2800		0	1070	1730
14	0	2800		0	1070	1730
15	0	2800		0	1070	1730
16	0	2800	3.00	267.5	1337.5	1462.5
17	0	2800	3.00	267.5	1605	1195
18	0	2800	3.00	267.5	1872.5	927.5
19	0	2800	3.00	267.5	2140	660
20	536.76	3336.76		0	2140	1196.76
21	536.76	3873.52		0	2140	1733.52
22	536.76	4410.28		0	2140	2270.28
23	536.76	4947.04		0	2140	2807.04
24	0	4947.04		0	2140	2807.04

	Required Capacity	**2807.04**	**cum**
	Existing Capacity	**2800**	**cum**
	Proposed Capacity for 2018	**0**	**cum**
	Balance Capacity	**7.04**	**cum**

Name of ESR:-DREAMLAND EXISTING ESR (24x7 water supply)	**2033**
Demand 2033:-	**3.04 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	2600	2600	0.0	0	0	2600
1	0	2600	0.2	24.32	24.32	2575.68
2	0	2600	0.2	24.32	48.64	2551.36
3	0	2600	0.2	24.32	72.96	2527.04
4	0	2600	0.2	24.32	97.28	2502.72
5	0	2600	0.4	51.68	148.96	2451.04
6	0	2600	1.0	127.68	276.64	2323.36
7	0	2600	2.0	252.32	528.96	2071.04
8	0	2600	2.5	316.16	845.12	1754.88
9	0	2600	2.5	316.16	1161.28	1438.72
10	0	2600	2.0	252.32	1413.6	1186.4
11	0	2600	1.5	191.52	1605.12	994.88

12	0	2600	1.5	191.52	1796.64	803.36
13	0	2600	0.8	100.32	1896.96	703.04
14	0	2600	0.6	76	1972.96	627.04
15	0	2600	0.6	76	2048.96	551.04
16	0	2600	1.3	164.16	2213.12	386.88
17	489.8	3089.8	1.5	191.52	2404.64	685.16
18	489.8	3579.6	1.5	191.52	2596.16	983.44
19	489.8	4069.4	1.2	152	2748.16	1321.24
20	489.8	4559.2	0.7	88.16	2836.32	1722.88
21	489.8	5049	0.6	76	2912.32	2136.68
22	489.8	5538.8	0.4	51.68	2964	2574.8
23	0	5538.8	0.4	51.68	3015.68	2523.12
24	0	5538.8	0.2	24.32	3040	2498.8

Required Capacity	**2600**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Capacity for 2033	**0**	**cum**
Balance Capacity	**-200**	**cum**

Name of ESR:-DREAMLAND EXISTING ESR (24x7 water supply)	**2048**
Demand 2048:-	**3.79 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	2320	2320	0.0	0	0	2320
1	489.8	2809.8	0.2	30.32	30.32	2779.48
2	0	2809.8	0.2	30.32	60.64	2749.16
3	0	2809.8	0.2	30.32	90.96	2718.84
4	0	2809.8	0.2	30.32	121.28	2688.52
5	0	2809.8	0.4	64.43	185.71	2624.09
6	0	2809.8	1.0	159.18	344.89	2464.91
7	0	2809.8	2.0	314.57	659.46	2150.34
8	0	2809.8	2.5	394.16	1053.62	1756.18
9	0	2809.8	2.5	394.16	1447.78	1362.02
10	0	2809.8	2.0	314.57	1762.35	1047.45
11	0	2809.8	1.5	238.77	2001.12	808.68

12	0	2809.8	1.5	238.77	2239.89	569.91
13	489.8	3299.6	0.8	125.07	2364.96	934.64
14	489.8	3789.4	0.6	94.75	2459.71	1329.69
15	489.8	4279.2	0.6	94.75	2554.46	1724.74
16	489.8	4769	1.3	204.66	2759.12	2009.88
17	489.8	5258.8	1.5	238.77	2997.89	2260.91
18	489.8	5748.6	1.5	238.77	3236.66	2511.94
19	489.8	6238.4	1.2	189.5	3426.16	2812.24
20	0	6238.4	0.7	109.91	3536.07	2702.33
21	0	6238.4	0.6	94.75	3630.82	2607.58
22	0	6238.4	0.4	64.43	3695.25	2543.15
23	0	6238.4	0.4	64.43	3759.68	2478.72
24	0	6238.4	0.2	30.32	3790	2448.4

Required Capacity	**2812.24**	**cum**
Existing Capacity	**2800**	**cum**
Proposed Capacity for 2048	**0**	**cum**
Balance Capacity	**12.24**	**cum**

Zone 12:- MIDC Propose ESR Command Area

Name of ESR:-MIDC PROP ESR (Intermittent water supply)	**2018**
Demand 2018:-	**5.19 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/ deficit
0(initial storage)	2500	2500		0	0	2500
1	0	2500		0	0	2500
2	0	2500		0	0	2500
3	0	2500		0	0	2500
4	0	2500		0	0	2500
5	0	2500		0	0	2500
6	0	2500	3.00	648.75	648.75	1851.25
7	0	2500	3.00	648.75	1297.5	1202.5
8	0	2500	3.00	648.75	1946.25	553.75
9	783.6	3283.6	3.00	648.75	2595	688.6

10	783.6	4067.2		0	2595	1472.2
11	783.6	4850.8		0	2595	2255.8
12	0	4850.8		0	2595	2255.8
13	0	4850.8		0	2595	2255.8
14	0	4850.8		0	2595	2255.8
15	0	4850.8		0	2595	2255.8
16	0	4850.8	3.00	648.75	3243.75	1607.05
17	0	4850.8	3.00	648.75	3892.5	958.3
18	783.6	5634.4	3.00	648.75	4541.25	1093.15
19	783.6	6418	3.00	648.75	5190	1228
20	783.6	7201.6		0	5190	2011.6
21	500	7701.6		0	5190	2511.6
22	0	7701.6		0	5190	2511.6
23	0	7701.6		0	5190	2511.6
24	0	7701.6		0	5190	2511.6

	Maximum surplus	**2511.6**	**cum**
	Existing Capacity	**0**	**cum**
	Proposed Capacity for 2018	**2500**	**cum**
	Balance Capacity	**11.6**	**cum**

Name of ESR:-MIDC PROP ESR-1 (24x7 water supply)	**2033**
Demand 2033:-	**6.93 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/ deficit**
0(initial storage)	2250	2250	0.00	0	0	2250
1	0	2250	0.20	57.75	57.75	2192.25
2	0	2250	0.20	57.75	115.5	2134.5
3	0	2250	0.20	57.75	173.25	2076.75
4	0	2250	0.20	57.75	231	2019
5	0	2250	0.40	115.5	346.5	1903.5
6	0	2250	1.00	288.75	635.25	1614.75
7	0	2250	2.00	577.5	1212.75	1037.25
8	0	2250	2.50	721.875	1934.625	315.375
9	783.6	3033.6	2.50	721.875	2656.5	377.1
10	783.6	3817.2	2.00	577.5	3234	583.2
11	783.6	4600.8	1.50	433.125	3667.125	933.675
12	783.6	5384.4	1.50	433.125	4100.25	1284.15

13	783.6	6168	0.80	231	4331.25	1836.75
14	783.6	6951.6	0.60	173.25	4504.5	2447.1
15	0	6951.6	0.60	173.25	4677.75	2273.85
16	0	6951.6	1.30	375.375	5053.125	1898.475
17	0	6951.6	1.50	433.125	5486.25	1465.35
18	0	6951.6	1.50	433.125	5919.375	1032.225
19	0	6951.6	1.20	346.5	6265.875	685.725
20	783.6	7735.2	0.70	202.125	6468	1267.2
21	783.6	8518.8	0.60	173.25	6641.25	1877.55
22	783.6	9302.4	0.40	115.5	6756.75	2545.65
23	0	9302.4	0.40	115.5	6872.25	2430.15
24	0	9302.4	0.20	57.75	6930	2372.4

Required Capacity	**2545.65**	**cum**
Existing Capacity	**2500**	**cum**
Proposed Capacity for 2018	**0**	**cum**
Balance Capacity	**45.65**	**cum**

Name of ESR:-MIDC PROP ESR-1 (24x7 water supply)	2048
Demand 2048:-	**6.08 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	2250	2250	0.00	0	0	2250
1	0	2250	0.20	48.64	48.64	2201.36
2	0	2250	0.20	48.64	97.28	2152.72
3	0	2250	0.20	48.64	145.92	2104.08
4	0	2250	0.20	48.64	194.56	2055.44
5	0	2250	0.40	103.36	297.92	1952.08
6	0	2250	1.00	255.36	553.28	1696.72
7	0	2250	2.00	504.64	1057.92	1192.08
8	0	2250	2.50	632.32	1690.24	559.76
9	783.3	3033.3	2.50	632.32	2322.56	710.74
10	783.3	3816.6	2.00	504.64	2827.20	989.4
11	783.3	4599.9	1.50	383.04	3210.24	1389.66
12	783.3	5383.2	1.50	383.04	3593.28	1789.92

13	0	5383.2	0.80	200.64	3793.92	1589.28
14	0	5383.2	0.60	152.00	3945.92	1437.28
15	0	5383.2	0.60	152.00	4097.92	1285.28
16	0	5383.2	1.30	328.32	4426.24	956.96
17	0	5383.2	1.50	383.04	4809.28	573.92
18	0	5383.2	1.50	383.04	5192.32	190.88
19	0	5383.2	1.20	304.00	5496.32	-113.12
20	783.3	6166.5	0.70	176.32	5672.64	493.86
21	783.3	6949.8	0.60	152.00	5824.64	1125.16
22	783.3	7733.1	0.40	103.36	5928.00	1805.1
23	0	7733.1	0.40	103.36	6031.36	1701.74
24	783.3	8516.4	0.20	48.64	6080.00	2436.4

Required Capacity	**2436.4**	**cum**
Existing Capacity	**2500**	**cum**
Proposed Capacity for 2033	**0**	**cum**
Balance Capacity	**-63.6**	**cum**

Name of ESR:-MIDC PROP ESR-2 (24x7 water supply)	2048
Demand 2048:-	**2.93 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	700	700	0.00	0	0	700
1	0	700	0.2	23.44	23.44	676.56
2	0	700	0.2	23.44	46.88	653.12
3	0	700	0.2	23.44	70.32	629.68
4	0	700	0.2	23.44	93.76	606.24
5	0	700	0.4	49.81	143.57	556.43
6	0	700	1.0	123.06	266.63	433.37
7	0	700	2.0	243.19	509.82	190.18
8	636.5	1336.5	2.5	304.72	814.54	521.96
9	636.5	1973	2.5	304.72	1119.26	853.74
10	0	1973	2.0	243.19	1362.45	610.55
11	0	1973	1.5	184.59	1547.04	425.96
12	0	1973	1.5	184.59	1731.63	241.37

13	0	1973	0.8	96.69	1828.32	144.68
14	0	1973	0.6	73.25	1901.57	71.43
15	0	1973	0.6	73.25	1974.82	-1.82
16	636.5	2609.5	1.3	158.22	2133.04	476.46
17	636.5	3246	1.5	184.59	2317.63	928.37
18	0	3246	1.5	184.59	2502.22	743.78
19	0	3246	1.2	146.5	2648.72	597.28
20	0	3246	0.7	84.97	2733.69	512.31
21	0	3246	0.6	73.25	2806.94	439.06
22	0	3246	0.4	49.81	2856.75	389.25
23	636.5	3882.5	0.4	49.81	2906.56	975.94
24	0	3882.5	0.2	23.44	2930	952.5

	Required Capacity	**975.94**	**cum**
	Existing Capacity	0	**cum**
	Proposed Capacity for 2048	**1000**	**cum**
	Balance Capacity	**-24.06**	**cum**

Zone 13:- Raymond Propose ESR Command Area

Name of ESR:-RAYMOND PROP ESR (Intermittent water supply)	**2018**
Demand 2018:-	**7.72 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/ deficit
0(initial storage)	2400	2400		0	0	2400
1	489.79	2889.79		0	0	2889.79
2	0	2889.79		0	0	2889.79
3	0	2889.79		0	0	2889.79
4	0	2889.79		0	0	2889.79
5	0	2889.79		0	0	2889.79
6	0	2889.79	3.00	965	965	1924.79
7	489.79	3379.58	3.00	965	1930	1449.58
8	489.79	3869.37	3.00	965	2895	974.37
9	489.79	4359.16	3.00	965	3860	499.16

10	489.79	4848.95		0	3860	988.95
11	489.79	5338.74		0	3860	1478.74
12	489.79	5828.53		0	3860	1968.53
13	489.79	6318.32		0	3860	2458.32
14	489.79	6808.11		0	3860	2948.11
15	0	6808.11		0	3860	2948.11
16	0	6808.11	3.00	965	4825	1983.11
17	489.79	7297.9	3.00	965	5790	1507.9
18	489.79	7787.69	3.00	965	6755	1032.69
19	489.79	8277.48	3.00	965	7720	557.48
20	489.79	8767.27		0	7720	1047.27
21	489.79	9257.06		0	7720	1537.06
22	489.79	9746.85		0	7720	2026.85
23	489.79	10236.64		0	7720	2516.64
24	0	10236.64		0	7720	2516.64

	Required Capacity	**2948.11**	**cum**
	Existing Capacity	0	**cum**
	Proposed Capacity for 2018	**3000**	**cum**
	Balance Capacity	**-51.89**	**cum**

Name of ESR:-RAYMOND PROP ESR (24x7 water supply) **2033**

Demand 2033:-	**8.57 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus/deficit
0(initial storage)	2520	2520	0.0	0	0	2520
1	0	2520	0.2	68.56	68.56	2451.44
2	0	2520	0.2	68.56	137.12	2382.88
3	0	2520	0.2	68.56	205.68	2314.32
4	0	2520	0.2	68.56	274.24	2245.76
5	0	2520	0.4	145.69	419.93	2100.07
6	0	2520	1.0	359.94	779.87	1740.13
7	0	2520	2.0	711.31	1491.18	1028.82
8	1175.5	3695.5	2.5	891.28	2382.46	1313.04
9	1175.5	4871	2.5	891.28	3273.74	1597.26
10	1175.5	6046.5	2.0	711.31	3985.05	2061.45
11	1175.5	7222	1.5	539.91	4524.96	2697.04
12	0	7222	1.5	539.91	5064.87	2157.13
13	0	7222	0.8	282.81	5347.68	1874.32
14	1175.5	8397.5	0.6	214.25	5561.93	2835.57
15	0	8397.5	0.6	214.25	5776.18	2621.32

16	0	8397.5	1.3	462.78	6238.96	2158.54
17	0	8397.5	1.5	539.91	6778.87	1618.63
18	1175.5	9573	1.5	539.91	7318.78	2254.22
19	1175.5	10748.5	1.2	428.5	7747.28	3001.22
20	0	10748.5	0.7	248.53	7995.81	2752.69
21	0	10748.5	0.6	214.25	8210.06	2538.44
22	0	10748.5	0.4	145.69	8355.75	2392.75
23	0	10748.5	0.4	145.69	8501.44	2247.06
24	562.1	11310.6	0.2	68.56	8570	2740.6

Required Capacity	**3001.22**	**cum**
Existing Capacity	**3000**	**cum**
Proposed Capacity for 2033	**0**	**cum**
Balance Capacity	**1.22**	**cum**

Name of ESR:-RAYMOND PROP ESR (24x7 water supply)	**2048**
Demand 2048:-	**9.21 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	1900	1900	0.0	0	0	1900
1	979.59	2879.59	0.2	73.68	73.68	2805.91
2	0	2879.59	0.2	73.68	147.36	2732.23
3	0	2879.59	0.2	73.68	221.04	2658.55
4	0	2879.59	0.2	73.68	294.72	2584.87
5	0	2879.59	0.4	156.57	451.29	2428.3
6	0	2879.59	1.0	386.82	838.11	2041.48
7	0	2879.59	2.0	764.43	1602.54	1277.05
8	979.59	3859.18	2.5	957.84	2560.38	1298.8
9	979.59	4838.77	2.5	957.84	3518.22	1320.55
10	979.59	5818.36	2.0	764.43	4282.65	1535.71
11	979.59	6797.95	1.5	580.23	4862.88	1935.07
12	979.59	7777.54	1.5	580.23	5443.11	2334.43
13	979.59	8757.13	0.8	303.93	5747.04	3010.09

14	0	8757.13	0.6	230.25	5977.29	2779.84
15	0	8757.13	0.6	230.25	6207.54	2549.59
16	0	8757.13	1.3	497.34	6704.88	2052.25
17	840.5	9597.63	1.5	580.23	7285.11	2312.52
18	840.5	10438.13	1.5	580.23	7865.34	2572.79
19	840.5	11278.63	1.2	460.5	8325.84	2952.79
20	0	11278.63	0.7	267.09	8592.93	2685.7
21	0	11278.63	0.6	230.25	8823.18	2455.45
22	0	11278.63	0.4	156.57	8979.75	2298.88
23	0	11278.63	0.4	156.57	9136.32	2142.31
24	0	11278.63	0.2	73.68	9210	2068.63

	Required Capacity	**3010.09**	**cum**
	Existing Capacity	**3000**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**10.09**	**cum**

Zone 14:- Supreme Propose ESR Command Area

Name of ESR:-SUPREME PROP-1 ESR (Intermittent water supply)	**2018**
Demand 2018:-	**3.33 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**8 hrs**

Time (hours)	Inflow (m^3/h)	Cumulative inflow (m^3/h)	Multiplier for peak flow	Outflow (m^3/h)	Cumulative outflow (m^3/h)	Surplus /deficit
0(initial storage)	600	600		0	0	600
1	150.36	750.36		0	0	750.36
2	149.77	900.13		0	0	900.13
3	148.4	1048.53		0	0	1048.53
4	146.99	1195.52		0	0	1195.52
5	145.53	1341.05		0	0	1341.05
6	144.05	1485.1	3.00	416.25	416.25	1068.85
7	142.51	1627.61	3.00	416.25	832.5	795.11
8	140.93	1768.54	3.00	416.25	1248.75	519.79
9	142.65	1911.19	3.00	416.25	1665	246.19

10	147.3	2058.49		0	1665	393.49
11	150.75	2209.24		0	1665	544.24
12	149.4	2358.64		0	1665	693.64
13	148.02	2506.66		0	1665	841.66
14	146.6	2653.26		0	1665	988.26
15	145.14	2798.4		0	1665	1133.4
16	143.64	2942.04	3.00	416.25	2081.25	860.79
17	142.1	3084.14	3.00	416.25	2497.5	586.64
18	140.51	3224.65	3.00	416.25	2913.75	310.9
19	143.94	3368.59	3.00	416.25	3330	38.59
20	148.43	3517.02		0	3330	187.02
21	150.4	3667.42		0	3330	337.42
22	149.04	3816.46		0	3330	486.46
23	147.65	3964.11		0	3330	634.11
24	146.22	4110.33		0	3330	780.33

Required Capacity	**1341.05**	**cum**
Existing Capacity	0	**cum**
Proposed Capacity for 2018	**1500**	**cum**
Balance Capacity	**-158.95**	**cum**

Name of ESR:-SUPREME PROP-1 ESR (24x7 water supply)	**2033**
Demand 2033:-	**2.61 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	1050	1050	0.0	0	0	1050
1	151.41	1201.41	0.2	20.88	20.88	1180.53
2	148.56	1349.97	0.2	20.88	41.76	1308.21
3	145.69	1495.66	0.2	20.88	62.64	1433.02
4	0	1495.66	0.2	20.88	83.52	1412.14
5	0	1495.66	0.4	44.37	127.89	1367.77
6	0	1495.66	1.0	109.62	237.51	1258.15
7	0	1495.66	2.0	216.63	454.14	1041.52
8	0	1495.66	2.5	271.44	725.58	770.08
9	0	1495.66	2.5	271.44	997.02	498.64
10	0	1495.66	2.0	216.63	1213.65	282.01
11	148.19	1643.85	1.5	164.43	1378.08	265.77

12	145.32	1789.17	1.5	164.43	1542.51	246.66
13	142.42	1931.59	0.8	86.13	1628.64	302.95
14	140.19	2071.78	0.6	65.25	1693.89	377.89
15	144.08	2215.86	0.6	65.25	1759.14	456.72
16	147.74	2363.6	1.3	140.94	1900.08	463.52
17	151.18	2514.78	1.5	164.43	2064.51	450.27
18	149.19	2663.97	1.5	164.43	2228.94	435.03
19	146.32	2810.29	1.2	130.5	2359.44	450.85
20	143.43	2953.72	0.7	75.69	2435.13	518.59
21	140.52	3094.24	0.6	65.25	2500.38	593.86
22	143.08	3237.32	0.4	44.37	2544.75	692.57
23	146.8	3384.12	0.4	44.37	2589.12	795
24	150.3	3534.42	0.2	20.88	2610	924.42

	Required Capacity	**1433.02**	**cum**
	Existing Capacity	**1500**	**cum**
	Proposed Capacity for 2033	**0**	**cum**
	Balance Capacity	**-66.98**	**cum**

Name of ESR:-SUPREME PROP-2 ESR (24x7 water supply)	**2033**
Demand 2033:-	**2.96 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	600	600	0.0	0	0	600
1	123.49	723.49	0.2	23.68	23.68	699.81
2	120.93	844.42	0.2	23.68	47.36	797.06
3	118.25	962.67	0.2	23.68	71.04	891.63
4	116.21	1078.88	0.2	23.68	94.72	984.16
5	114.94	1193.82	0.4	50.32	145.04	1048.78
6	113.63	1307.45	1.0	124.32	269.36	1038.09
7	113.71	1421.16	2.0	245.68	515.04	906.12
8	118.94	1540.1	2.5	307.84	822.88	717.22
9	123.55	1663.65	2.5	307.84	1130.72	532.93
10	122.6	1786.25	2.0	245.68	1376.4	409.85
11	120.58	1906.83	1.5	186.48	1562.88	343.95
12	117.9	2024.73	1.5	186.48	1749.36	275.37

13	115.09	2139.82	0.8	97.68	1847.04	292.78
14	112.86	2252.68	0.6	74	1921.04	331.64
15	116.71	2369.39	0.6	74	1995.04	374.35
16	120.16	2489.55	1.3	159.84	2154.88	334.67
17	123.29	2612.84	1.5	186.48	2341.36	271.48
18	121.49	2734.33	1.5	186.48	2527.84	206.49
19	118.85	2853.18	1.2	148	2675.84	177.34
20	116.08	2969.26	0.7	85.84	2761.68	207.58
21	113.19	3082.45	0.6	74	2835.68	246.77
22	115.74	3198.19	0.4	50.32	2886	312.19
23	119.29	3317.48	0.4	50.32	2936.32	381.16
24	122.5	3439.98	0.2	23.68	2960	479.98

	Required Capacity	**1048.78**	**cum**
	Existing Capacity	**0**	**cum**
	Proposed Capacity for 2033	**1500**	**cum**
	Balance Capacity	**-451.22**	**cum**

Name of ESR:-SUPREME PROP-1 ESR (24x7 water supply)	**2048**
Demand 2048:-	**3.74 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24 hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus/deficit**
0(initial storage)	600	600	0.0	0	0	600
1	288.26	888.26	0.2	29.92	29.92	858.34
2	288.67	1176.93	0.2	29.92	59.84	1117.09
3	0	1176.93	0.2	29.92	89.76	1087.17
4	0	1176.93	0.2	29.92	119.68	1057.25
5	0	1176.93	0.4	63.58	183.26	993.67
6	0	1176.93	1.0	157.08	340.34	836.59
7	0	1176.93	2.0	310.42	650.76	526.17
8	0	1176.93	2.5	388.96	1039.72	137.21
9	291.54	1468.47	2.5	388.96	1428.68	39.79
10	280.55	1749.02	2.0	310.42	1739.1	9.92
11	288.85	2037.87	1.5	235.62	1974.72	63.15
12	296.42	2334.29	1.5	235.62	2210.34	123.95

13	299.86	2634.15	0.8	123.42	2333.76	300.39
14	283.15	2917.3	0.6	93.5	2427.26	490.04
15	284.4	3201.7	0.6	93.5	2520.76	680.94
16	292.36	3494.06	1.3	201.96	2722.72	771.34
17	299.64	3793.7	1.5	235.62	2958.34	835.36
18	292.36	4086.06	1.5	235.62	3193.96	892.1
19	280.58	4366.64	1.2	187	3380.96	985.68
20	288.88	4655.52	0.7	108.46	3489.42	1166.1
21	0	4655.52	0.6	93.5	3582.92	1072.6
22	0	4655.52	0.4	63.58	3646.5	1009.02
23	0	4655.52	0.4	63.58	3710.08	945.44
24	0	4655.52	0.2	29.92	3740	915.52

Required Capacity	**1166.1**	**cum**
Existing Capacity	**1500**	**cum**
Proposed Capacity for 2048	0	**cum**
Balance Capacity	**-333.9**	**cum**

Name of ESR:SUPREME PROP-2 ESR (24x7 water supply)	**2048**
Demand 2048:-	**4.29 ML inclusive of fire demand and @ 10% distribution**
Hours of supply:-	**24hrs**

Time (hours)	**Inflow (m^3/h)**	**Cumulative inflow (m^3/h)**	**Multiplier for peak flow**	**Outflow (m^3/h)**	**Cumulative outflow (m^3/h)**	**Surplus /deficit**
0(initial storage)	900	900	0.0	0	0	900
1	220.69	1120.69	0.2	34.32	34.32	1086.37
2	223.77	1344.46	0.2	34.32	68.64	1275.82
3	225.94	1570.4	0.2	34.32	102.96	1467.44
4	0	1570.4	0.2	34.32	137.28	1433.12
5	0	1570.4	0.4	72.93	210.21	1360.19
6	0	1570.4	1.0	180.18	390.39	1180.01
7	0	1570.4	2.0	356.07	746.46	823.94
8	0	1570.4	2.5	446.16	1192.62	377.78
9	220.69	1791.09	2.5	446.16	1638.78	152.31
10	216.46	2007.55	2.0	356.07	1994.85	12.7
11	278.21	2285.76	1.5	270.27	2265.12	20.64

12	278.21	2563.97	1.5	270.27	2535.39	28.58
13	226.47	2790.44	0.8	141.57	2676.96	113.48
14	217.92	3008.36	0.6	107.25	2784.21	224.15
15	218.62	3226.98	0.6	107.25	2891.46	335.52
16	222.8	3449.78	1.3	231.66	3123.12	326.66
17	226.36	3676.14	1.5	270.27	3393.39	282.75
18	222.8	3898.94	1.5	270.27	3663.66	235.28
19	216.47	4115.41	1.2	214.5	3878.16	237.25
20	221.01	4336.42	0.7	124.41	4002.57	333.85
21	225.73	4562.15	0.6	107.25	4109.82	452.33
22	225.12	4787.27	0.4	72.93	4182.75	604.52
23	221.53	5008.8	0.4	72.93	4255.68	753.12
24	217.58	5226.38	0.2	34.32	4290	936.38

	Required Capacity	**1467.44**	**cum**
	Existing Capacity	**1500**	**cum**
	Proposed Capacity for 2048	**0**	**cum**
	Balance Capacity	**-32.56**	**cum**