बिहार सरकार

नगर विकास एवं आवास विभाग

Model Estimate of Water Supply for 1500 Households

(QUALITY AFFECTED)

पटना, बिहार।

C

Report

Name of Work:- Construction of MODEL ESTIMATE for 1500 households of Urban Water Supply Scheme in different ULBs of Bihar.

This Model estimate has been framed in compliance to the direction received from Urban Development and Housing Department, Bihar, Patna. To provide "Har Ghar Nal Ka Jal" through Tap water is one of the important part of MUKHYAMANTRI SEVEN NISCHAY YOJANA. It is mandatory to provide House Service Connection to each and every household.

Hence, in compliance to the Nischay yojana , this Model Estimate has been framed to provide water supply through Tap in urban area of Bihar.

DESIGN PERIOD:-

Following design period has been adopted while designing the project:-

Source: -	15 Years
Electric Motor and Pump: -	15 Years
Distribution Main: -	30 Years

Population Forcast:-

The population is forecasted @ 2% per annum for the year 2033 based on population of 2011 Census taking base year 2018.

Demand: -

As per the CPHEEO manual on water supply and treatment published by Government of India, Ministry of Urban development, the per Capita water demand is taken as 135 Liters per day excluding 15% NRW.

Source :-

Since the most of the area of Bihar has good aquifer layer, the provision of High Yeiding Tubewell has been made in this Estimate.

Details of Provision :-

1. Provision of 300mm X200mm X150 M deep High Yielding Tubewell
2. Provision of 20 HP Submersible Pump discharging 26.24 lps with 42 m head.
3. Provision for laying of 63mm, 110mm, 200mm and 250mm H.D.P.E (PE100-PN8) Distribution network has been made.
4. Provision of House service connection for every household has been made.
5. Provision of iron removal plant (94500 LPH) has been made.

Rates :-

Schedule of rates effective from 17.10.2016 of Building Department and current Schedule Rate of PHED for scheduled items and prevailing market rates for non-scheduled items have been considered.

Specification :-

The standard specification of PWD & PHED will have to be followed during the execution of work.

This is a model estimate. Actual length of pipe line may vary substantially which has to be considered at the time of technical sanction after verification of actual site condition.

There may be some sites/habitations where high yielding tube well will not fruitful. For such sites/ habitations other source of water has to be considered necessitating separate water supply scheme.

For better planning and implementation of scheme, vetting from the nodal department of water supply field may be taken into consideration.

Life of HDPE pipes has been considered 30 years but for design purpose intermediate life (15 years) has been considered in this estimate.

1,67,43,700.00

Estimated Cost:- The Estimated cost of this Estimate comes to Rs. ~~1,68,46,000.00~~ (One Crore Sixty seven Lakh Forty three thousand Seven hundred) ~~(One Crore Sixty eight Lakh, Forty Six Thousand~~) only including 0.5% contingency.

Per Capita Cost:-

The per capita cost comes to **Rs.~~2246.00~~** 2232.00 and per household cost comes to **Rs.~~11230.00~~** 11160.00 based on the population of 2011 Census.

10.1.17

Arvind Kumar
(Chief Engineer)
Bihar Rajya ~~Jal~~ Parshad

Vetted & corrected for estimated cost as Rs. 1,67,43,710-00 (Rs. one Crore sixty seven lakh forty three thousand seven hundred) only.

10/1/17 10/1 10.1.17 10.1.17

10/1/17 LPSingh 10.1.2017

Model Estimate for 1500 HH Water Supply Scheme (Quality Affected)
Popullation as per 2018:-- 7500
Projected Population at Intermediate (2037) stage:- 9750

General Abstract of Cost

S. N.	Particulars	Qty.	Unit	Rate	Amount
1	**High Yielding Tubewell**				
	Cost for construction of 300mm x 200mm x 150m deep high yielding drilled tube well all complete as per direction of E/I. **as per Sub estimate 1**	1	Each	544859.00	544859.00
2	**Pump motor**				
	Supplying and installation of **20 HP** Submersible pump and motor having discharge **26.24lps against a total head of 42m** including suitable dia GI medium class column pipe, suitable dia N/R Valve, suitable dia flange, submersible flat cable, LT connection from control panel to starter etc all complete with floor mounted outdoor type L.T feeder pillar, three phase starter controll pannel etc all complete as per direction of E/I. **as per Sub estimate 2**	1	Each	545000.00	545000.00
3	**Distribution Network**				
	Providing laying and jointing distribution pipes as per IS specifications from 63 mm dia to 250 mm dia HDPE pipe for distribution net works etc all complete as per direction of E/I. **Total length of Pipe- 16335 m.** **as per Sub estimate 3**	1	Each	1,14,11,071.36 ~~11513217.97~~	1,14,11,071.36 ~~11513217.97~~
4	**House service connection**				
	House service connection with 15mm dia CPVC/MDPE pipe including fitting and fixing specials such as ferrule, bib cock etc all complete. **as per Sub estimate 4**	1500	Each	1513.00	2269500.00
5	Quality Measure				
	Supplying and Installation of Quality measure instrument such as iron removal plant etc. all complete job as per direction of E/I.	94500	LPH	20.00	1890000.00
	Total			1,66,60,430.36	16762576.97
	Contigency @ 0.5%			83,302.15	83812.88
	Grand Total			1,67,43,732.52	~~16846389.86~~
				Say	**16846000.00**

1,67,43,700/—

Note:
Note:

1. The length of distribution pipe may decrease or increase as per actual site condition. The carriage of materials is based on Patna town. It may decrease or increase as per the actual distance. The carriage may be calculated as per attached sheet. Road cutting cost may increase or decrease as per actuals. The technical sanction may be accorded after above cosideration.
2. Strongly advised that pipeline should be laid before construction of Naali-Gali
3. This is a particular estimate, should not be universly adopted.

10/01/17 10/1/17

Technically approved for Rs 1,68,46,000/- (Rs. One Carore - sixty eight lakh and forty six thousand only)

10.1.17
Chief Engineer

SUB-ESTIMATE 1

Estimate for construction of 300 mm x 200 mm x 150 m Deep High Yeild Tubewell					
S.No.	Description	QTY	Unit	Rate	Amount
1	Providing all materials, labour and equipment for drilling by Reverse Rotary rig Machine for following dia of bore hole in all kind of soil mixed with Kankar, sand stone including providing sample box and collection starta sample at every 3.0M depth of drilling for ascertaining proper aquifer for completing High Yielding Tube Well all complete as per IS:2800-1979 & PHED specification and direction of E/I				
	(a) 450 mm dia bore from G.L to 30.0m below GL.	30	PM	650.00	19500.00
24.1.1.3	(b) 400 mm dia bore from 30m to 90.0m and beyond Below GL.	60	PM	529.30	31758.00
24.2.1.3	(c) 400 mm dia bore from 90m to 160.0m and beyond Below GL.	70	PM	691.80	48426.00
2	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded) FE 410 mild steel screwed and socketed/ plain ended casing pipes of required dia,conforming to IS: 4270, of reputed & approved make, including painted with outside surface with two coats of anticorrosive paint of approved brand and manufacture, including required hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer-incharge.				
	(a) 300 mm nominal size dia having minimum wall thickness 6.0 mm	30	PM	2053.00	61590.00
24.10.3	(b) 200 mm nominal size dia having minimum wall thickness 5.40 mm	90	PM	1696.20	152658.00
3	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded)FE 410 plain slotted (having slot of size 1.6/3.2 mm) mild steel threaded and socketed / plain bevel ended pipe (type A) of required dia, conforming to IS: 8110, of reputed and approved make,having wall thickness not less than 5.40 mm, including painted with outside surface with two coats of anticorrosive bitumestic paint of approved brand and manufacture,including hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer -in-charge.				
24.11.3	200 mm nominal size dia	30	PM	1780.10	53403.00
4	Providing all tools and labour including supplying fitting & fixing the following accessories for aforesaid 250 mm x 200 mm T/W as per direction of E/I.				
	(i) 300 mm x 200 mm dia M.S Reducer	1	Each	1000.00	1000.00
	(ii) 300 mm dia M.S well cap.	1	Each	400.00	400.00

24.15.3	(iii) 200 mm dia M.S well plug with 10mm dia hook welded as per direction of E/I.	1	Each	278.90	278.90
	(iv) M.S Centre guide suitable for 300 mm dia pipe	3	Each	250.00	750.00
	(v) M.S Centre guide suitable for 200 mm dia pipe	10	Each	200.00	2000.00
	(vi) MS clamp set of required Dia as per IS 2800 including necessary bolts and nuts required	1	P.Pair	1500.00	1500.00
5A/24.8	Providing all materials, labour and tools for providing and placing around tube well double washed pea gravel confirming to IS:8419-1977 of size 4mm to 8mm from dalbhumgarh of east singhbhum (JH) inclusive of loading, carriage, unloading & stacking in proper shape for measurement at site. (Stock measurement of clean and washed gravel shall be taken 13" as 12" in height to count void) as per direction of E/I.				
		15	PM^3	990.10	14851.50
5B	Carriage of Pea Gravel from Dhalbhumigarh (taken av distance 500km.)	15	PM^3	5450.77	81761.55
6	Development of tube well in accordance with IS : 2800(part I) and IS: 11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity air compressor, running the compressor for required time till well is fully develo ped, measuring yield of well by"V" notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water samples & getting tested in approved laboratory, i/c disinfection of tubewell, all complete,including hire & labour charges of air compressor, tools & accessories etc., all as per requirement and direction of Engineer-in-charge.				
24.12		30	Per Hour	649.40	19482.00
7	Transportation and erection of drilling plants, developing equipments & all other required tools and M/C by and suitable mechanical means including all cost of loading, unloading, placing at work site and back after completion of work as per S/D of E/I.				
		1	Each	15000.00	15000.00
8	Supplying all materials and labours for arrangement for additionla water required during the drilling period for 70 Hrs & site clearance & levelling etc and providing the soap duster etc to staff engaged in drilling etc all complete work as per specification & direction of E/I.				
		1	Each	40000.00	40000.00
9	Chemical and bacteriological testing of water sample including the cost of collection, carrying to designated PHE/other laboratories and submission of report in				
		1	Each	500.00	500.00
	Total-				**544859.00**

SUB-ESTIMATE 2

Installation of Pump & Motor with Panel

S.No.	Description	QTY	Unit	Rate	Amount
1	Supplying, installation, Testing and commissioning of **20 HP Submersible pump and motor having discharge 26.24 lps against a total head of 42 m** including suitable dia GI medium class column pipe, suitable dia N/R Valve, suitable dia flange, submersible flat cable, LT connection from control panel to starter etc all complete with floor mounted outdoor type L.T feeder pillar, three phase starter controll pannel operated on 440 V, 3 phase , 50 c/s made of MS sheet (minimum 2 mm thick) duly spray power coated painting with all accessories as per direction of E/I	1	Each	282000.00	282000.00
2	Supplying, installation, Testing and commissioning of **63 KVA** Transformer (copper wound) with suitable DP structure and extension of HT line (0.25KM) including supervision charge of BSEB.	1	Each	263000.00	263000.00
	Total				545000.00

SUB-ESTIMATE 3

Water Supply Distribution System

S.No.	Description	Qty	Unit	Rate	Amount
1/2.8	Earth work in excavation in foundation trenches or drains(not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, lift upto 1.5 m. including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				
	63mm 9335.0 0.46 0.5	2161.05			
	110mm 5600.0 0.51 1.0	2856			
	200mm 900.0 0.60 1.0	540			
	250mm 500.0 0.65 1.0	325			
	5 % extra	294.1			
	Total-	6176.2	PM³	230.50	1423603.76
2/2.26	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth: consolidating each deposited layer by ramming and watering lead				
	90% of item no 1	5558.5	PM³	74.50	414111.20
3	Providing and supplying High Density Polyethyene pipe (HDPE pipe) of 20 mm to 225 mm OD and pressure 6.0 Kg/cm2 and 10 Kg/cm2 sutable for water supply which is available in all standard, like ISI-4984, ISO - 4427 DIN-8074 and various grades like PE-63, PE-80, PE-100 and newly invented PE 100+ materials				
	HDPE pipe of materials grade PE100- PN8 (dia in mm)				
	63 mm dia	9335.0	PM	119.38 ~~121.70~~	~~1136094.83~~ 1,11,14,505.65
	110 mm dia	5600.0	PM	363.33 ~~370.99~~	~~2077533.11~~ 20,38,008.00
	200 mm dia	900.0	PM	977.50 ~~993.43~~	~~894086.05~~ 8,77,086.00
	250 mm dia	500.0	PM	~~1551.05~~ 1521.56	~~775526.21~~ 7,60,780.00
4	Supplying labours and tools for lowering in trenches, laying and jointing H.D.P.E. pipes in trenches and making butt welded joint, supplying heating mirror, jack etc. including hydraulic testing and providing night guard, barrier and red light to safe guard against ancident, all complete as per specification and direction of E/I				
	HDPE pipe of materials grade PE100- PN8 (dia in mm)				

	63 mm dia	9335.0	PM	21.32	199022.20
	110 mm dia	5600.0	PM	53.33	298648.00
	200 mm dia	900.0	PM	129.40	116460.00
	250 mm dia	500.0	PM	193.23	96615.00
5	Providing all materials labours tools and tackles for fitting, jointing and testing to HDPE Standard specials confirming to IS specifications etc all complete.				4,79,037.97
	10% of item No-3				~~488324.02~~
9/ 18.31	Providing and fixing CI Sluice valves (with cap) Complete with bolts, nuts, rubber insertions etc.				
18.31.1.2	100mm dia Class II	1	Each	4046.30	4046.30
18.31.3.2	150mm dia Class II	1	Each	5890.00	5890.00
10/ 18.59	Providing and fixing CI double acting air valve of approved quality and bolts, nuts, rubber insertion etc. compete				
18.59.2	80mm dia	1	Each	6371.70	6371.70
11/ 18.35	Constructing masonry chamber 120 x 120 x 100cm inside in brick work in cement mortar 1:4 (1 Cement:4 coarse sand) for sluice valve, with CI Surface box 100mm top diameter, 160mm bottom diameter and 180mm deep (inside)with chained lid and RCC top slab 1:2:4 mix (1 Cement :2 Coarse sand: 4 graded stone aggregate 20mm nominal size), I/C necessary excavtion foundation concrete 1:5:10 (1 Cement:5 fine sand : 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 Cement:3 Coars sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design.				
		2	Each	14598.40	29196.80

12/ 18.36	Constructing masonry chamber 60 x 60 x 75cm inside in brick work in cement mortar 1:4 (1 Cement:4 coarse sand) for sluice valve, with CI Surface box 350x350mm top, 165mm bottom diameter and 180mm deep (inside)with chained lid and RCC top slab 1:2:4 mix (1 Cement :2 Coarse sand: 4 graded stone aggregate 20mm nominal size), I/C necessary excavtion foundation concrete 1:5:10 (1 Cement:5 fine sand : 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 Cement:3 Coars sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design.							
					1	Each	5917.10	5917.10
Road cutting and restoration								
13/ 15.24	Dismantling brick on edge soling in road including stacking serviceable materials in countable stacks within 15m lead and disposal of unserviceable materials with all leads etc all complete as per direction of E/I.							
	63mm dia	933.5	0.46	0.125	54.03			
	110 mm dia	560	0.51	0.125	35.70			
	200 mm dia	90	0.60	0.125	6.75			
	250 mm dia	50	0.65	0.125	4.06			
	Total-				100.54	PM^3	321.80	32353.39
11/ 11.73	Providing designation 100A one brick on edge soiling joints filled with local sand including cost of watering, taxes, royalty etc all complete as per building specification and direction of E/I.							
	63mm dia	933.5	0.46		432.21			
	110 mm dia	560	0.51		285.60			
	200 mm dia	90	0.60		54.00			
	250 mm dia	50	0.65		32.50			
	Total-				804.31	PM^2	407.00	327354.37
	Deduction for 80% Brick which are taken out during dismentaing work will be reused				39.43	P1000	-7019.25	-276772.66
14/ 15.2.1	Demolishing Cement concrete manualy or by mechanical means including disposal of materials within 50m lead as per direction of E/I.							
	63mm dia	1867	0.46	0.25	216.11			
	110 mm dia	1120	0.51	0.25	142.80			

	200 mm dia	180	0.60	0.25	27.00			
	250 mm dia	100	0.65	0.25	16.25			
	Total-				402.16	PM^3	578.30	232566.38
15/ 4.5.2	Providing and laying in position cement concrete 1:2:4(1cement:2coarse sand:4 graded stone chips 20mm nomina size)etc. all complete as per standard specification and direction of E/I.							
	Quantity as per item no.13				402.16	$P.M^3$	3850.50	1548498.79
16/ 2.28	Providing local clean sand in filling in foundation trenches and in plinth including ramming and water in layers not exceeding 150mm thick with all leads and lifts including cost of all materials labours royalty and taxes all complete as per building specification and direction of E/I.							
	63mm dia	1867	0.46	0.15	129.66			
	110 mm dia	1120	0.51	0.15	85.68			
	200 mm dia	180	0.60	0.15	16.20			
	250 mm dia	100	0.65	0.15	9.75			
	Total-				241.29	PM^3	204.40	49320.32
17/ 11.72	Providing designation 100A brick one brick flat soling joints filled with local sand and as per direction of E/I.							
	63mm dia	1867	0.46		864.42			
	110 mm dia	1120	0.51		571.20			
	200 mm dia	180	0.60		108.00			
	250 mm dia	100	0.65		65.00			
	Total-				1608.62	PM^2	253.80	408268.01
18/ Analysis attached	Carriage of the following materials from quarry to work site including loading, unloading and staking at work site as per specification & direction of E/I.							
	(a). Bricks				61.29	P1000	607.00	37202.09
	(b). Coarse sand				180.97	PM^3	485.81	87916.97
	(C). Stone chips				361.94	PM^3	2796.69	1012233.21
	(d). Local sand				241.29	PM^3	343.28	82830.82
	Total							~~11513217.97~~

1,14,11,071.36

SUB-ESTIMATE 4

House to House Service connection

S.N.	Particulars	Quantity	Unit	Rate	Amount
1A/ 2.8	Earth work in excavation in foundation trenches or drains(not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, lift upto 1.5 m. including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				
	For Pipe Laying (6 m X .3 m X 0.6m deep)	1.08	PM³	230.50	248.94
1B/2.26	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth: consolidating each deposited layer by ramming and watering lead	1.06 ~~1.03~~	PM³	74.50	78.85 ~~76.44~~
2/ PHED	Providing and fixing MDPE pipe (PE80) confirming IS: 15801/2008 and ISO 4427 with latest amendment PN12.5 (OD 20mm)	6	P/M	16.94 ~~17.27~~	101.64 ~~103.62~~
3/ PHED	Lowering, laying and jointing M.D.P.E. pipes in proper position including all specials by compreession fitting/electrofusion and butt fusion jointing procesure including hydraulic testing as per relevant IS code complete with all materials for jointing procedures like Electrofusion machine, Electric mirror/heater, Butt fusion welding machine with hydraulic jack, top loading clamp, etc, pump and accessories for hydraqulic testing and all lobour as directed by Engineer-incharge as per IS-7634 Part II 2012 (amended up to date) Including Contractor's profit & Over head, water charge, labour cess but excluding trenching & refilling, road cutting and restoration the same.				
	20mm dia	6	P/M	3.03	18.18
4/ 18.7.1	Providing and fixing chlorinated polyvinyl chloride (CPVC) pipes, having thermal stability for hot and cold water supply, including all CPVC plain and brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes and fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work (Exposed on wall) 15 mm nominal outer dia pipes.	1	P/M	138.70	138.70
5/ 18.20.1	Providing and fixing 15 mm brass ferrule with CI mouth cover including boring and tapping the main etc. all complete job.	1	Each	254.10	254.10
6/ LS	Providing and fixing HDPE electrfusion service saddle including all complete job as per direction of E/I.	1	Each	400.00	400.00
7/ 18.15.1	Providing and fixing brass bib cock of approved quality 15 mm nominal bore	1	Each	273.00	273.00
	Total :				~~1512.98~~ 1513.41
	Say Rs.:				**1513.00**

Rate Analysis Per Meter

S.N.	Particulars	Dia. Of Pipe	Rate including Excise Duty & CST	Cost without VAT	Amount of VAT	CP & Overhead Charges @ 15%	Total Cost including 1% Labour Cess
1	2	3	4	5 (4/1.06)	6(4-5)	7 (5*0.15)	8(1.01*(4+7))
1	HDPE Pipe (PE100) PN8 conforming to IS 4984/1995 with latest amendment	63mm	105.56	99.58	5.98	14.94	121.70
2		75mm	150.82	142.28	8.54	21.34	173.88
3		90mm	216.68	204.42	12.26	30.66	249.82
4		110mm	321.78	303.57	18.21	45.53	370.99
5		125mm	417.95	394.29	23.66	59.14	481.86
6		140mm	523.62	493.98	29.64	74.10	603.69
7		160mm	523.62	493.98	29.64	74.10	603.69
8		180mm	682.28	643.66	38.62	96.55	786.62
9		200mm	861.66	812.89	48.77	121.93	993.43
10		225mm	1061.90	1001.79	60.11	150.27	1224.29
11		250mm	1345.32	1269.17	76.15	190.38	1551.05
12	HDPE Pipe (PE100) PN10 conforming to IS 4984/1995 with latest amendment	63mm	128.04	120.79	7.25	18.12	147.62
13		75mm	183.6	173.21	10.39	25.98	211.68
14		90mm	262.84	247.96	14.88	37.19	303.03
15		110mm	388.52	366.53	21.99	54.98	447.93
16		125mm	503.94	475.42	28.52	71.31	581.00
17		140mm	630.78	595.08	35.70	89.26	727.24
18		160mm	822.14	775.60	46.54	116.34	947.87
19		180mm	1044.44	985.32	59.12	147.80	1204.16
20		200mm	1288.04	1215.13	72.91	182.27	1485.01
21		225mm	1625.63	1533.61	92.02	230.04	1874.23
22		250mm	2001.26	1887.98	113.28	283.20	2307.30
23	MDPE Pipe (PE80) PN 12.5 confirming to IS 15801/2008 and IS 4427 with latest amendment	20mm	14.98	14.13	0.85	2.12	17.27
24		25mm	20.16	19.02	1.14	2.85	23.24
25		32mm	32.48	30.64	1.84	4.60	37.45

Carriage Analysis for Patna Town

S.No.	Items	Rate (Rs.)	Remarks
1	**Pea gravel**		
	Carrriage from Dalbhumgadh to work site (500 Km pakka and 5 Km unsurface road)		
	8/5 (500 x 6.50 + 5 x 7.90) + 133.60	5396.80	
	Including 1% Labour Cess	5450.77	per cum
2	**Local Sand {Lead - 15 Km (14P + 1K)}**		
	8/5 (14x6.50 + 1 x 15.80)	170.88	BCD SOR 2016
	Loading & Unloading	169.00	
		339.88	
	Including 1% Labour Cess	343.28	per cum
3	**Bricks {Lead - 8 Km (7P + 1K)}**		
	8/2 (7 x 6.50 + 1 x 15.80)	245.2	
	Loading & Unloading	355.79	
		600.99	
	Including 1% Labour Cess	607.00	per 1000 nos
4	**Coarse Sand (Lead - 30 Km)**		
	8/5 (30 x 6.50)	312	
	Loading & Unloading	169.00	
		481.00	
	Including 1% Labour Cess	485.81	per cum
5	**Stone chips (Lead 250 Km)**		
	8/5 (250 x 6.5)	2600.00	
	Loading & Unloading	169.00	
		2769.00	
	Including 1% Labour Cess	2796.69	Per cum

Design Parameter

1. **No. of Households :-** 1500
2. **Present Population Taking 5 Person per Households :- 7500**
3. **Projected Population (2033) taking 2% growth rate per annum :- 9750**
4. **Pumping hour :- 16** hours
5. **Water Demand :-**135 lpcd +15% UFW
6. **Total Water Demand :-9750** X155 = 1511250 Litre per day
7. **Rate of Pumping :-** 1511250/(16*3600) = 26.24 LPS
8. **Head of Pump-motor:-**

(a) Sub soil water level -	18 m
(b) Drawdown-	4.5 m
(c) Friction loss in pipes -	12.5 m
(d) Tail End pressure -	7 m
Total:-	42m

9. **Tubewell :-**

(a) Discharge of tubewell is kept 1.5 times of the discharge of pump- 1.5 X 26.24 = 39.36 LPS
= 0.03936 m^3/s

(b) Velocity of flow in tubewell - 1.2 m/s

(c) Area of tubewell - 0.03936/1.2 = 0.0328 m^2

(d) Diameter of tubewell - sqroot(4*0.0328/3.14) = 0.204 m , Say 200 mm

Hence provide 450mm x 300mm x 150m deep tubewell with 30 m screen pipe.

10. **Distribution :-** Total 16335 M distribution network has been assumed to cover 1500 households.