PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AN AREA MEASURING 10.02847 ACRE (LICENCE NO 73 DATED 01/06/2022) IN SECTOR - 68, GURUGRAM, MANESAR URBAN COMPLEX

SERVICE PLAN ESTIMATE
FOR
PUBLIC HEALTH ENGINEERING & FIRE SERVICES WORK

Client

SH. MUKUL YADAV & OTHERS IN COLLABORATION WITH PAREENA INFRASTRUCTURE PVT. LTD.

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PROJECT REPORT / ESTIMATES FOR PROVIDING INTERNAL SERVICES e.g. WATER SUPPLY, FIRE, SEWERAGE & STORM WATER DRAINAGE ETC. IN RESPECT OF PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AN AREA MEASURING 10.02847 ACRE (LICENCE NO 73 DATED 01/06/2022) IN SECTOR - 68, GURUGRAM, MANESAR URBAN COMPLEX

Gurgaon is located at 28°28'N 77°02'E28.47°N 77.03°E/28.47; 77.03. It has an average elevation of 220 metres (721 ft) Gurgaon district, comprising four blocks Pataudi, Sohna, Gurgaon and Farrukhnagar, was created on 15 August, 1979.On its north, it is bounded by the district of Rohtak and the Union Territory of Delhi. Faridabad district lies to its east. On its south, the district shares boundaries with the district of Mewat. To its west lies the district of Rewari and the State of Rajasthan.Gurgaon is situated between the Himalayas and Aravalis mountain ranges. It is surrounded on three sides by Haryana and to the east, across the river Yamuna by Uttar Pradesh. Its greatest length is around 13 miles and the greatest breadth is 17 miles. Delhi's altitude ranges between 213 to 305 meters above sea level.

PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AN AREA MEASURING 10.02847 ACRE (LICENCE NO 73 DATED 01/06/2022) is a residential proposed between **SECTOR - 68, GURUGRAM, MANESAR URBAN COMPLEX** for development by **SH. MUKUL YADAV & OTHERS IN COLLABORATION WITH PAREENA INFRASTRUCTURE PVT. LTD.**

1 Water Supply

The source of water supply shall be HUDA water supply connection. It has been proposed to construct undergorund tanks of capacity as per attached detaileds for domestic and other purpose. The underground tanks will be filled up from the riser and then pumped to the overhead water tanks of each tower.

i.) Source

The source of water supply in this area is tubewells as the underground water is sweet and fit for human consumption, moreover, the water is available at reasonable depth.The average yield of tubewell with 60'–80' strainer will be about 33000 lph per hour. The recharging of under ground water table in this belt is stated to be good. However still we shall resort to rain water harvesting system to keep up the recharging system. The number of tubewells required for the above area has been worked out to 03 Nos for housing part and 1 Nos. for commercial-1 part and the tubewells will be bored in tune with growth of demand to avoid absolence of the tubewells.

ii.) Design

The scheme has been designed for population of 6950 persons in 10.02847 Acre. The rate of water supply per head per day has been taken assumed as 172.5 litres per head per day as per HUDA norms. In addition to above necessary provision of water for Community building, Commercial building, parks etc. have been taken into account for calculating the maximum number of tubewell water required.

iii.) Pumping Equipments

It has been proposed to install pumping set as described with standby of equal capacity. The provision for standby generating set has been provided in case of any electricity failure. Generator will be provided separately or added to the capacity of main generator.

iv.) Under Ground Storage

Underground storage tank provision has been made, which caters for the present and a lot of future requirement as well as fire fighting requirement. The water for domestic water compartment shall over flow from the fire compartment so that the water in the fire compartment also remains fresh.

v.) Boosting Station

The boosting station is being planned near UGSR catering to the above requirement.

vi.) Distribution System

The distribution systems for this development has been designed to supply @ 172.5 Litres per head per day @ 3 times the average rate of flow on 'Hazen Willima' formula with C-100. Necessary provision for laying D.I. pipes only conforming to relevant IS standards along with valves and specials has been made in this estimate.

vii.) Rising Mains

Rising mains from HUDA water main on sector road to water works have also been designed and provision for D.I. pipe line (dia as/design) has been made in this estimate.

2 Sewerage

This scheme is designed for sewer connecting to the proposed sewage treatment plant. The sewerage system has been marked on the respective plans.

The sewer lines have been designed for 3 times average DWR in relation to the water supply demand assuming that 80% of the domestic water supply shall find its way into the proposed sewer SW pipe sewers have been proposed designed to run half full. The sewers have been designed on 0.76 mtr. per second velocity ie. Self cleansing velocity. Necessary provisions for laying SW pipes manholes etc. has been made in this estimate.

Necessary design statement for entire sewerage system has been prepared and attached with estimate.

3 Storm Water Drainage

The storm water drain is being designed to carry 45 mm rain fall per hour. Also suitable provisions are contemplated in our scheme to ensure better recharging of under ground water table in the area.RCC NP_3 pipe drain with minimum 400 mm dia is proposed in this area.

4 Roads

Cost of road has been taken in the estimate.

5 Street Lighting

Provision for street lighting on surrounding area has been made.

5 Horticulture

Estimates and details of plantation, landscaping, signage etc. has been included.

7 Specifications :

The work will be carried out in accordance with the standard specifications of PH as laid down by the HUDA/Haryana Government.

8 Rates

Estimates for providing services in this site has been prepared on the recent HUDA rates.

9 Cost

The total cost of development in this Project including various PH & B & R services works out to **Rs. 1460.12 lacs** which includes 3% contingency and PE charges and 49% departmental charges also.

The cost per gross acre for this phase works out to **Rs. 145.598 Lacs/acre** which covers the provision of services like water supply, sewerage, storm water drainage, roads, street lighting and plantations including plantations maintenance thereof as well as future expansion whatsoever indicated.

SH. MUKUL YADAV & OTHERS IN COLLABORATION WITH PAREENA INFRASTRUCTURE PVT. LTD.

Authorised Signatory

PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AN AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM, MANESAR URBAN COMPLEX

DESIGN CALCULATION FOR HOUSING PART

	Total No. of Units			1390	Nos.
	Population per Units (general)			5	persons
1	Therefore population (general)			6950	persons
	Total Population			6950	persons
		SAY		**6950**	**persons**
	Water requirement for Units (General)	@		172.50	Lpcd.
			Domestic @ 70 %	**Flushing @ 30 %**	
	Water requirement for Units (General)	@	121.00	51.50	Lpd.
			840950	357925	Lpd.
		or	**840.95**	**357.93**	**Kld.**
2	**Visitors @ 10%**			695.00	persons
	Water requirement	@		15.00	Lpd.
			Domestic	**Flushing**	
	Water requirement	@	5.00	10.00	Lpd.
			3475	6950	Lpd.
		or	**3.48**	**6.95**	**Kld.**
3	**COMMERCIAL (796.33 sqm or 0.196 Acres)**	0.196	32000		
	Daily water requirement @ 32000 lit/Acre	@	20800	11200.00	Lpd.
	Therefore daily water requirement		4076.8	2195.2	Lpd.
			4.08	**2.20**	**Kld.**
4	**COMMUNITY/AGANWADI (751.92 sqm or 0.185 Acres)**	0.185	25000		
	Daily water requirement @ 25000 lit/Acre	@	16250	8750.00	Lpd.
	Therefore daily water requirement		3006.25	1618.75	Lpd.
			3.01	**1.62**	**Kld.**
5	**MILK BOOTH**	0.00	0		
	Daily water requirement	@	0	0.00	Lpd.
	Therefore daily water requirement		0	0	Lpd.
			0.00	**0.00**	**Kld.**
	Total Domestic Water Requirement (1+2+3+4+5)	**Total**	**851.51**	**368.69**	**Kld.**
6	**Green area (5236.81 sqm or 1.294 Acres)**	1.294			
	Daily water requirement @ 25000 lit/Acre	@	-	25000	Ltr./Acre
			-	32350.00	Lpd.
			0.00	**32.35**	**Kld.**
7	**Area under road/paved (13693.44 sqm or 3.383 Acres)**	3.383			

	Daily water requirement @ 5000 lit/Acre		@	-	5000 Ltr./Acre
				-	16915.00 Lpd.
				0.00	**16.92 Kld.**
		(6+7)	**Total**	**0.00**	**49.27 Kld.**
I	**Total daily requirement**				
	a) For Domestic+Flushing use (1+2+3+4)			851.51	368.69 Kld.
	b) Under Road+ Parks (5+6)			0.00	49.27 Kld.
	Total Daily Requirement			851.51	417.95 Kld.
			SAY	**900.00**	**420.00 Kld.**
II	**Tubewell**				
	Assuming working hours of tubewells				8 Hours
	Assuming discharge/hour of each tubewell				33 KL/Hours
	Total domestic demand				**851.51 Kld.**
	No. of tubewells required		851.51 /33/8		3.23
			Say		**4.00 Nos.**
III	**Pumping machinery for tubewell**				
	Gross working load			=	45.00 Mtr.
	Average fall in SL			=	3.05 Mtr.
	Depression head			=	6.10 Mtr.
	Friction loss in main			=	2.50 Mtr.
				=	56.65 Mtr.
			Say	=	60.00 Mtr.
	BHP = 36000x60x1/60/60/75/0.6			=	13.33 HP
	With 60% efficiency		**Say**		**14.00 HP**
IV	**Underground Tank**				
	Daily requirement for domestic use			=	851.51 Kld.
	Capacity of under ground tank				
	24 hours storage		851.51 x 24 / 24		851.51 Kld.
			Say	**=**	**900.00 Kld.**
	Fire Tank Capacity As/NBC-2016			=	550.00 KLD
			Say	=	**550.00 KL**
			TOTAL		**1450.00 KL**

It is proposed to provide under ground tank of capacity **1350 KL** which also includes **550 KL** capacity for fire fighting.

Tanks will have six compartments, two for fire, two for raw and the other two for domestic use. The water first enters the fire compartment, then over flows to the raw use compartment so that the water in the fire compartment shall remain fresh.

It is proposed to provide the under ground tank of following capacity :

Capacity of Fire Water Tank-01	**275.00 Kl.**
Capacity of Fire Water Tank-02	**275.00 Kl.**
Capacity of Raw Water Tank-01	**225.00 Kld.**
Capacity of Raw Water Tank-02	**225.00 Kld.**
Capacity of Domestic Water Tank-01	**225.00 Kld.**
Capacity of Domestic Water Tank-02	**225.00 Kld.**
	UGT

V BOOSTING MACHINERY

UG. Tank

Daily requirement for domestic use		=	851.51	Kld.
Assuming 6 hours pumping	4 pumps (with one standby)			
Discharge/hour	851.51 / 6 / 4	=	35.48	KL/Hours
Head of pump				
i) Suction lifts		=	0.0	Mtr.
ii) Friction loss in M<main & specials		=	4.0	Mtr.
iii) Clear head		=	85.2	Mtr.
iv) Residual head		=	5.0	Mtr.
		=	94.2	Mtr.
BHP of motor			20.6	HP
		=	21.0	**HP**

VI PUMPS FOR FIRE PROTECTION

	Pump Description	Location	Nos.	Discharge	Head	HP
i)	**Diesel Driven Pump**	Pump Room	**2**	**2850**	**135.00**	
ii)	**Hydrant Pump**	Pump Room	**1**	**2850**	**135.00**	**150**
iii)	**Sprinkler Pump**	Pump Room	**1**	**2850**	**135.00**	**150**
iv)	**Jockey Pump**	Pump Room	**2**	**180**	**135.00**	**10**
v)	**Water curtain Pump**	Pump Room	**1**	**1620**	**45.00**	**30**

Capacity of Gen Set	Nos.	HP			
Domestic Water Transfer Pumps	4	21.0	=	84	HP
Tubewell	4	14.0	=	56	HP
Fire Pump (Jockey)	2	10.0	=	20	HP
Lighting			=	25	HP
				185	HP
or	185 x0.746x1.50			207.02	KVA
	Say			**210.00**	**KVA**

VII Sewage Treatment Plant Capacity (STP.)

Gross Domestic+Flushing water requirment / day	1220.20	Kld.
Sewage flow (80% domectic + 100% flushing) of total load	1049.90	Kld.
Proposed STP. Capacity	**1050.00**	**Kld.**
	STP	

DESIGN CALCULATION FOR COMMERCIAL - 01 PART

1	**COMMERCIAL (5222.75 sqm or 1.290 Acres)**	1.290	32000		
	Daily water requirement @ 32000 lit/Acre	@	20800	11200.00	Lpd.
	Therefore daily water requirement		26832	14448	Lpd.
			26.83	**14.45**	**Kld.**
	Total Domestic Water Requirement (1)	**Total**	**26.83**	**14.45**	**Kld.**
2	**Green area**	0.000			
	Daily water requirement @ 25000 lit/Acre	@	-	25000	Ltr./Acre
			-	0.00	Lpd.
			0.00	**0.00**	**Kld.**
3	**Area under road/paved (3178.22 sqm or 0.785 Acres)**	0.785			
	Daily water requirement @ 5000 lit/Acre	@	-	5000	Ltr./Acre
			-	3925.00	Lpd.
			0.00	**3.93**	**Kld.**
	(2+3)	**Total**	**0.00**	**3.93**	**Kld.**
I	**Total daily requirement**				
	a) For Domestic+Flushing use (1)		26.83	14.45	Kld.
	b) Under Road+ Parks (2+3)		0.00	3.93	Kld.
	Total Daily Requirement		26.83	18.37	Kld.
		SAY	**30.00**	**20.00**	**Kld.**
II	**Tubewell**				
	Assuming working hours of tubewells			8	Hours
	Assuming discharge/hour of each tubewell			33	KL/Hours
	Total domestic demand			**26.83**	**Kld.**
	No. of tubewells required	26.83 /33/8		0.10	
		Say		**1.00**	**Nos.**
III	**Pumping machinery for tubewell**				
	Gross working load		=	45.00	Mtr.
	Average fall in SL		=	3.05	Mtr.
	Depression head		=	6.10	Mtr.
	Friction loss in main		=	2.50	Mtr.
			=	56.65	Mtr.
		Say	=	60.00	Mtr.
	BHP = 36000x60x1/60/60/75/0.6		=	13.33	HP
	With 60% efficiency	**Say**		**14.00**	**HP**
IV	**Underground Tank**				
	Daily requirement for domestic use		=	26.83	Kld.
	Capacity of under ground tank				
	16 hours storage	26.83 x 16 / 24		17.89	Kld.
		Say	**=**	**20.00**	**Kld.**
	Fire Tank Capacity As/NBC-2016		=	250.00	KLD
		Say	=	**250.00**	**KL**

			TOTAL		**270.00 KL**

It is proposed to provide under ground tank of capacity **280 KL** which also includes **250 KL** capacity for fire fighting.

Tanks will have four compartments, two for fire, one for raw and the other one for domestic use. The water first enters the fire compartment, then over flows to the raw use compartment so that the water in the fire compartment shall remain fresh.

It is proposed to provide the under ground tank of following capacity :

Capacity of Fire Water Tank-01					**125.00 Kl.**
Capacity of Fire Water Tank-02					**125.00 Kl.**
Capacity of Raw Water Tank-01					**10.00 Kld.**
Capacity of Domestic Water Tank-01					**10.00 Kld.**
					UGT

V BOOSTING MACHINERY

UG. Tank

Daily requirement for domestic use			=	26.83 Kld.
Assuming 6 hours pumping	1 Nos. pump (with one standby)			
Discharge/hour	26.83	/ 6 / 1	=	4.47 KL/Hours
Head of pump				
i) Suction lifts			=	0.0 Mtr.
ii) Friction loss in M<main & specials			=	4.0 Mtr.
iii) Clear head			=	35.9 Mtr.
iv) Residual head			=	5.0 Mtr.
			=	44.9 Mtr.
BHP of motor				1.2 HP
			=	2.0 **HP**

VI PUMPS FOR FIRE PROTECTION

	Pump Description	**Location**	**Nos.**	**Discharge**	**Head**	**HP**
i)	**Diesel Driven Pump**	Pump Room	**1**	**2280**	**85.00**	
ii)	**Hydrant Pump**	Pump Room	**1**	**2280**	**85.00**	**80**
iii)	**Sprinkler Pump**	Pump Room	**1**	**2280**	**85.00**	**80**
iv)	**Jockey Pump**	Pump Room	**2**	**180**	**85.00**	**10**
v)	**Water curtain Pump**	Pump Room	**1**	**1620**	**45.00**	**30**

Capacity of Gen Set	Nos.	HP		
Domestic Water Transfer Pumps	4	2.0	=	8 HP
Tubewell	1	14.0	=	14 HP
Fire Pump (Jockey)	2	10.0	=	20 HP
Lighting			=	25 HP
				67 HP
or	67 x0.746x1.50			74.97 KVA
	Say			**80.00 KVA**

VII Sewage Treatment Plant Capacity (STP.)

Gross Domestic+Flushing water requirment / day	41.28 Kld.
Sewage flow (80% domectic + 100% flushing) of total load	35.91 Kld.
Proposed STP. Capacity	**40.00 Kld.**
	STP

Estimate for Providing in Internal Development works

SH. MUKUL YADAV & OTHERS IN COLLABORATION WITH PAREENA INFRASTRUCTURE PVT. LTD.

Description	Amount (Lacs.)
Sub Work - I Water Supply System	**553.36**
Sub Work - II Sewerage System	**211.46**
Sub Work - III Storm Water Drainage System	**100.51**
Sub Work - IV Roads & Footpath	**277.27**
Sub Work - V Street Lighting	**38.48**
Sub Work - VI - Horticulture	**26.12**
Sub Work - VII - Maintenance of Services for 10 years including resurfacing of roads after 1st 5 years & II phase i.e. 10 years of maintenance (as per HUDA norms)	**252.93**
Total	**1460.12**

(RUPEES FOURTEEN CRORES SIXTY LACS TWELVE THOUSAND ONLY)

SH. MUKUL YADAV & OTHERS IN COLLABORATION WITH PAREENA INFRASTRUCTURE PVT. LTD.

Authorized Signatory

FINAL ABSTRACT OF REVISED COST

Description		Amount (Lacs.)
Sub Head - (I) Head Works		128.90
Sub Head - (II) Pumping Machinery		133.60
Sub Head - (III) Distribution System		39.24
Sub Head - (IV) Irrigation Scheme		5.39
Sub Head - (V) Fire Scheme		53.43
	Total	**360.56**
Add 3% Contingencies		10.82
	Total	**371.38**
Add 49% Departmental Charges		181.98
	Grand Total	**553.36**
(CO to final abstract of cost)	**Say**	**553.36**

Sub Work I **Water Supply**

Sub Head No. I **Head Works**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount Rs. (lacs)
1	Boring and installing 510 mm i/d tubewells with reverse/direct rotary rig complete with pipe strainer to a depth of about 80 m. complete. (For Residential & commercial part)	Nos.	5	750000.00	37.50
2	Constructing pump chambers as per standard design of PWD PH/HUDA of size 1.50x1.50 m.	Nos.	5	100000.00	5.00
3	Construction of boosting chambers of suitable size along with under ground tank & pumping machinery and generating set etc. complete in all respects.				
	Details of boosting station for residential part				
i)	construction of boosting chambers	Nos.	1	400000.00	4.00
ii)	construction of UG tank (Dom.+ Fire)	KL	1450	4500.00	65.25
	Details of boosting station for commercial part				
i)	construction of boosting chambers	Nos.	1	200000.00	2.00
ii)	construction of UG tank (Dom.+ Fire)	KL	270	4500.00	12.15
4	Provision for carriage of material and other unforeseen items.	LS	-	-	1.50
5	Provision for facilites staff for Maintenance	LS	-	-	1.50
	(C.O. to abstract of cost of Sub-work No.I)				**128.90 Lacs**
				Say	**128.90 Lacs**

Sub Work I **Water Supply**

Sub Head No. II **Pumping Machinery**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (in Lakhs)
1	Providing and installing electricity driven electro or submersible pumping set capable of delivering about 33 KL water per hour against a total head of 60 M complete with motor and other accessories. (For Residential & commercial part)	Nos.	5	120000.00	6.00
2	Providing & installing electricity driven pumping set capable of delivering 600 LPM of water against a total head of 95 m complete with motor and other accessories (For Domestic - 21 HP). (for residential part)	Nos.	5	245000.00	12.25
3	Providing & installing electricity driven pumping set capable of delivering 80 LPM of water against a total head of 45 m complete with motor and other accessories (For Domestic - 2 HP). (for commercial part)	Nos.	2	70000.00	1.40
4	Provision for diesel engine generator set each for standby Arrangements for booster pump complete with gear haed arrangements of following capacities.				
i)	210 KVA (for residential part)	Nos.	1	1750000.00	17.50
ii)	80 KVA (for commercial part)	Nos.	1	800000.00	8.00
5	Providing & installing pumping set of following capacities for fire protection:				
5.1	**For residential part**				
i)	180 LPM @ 135 M Head (10 HP)	Nos.	2	125000.00	2.50
ii)	2850 LPM @ 135 M Head (150 HP) Hydrant	Nos.	1	750000.00	7.50
iii)	2850 LPM @ 135 M Head (150 HP) Sprinkler	Nos.	1	750000.00	7.50
iv)	2850 LPM @ 135 M Head (DG Pump)	Nos.	2	1150000.00	23.00
v)	1620 LPM @ 45 M Head (30 HP) Water curtain	Nos.	1	450000.00	4.50
5.2	**For commercial part**				
i)	180 LPM @ 85 M Head (10 HP)	Nos.	2	125000.00	2.50
ii)	2280 LPM @ 85 M Head (80 HP) Hydrant	Nos.	1	510000.00	5.10
iii)	2280 LPM @ 85 M Head (80 HP) Sprinkler	Nos.	1	510000.00	5.10
iv)	2280 LPM @ 85 M Head (DG Pump)	Nos.	1	850000.00	8.50
v)	1620 LPM @ 45 M Head (30 HP) Water curtain	Nos.	1	450000.00	4.50
6	Provision for diesel engine genset stand bye arrangements for Tubewells. (For Residential & commercial part)	Nos.	5	125000.00	6.25

7	Provision for cheap pressure type chlorination plant complete. (For Residential & commercial part)	Nos.	5	100000.00	5.00
8	Provision for making foundations & erection of pumping machinery.	LS	-	-	2.00
9	Provision for pipes, valves & specials inside the pump chamber.	LS	-	-	1.50
10	Provision for electric services connection including electric fittings for tubewells chambers complete including cost of transformer.	LS	-	-	1.50
11	Provision for carriage for materials and other unforeseen items.	LS	-	-	1.50
	(C.O. to abstract of cost of Sub-work No.I)			**Total**	**133.60**
				Say	**133.60**

Sub Work I — **Water Supply**

Sub Head No. III — **Distribution System/Rising Main**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Providing, laying, jointing & testing D.I. pipes including cost of excavation complete as per ISI marked.				
i)	100 mm dia	M	1631	1460.00	2381260.00
ii)	150 mm dia	M	162	2040.00	330480.00
2	Providing, laying, jointing & testing G.I. pipes including cost of excavation complete as per ISI marked.				
i)	32mm dia nominal bore	M	211	550.00	116050.00
ii)	40mm dia nominal bore	M	0	650.00	0.00
3	Providing, fixing & Testing butterfly valves including cost of complete in all respects.				
i)	100 mm i/d	Nos.	12	10000.00	120000.00
ii)	150 mm i/d	Nos.	4	15000.00	60000.00
4	Providing, fixing & Testing Non Return valves (NRV) including cost of complete in all respects.				
i)	100 mm i/d	Nos.	5	14000.00	70000.00
5	Providing and fixing air valves and scour valves including cost of complete in all respects.	Nos.	6	10000.00	60000.00
6	Providing and fixing indicating plates for valves.	Nos.	27	1000.00	27000.00
7	Provision for carriage of material	LS	-	-	150000.00
8	Provision for cutting the roads and making to its original conditions.	LS	-	-	200000.00
9	Making water supply connection.	LS	-	-	200000.00
10	Provision for rising main from HUDA water supply line to UG Tank.				
i)	100 mm i/d	M	173	1210.00	209330.00
	(C.O. to abstract of cost of Sub-work No.I)			**Total**	**3924120.00**
				Say	**39.24 Lacs**

Sub Work I **Water Supply**

Sub Head No. IV **Irrigation**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Providing, laying, jointing & testing uPVC pipe line confirming to IS 4985 including cost of Excavation etc. complete in all respect.				
i)	90 OD	M	776	430.00	333680.00
ii)	50 OD	M	322	140.00	45080.00
2	Providing and fixing 20mm dia Irrigation hydrant valve complete in all respect. (For Residential & commercial part)	Nos.	22	1200.00	26400.00
3	Providing, fixing & Testing butterfly valves including cost of complete in all respects.				
i)	80 mm i/d	Nos.	3	4750.00	14250.00
4	Providing and fixing air valves and scour valves including cost of complete in all respects.	Nos.	3	4500.00	13500.00
5	Providing and fixing indicating plates for butterfly valve, NRV & air valve etc.	Nos.	6	1000.00	6000.00
6	Provision for carriage of materials etc. and other unforsean charges.	LS	-	-	50000.00
7	Provision for cutting of roads & making good to its in original condition.	LS	-	-	50000.00
				Total	**538910.00**
				Say	**5.39 Lacs**

Sub Work I

Sub Head No. V **Fire Scheme**

S. No.	Description	Unit	Qty	Rate	Amount (Rs.)
1	Providing, laying, jointing & testing M.S. pipes for fire ring main including cost of Fittings & excavation complete (as per ISI marked) in all respect.				
a)	80 mm dia	M	270	1000.00	270000.00
b)	100 mm dia	M	82	1250.00	102500.00
c)	150 mm dia	M	2035	1850.00	3764750.00
2	Providing and fixing External Fire Hydrants complete with masonary chambers. (For Residential & commercial part)	Nos.	26	15000.00	390000.00
3	Providing, fixing & Testing butter fly valve including cost of complete in all respects.				
a)	80 mm dia	Nos.	26	10000.00	260000.00
b)	150 mm dia	Nos.	10	20000.00	200000.00
4	Providing, fixing & Testing Non Return valves (NRV) including cost of complete in all respects.				
i)	80 mm i/d	Nos.	26	5000.00	130000.00
5	Providing and fixing Fire Brigade connection. (For Residential & commercial part)				
i)	4 way inlet connection.	Nos.	6	15000.00	90000.00
ii)	2 way withdrawl connection.	Nos.	2	10000.00	20000.00
5	Provision for cutting of roads and carriage of materials etc. and other unforsean charges	LS	-	-	40000.00
6	Provision for indication plates	Nos.	26	1000.00	26000.00
7	Provision for carriage of material	LS	-	-	50000.00
			Total		**5343250.00**
			Say		**53.43 Lacs**

Sub Work II (Part-1) **Sewerage Scheme**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Providing, lowering, jointing, cutting SW/RCC NP_3 pipes and specials into trenches including cost of excavation, bed concrete lot of manholes complete.				
i)	**200 mm i/d**				
a)	Average depth 0.0 m to 1.5 m	M	63	1700.00	107100.00
b)	Average depth 1.5 m to 4.5 m	M	480	2040.00	979200.00
ii)	**250 mm i/d**				
a)	Average depth 0.0 m to 1.5 m	M	0	2150.00	0.00
b)	Average depth 1.5 m to 4.5 m	M	26	2400.00	62400.00
iii)	**300 mm i/d**				
a)	Average depth 1.5 m to 4.5 m	M	80	2550.00	204000.00
iv)	**400 mm i/d**				
a)	Average depth 1.5 m to 4.5 m	M	46	2650.00	121900.00
2	Provision for lighting, watching and temporary diversion of traffic	LS	-	-	100000.00
3	Provision for cutting of roads and carriage of materials etc. and other unforsean charges.	LS	-	-	100000.00
4	Provision for connection with HUDA.	LS	-	-	100000.00
5	Cost of 1050 Kld Sewerage Treatment Plant (**Note:** The STP cost is inclusive of civil & electromechanical part including flushing water transfer pumps) (For Residential part)	LS	-	-	10000000.00
5	Cost of 40 Kld Sewerage Treatment Plant (**Note:** The STP cost is inclusive of civil & electromechanical part including flushing water transfer pumps) (For Commercial part)	LS	-	-	1800000.00
6	Provision for CI / DI pipe from STP. To Huda Main Line.				
i)	150 mm dia pipe.	M	100	2040.00	204000.00
					13778600.00
	Add 3% contingencies				413358
					14191958.00
	Add 49% Deptt. Charges				6954059.42
				Total	**21146017.42**
	(C.O. to abstract of cost of Sub-work No. 1)			**Say**	**211.46 Lacs**

Sub Work - III **Storm Water Drain**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Providing, lowering, jointing, cutting RCC NP_3 pipes and specials into trenches including cost of excavation cost of manholes, ventilating chambers etc. complete in all respects.				
i)	**400 mm i/d**				
a)	Average depth upto 1.5 m	M	1183	2500.00	2957500.00
b)	Average depth 1.5 m to 4.5 m	M	0	2600.00	0.00
ii)	**500 mm i/d**				
a)	Average depth 1.5 m to 4.5 m	M	2	2850.00	5700.00
2	Provision for Road Gully & Drain.	LS	-	-	311000.00
3	Provision for cutting of roads and carriage of materials etc. and other unforseen items	LS	-	-	250000.00
4	Provision for disposal arrangements Recharge Pit. (For Residential & commercial part)	Nos	8	350000.00	2800000.00
5	Provision for lighting, watching and temporary diversion of traffic	LS	-	-	100000.00
6	Provision for connection with HUDA.				
i)	400 mm i/d (Average depth 0.0 m to 3.0 m)	M	50	2500.00	125000.00
					6549200.00
	Add 3% contingencies				196476.00
					6745676.00
	Add 49% Deptt. Charges				3305381.24
				Total	**10051057.24**
	(C.O. to abstract of cost of Sub-work No. 1			**SAY**	**100.51 Lacs**

Sub Work IV **Road Work**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Provision for leveling & earth filling as per site condition 10.02847 acre @ 175000/acre	Acres	10.02847	175000	1754982.25
2	Construction of road by:- i) Providing GSB 200 mm thick. ii) 250 mm thick W.M.M. stone aggregate. iii) 50 mm thick BDM iv) 30 mm thick BC complete in all respect.	Sq. mtr.	7689.0	1500	11533500.00
3	Provision for making approach and pavement to building block by providing concrete pavement or tiles. Etc.	Sq. mtr.	1538.00	650	999700.00
4	Provision for parking arrangement @ 1500 / sqm	Sq. mtr.	1160.0	1500	1740000.00
5	Provision for kerb stone with complete specification.	mtr.	2564.0	600	1538400.00
6	Provision for Carriage of material	LS.		200000.00	200000.00
7	Provision for traffic lighting and guide map/ indicators	LS.		300000.00	300000.00
				Total	**18066582.25**
	Add 3% contingencies				541997.47
					18608579.72
				Total	186.09 Lacs
	Add 49 % department charges				91.18 Lacs
				SAY	**277.27 Lacs**

Sub Work V **Street Lighting**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Providing street lighting on internal roads as per standard specifications of HVPNL with CFL	per acre	10.0285	250000.00	**2507117.50**
	Add 3% contingencies				75213.53
				Total	**2582331.03**
	Add 49% Deptt. Charges				1265342.20
				Total	**3847673.00**
				SAY	**38.48 Lacs**

Sub Work VI **Horticulture**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Development of lawn area a) Trenching the ordinary soil upto depth of 60 cm.Including removal & packing of serviceable material & disposing at a lead of 50 M and making up the trenched area to prope level by filling with earth mixed with manure befor & after flodding trench with water including cost of imported earth & manure. b) Rough dressing of trenched area. c) Grassing including watering & maintenance of lawns free from weeds & fit for mowing in rows including hedges, shrubs & green belts (as per HUDA Norms)				
	10.02847 acres @ Rs. 1.5 lacs.	per acre	10.02847	150000.00	1,504,271
	235 trees @ Rs. 1800/- each				198,000
	(1282/12)=106.833 nos. approx, say-110 nos.				
					1702270.50
	Add 3% contingency charges				**51068.12**
				Total	**1753338.62**
	Add 49% Deptt. Charges				**859135.92**
				Total	**2612474.54**
				Say	**26.12 Lacs**

Sub Work VII — **Maintenance Charges & Resurfacing of Roads**

S. No.	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1	Provision for maintenance charges for water supply, sewerage,storm water drainage, roads, street light, horticulture etc. complete including operation & establishments charges as per HUDA norms after completion & resurfacing of roads after 10 years or 1st phase.				
	10.02847 acres @ 8 lacs per acre	per acre	10.02847	800000.00	8022776.00
2	Provision for resurfacing & strengthening of road (with 50mm thick BM + 50 mm thick BC) after five years of Ist phase @ 450/- per sqm	Sq. mtr.	7689.0	450	3460050.00
3	Provision for resurfacing & strengthening of road (with 50mm thick BM + 50 mm thick BC) after ten years of 2nd phase @ 650/- per sqm	Sq. mtr.	7689.0	650	4997850.00
				Total	**16480676.00**
	Add 3% contingency & PE charges				494420.28
				Total	**16975096.28**
	Add 49% Departmetal charges				8317797.177
				Total	**25292893.46**
			say		**252.93 Lacs**

WATER SUPPLY QUANTITY SHEET

DOMESTIC WATER SUPPLY QUANTITY SHEET

S.No.	Line No		Length of Pipe	Dia of Pipe
	From	To	mtr.	mtr.
1	***UGT***	D1	37.0	150
2.	D1	D2	30.0	150
3.	D2	D2a	130.0	100
4.	D2a	D3a	110.0	100
5.	D3a	D3	139.0	100
6.	D2	D3	119.0	100
7.	D1	D1a	172.0	100
	Commercial Part			
8.	***UGT***	D4	32.0	32

FLUSHING WATER SUPPLY QUANTITY SHEET

1	***STP***	F1	40.0	150
2.	F1	F2	76.0	100
3.	F2	F2a	130.0	100
4.	F2a	F3a	110.0	100
5.	F3a	F3	139.0	100
6.	F2	F3	119.0	100
7.	F1	F1a	126.0	100
	Commercial Part			
8.	***STP***	F4	107.0	32

S.No.	Line No		Length of Pipe	Dia of Pipe
	From	To	mtr.	mtr.
TUBE WELL WATER SUPPLY QUANTITY SHEET				
1	**Tube Well 01**	T1	6.0	100
2.	T1	T2	125.0	100
3.	**Tube Well 02**	T2	6.0	100
4.	T2	T3	17.0	150
5.	**Tube Well 03**	T3	124.0	100
6.	T3	***UGT.***	38.0	150
	Commercial Part			
7.	**Tube Well 04**	***UGT.***	72.0	32
HUDA WATER SUPPLY QUANTITY SHEET				
1	**MUNICIPAL LINE**	***UGT***	109.0	100
	Commercial Part			
2	**MUNICIPAL LINE**	***UGT***	64.0	100
Description			**Length in (MTR)**	**Pipe Dia (MM)**
Domestic, Flushing & Tube Well Water Supply line			211	32
Domestic, Flushing & Tube Well Water Supply line			0	40
Domestic, Flushing & Tube Well Water Supply line			1631	100
Domestic, Flushing & Tube Well Water Supply line			162	150
Description			**Length in (MTR)**	**Pipe Dia (MM)**
Municipal Water Supply line			173.0	100
100 Dia Valve			12	Nos.
150 Dia Valve			4	Nos.
100 Dia Non Return Valve			5	Nos.
Air Valve			6	Nos.

IRRIGATION WATER SUPPLY QUANTITY SHEET				
S.No.	Line No		Length of Pipe	Dia of Pipe
	From	To	mtr.	OD
1	***S.T.P***	G1	40.0	90
2.	G1	G2	195.0	90
3.	G2	G3	194.0	90
4.	G1	G1a	223.0	90
5.	G1a	G3	124.0	90
	Commercial Part			
6.	***S.T.P***	G4	5.0	50
7.	G4	G5	122.0	50
8.	G5	G6	68.0	50
9.	G4	G6	127.0	50
Irrigation Water Supply line			**776.0**	**90**
Irrigation Water Supply line			**322.0**	**50**
Garden Hydrant (Housing Part)			**16**	**Nos.**
Garden Hydrant (Commercial Part)			**6**	**Nos.**
80 Dia Valve			**3**	**Nos.**
Air Valve			**3**	**Nos.**

TITLE : FIRE QUANTITY SHEET

FIRE HYDRANT QUANTITY SHEET

S.No.	Line No		Length of Pipe	Dia of Pipe
	From	To	mtr.	mtr.
1	***U.G.T***	B1	6.0	150
2.	B1	B2	32.0	150
3.	B2	B3	13.0	150
4.	B3	B3a	43.0	80
5.	B3	B4	136.0	150
6.	B4	B5	134.0	150
7.	B5	B5a	34.0	80
8.	B5	B6	119.0	150
9.	B6	B6a	35.0	150
10.	B2	B2a	38.0	150
11.	B2a	B2b	48.0	80
12.	B2a	B2c	63.0	150
13.	B2c	B2d	177.0	150
14.	B2d	B2e	40.0	80
15.	B2d	B6	55.0	150
	Commercial Part			
16.	***U.G.T***	B6	5.0	150
17.	B6	B7	19.0	150
18.	B7	B7a	32.0	80
19.	B7	B8	8.0	150
20.	B8	B9	39.0	150
21.	B9	B9a	7.0	150
22.	B9a	B9b	34.0	100
23.	B9b	B9c	36.0	80
24.	B9a	B9d	11.0	80
25.	B9	B6a	48.0	100
26.	B6	B6a	26.0	80

S.No.	Line No		Length of Pipe	Dia of Pipe
	From	To	mtr.	mtr.
FIRE SPRINKLER QUANTITY SHEET				
1	***U.G.T***	S1	5.0	150
2.	S1	S2	32.0	150
3.	S2	S3	150.0	150
4.	S3	S4	133.0	150
5.	S4	S5	120.0	150
6.	S2	S2a	100.0	150
7.	S2a	S2b	169.0	150
8.	S2b	S5	65.0	150
1	Hydrant Line	4 WAY	10.0	150
2.	4WAY INLET	***UGT***	102.0	150
3.	4WAY INLET SPR	Sprinkler Line	6.0	150
4.	2WAY WITHDRAWL	UGT	10.0	150
	Commercial Part			
5.	Hydrant Line	4 WAY	26.0	150
6.	4WAY INLET	***UGT***	119.0	150
7.	4WAY INLET SPR	Sprinkler Line	90.0	150
8.	2WAY WITHDRAWL	UGT	12.0	150
80 mm Dia Pipe			**270.0**	**mtr.**
100 mm Dia Pipe			**82.0**	**mtr.**
150 mm Dia Pipe			**2035.0**	**mtr.**
External Fire Hydrant (Housing Part)			**20**	**Nos.**
External Fire Hydrant (Commercial Part)			**6**	**Nos.**
80 Dia Valve			**26.0**	**Nos.**
150 Dia Valve			**10.0**	**Nos.**
80 Dia Non Return Valve			**26.0**	**Nos.**

TITLE - SEWERAGE QUANTITY SHEET

S.No.	Line No.		Length	Pipe Dia		Depth			EXCAVATION			
						Start	End	Avg.	0.0 - 1.5	1.5 - 3.0	3.0 - 4.5	4.5 - 6.0
-	From	To	(mtr.)	(mm)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)
1.	S1	S2	139.0	200	0.200	1.20	2.19	1.70	0.0	139.0	0.0	0.0
2.	S2a	S2	63.0	200	0.200	1.20	1.65	1.42	63.0	0.0	0.0	0.0
3.	S2	S3	26.0	250	0.250	2.24	2.38	2.31	0.0	26.0	0.0	0.0
4.	S3a	S3	133.0	200	0.200	1.20	2.15	1.67	0.0	133.0	0.0	0.0
5.	S3	S4	80.0	300	0.300	2.43	2.76	2.59	0.0	80.0	0.0	0.0
6.	S4a	S4	109.0	200	0.200	1.20	1.98	1.59	0.0	109.0	0.0	0.0
7.	S4	S5	40.0	400	0.400	2.86	2.97	2.91	0.0	40.0	0.0	0.0
8.	S5	***STP.***	6.0	400	0.400	2.97	2.98	2.98	0.0	6.0	0.0	0.0
	Commercial part											
9.	S6	S7	94.0	200	0.200	1.20	1.87	1.54	0.0	94.0	0.0	0.0
10.	S7	***STP.***	5.0	200	0.200	1.87	1.91	1.89	0.0	5.0	0.0	0.0
Total			**695.0**						**63.0**	**632.0**	**0.0**	**0.0**

Excavation Depth

Description	(0.0 - 1.5)	(1.5 - 3.0)	(3.0 - 4.5)	(4.5 - 6.0)
200 mm Dia pipe	63.0	480.0	0.0	0.0
250 mm Dia pipe	0.0	26.0	0.0	0.0
300 mm Dia pipe	0.0	80.0	0.0	0.0
400 mm Dia pipe	0.0	46.0	0.0	0.0

TITLE : STORM WATER QUANTITY SHEET

S.No.	Line No.		Length	Size of Pipe		Depth			EXCAVATION		
						Start	End	Avg.	0.0 -1.5	1.5 - 3.0	3.0 - 4.5
-	From	To	(mtr.)	(mm)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)
1.	A1	A2	61.0	400	0.400	1.20	1.31	1.25	61.0	0.0	0.0
2.	A2	***D.C.-01***	3.0	400	0.400	1.31	1.31	1.31	3.0	0.0	0.0
3.	***D.C.-01***	***R.P.-01***	2.0	400	0.400	1.31	1.32	1.31	2.0	0.0	0.0
4.	***R.P.-01***	A3	6.0	400	0.400	1.20	1.21	1.21	6.0	0.0	0.0
5.	A3	A4	39.0	400	0.400	1.21	1.28	1.24	39.0	0.0	0.0
6.	A4a	A4	36.0	400	0.400	1.20	1.26	1.23	36.0	0.0	0.0
7.	A4	A5	44.0	400	0.400	1.28	1.36	1.32	44.0	0.0	0.0
8.	A5	***D.C.-02***	2.0	400	0.400	1.36	1.36	1.36	2.0	0.0	0.0
9.	***D.C.-02***	***R.P.-02***	2.0	400	0.400	1.36	1.36	1.36	2.0	0.0	0.0
10.	***R.P.-02***	A6	15.0	400	0.400	1.20	1.23	1.21	15.0	0.0	0.0
11.	A6	A7	22.0	400	0.400	1.23	1.26	1.25	22.0	0.0	0.0
12.	A7a	A7b	133.0	400	0.400	1.20	1.43	1.32	133.0	0.0	0.0
13.	A7b	***D.C.-03***	2.0	400	0.400	1.43	1.44	1.44	2.0	0.0	0.0
14.	***D.C.-03***	***R.P.-03***	2.0	400	0.400	1.44	1.44	1.44	2.0	0.0	0.0
15.	***R.P.-03***	A7c	7.0	400	0.400	1.20	1.21	1.21	7.0	0.0	0.0
16.	A7c	A7	42.0	400	0.400	1.21	1.29	1.25	42.0	0.0	0.0
17.	A7	A8	43.0	400	0.400	1.29	1.36	1.32	43.0	0.0	0.0
18.	A8a	A8	20.0	400	0.400	1.20	1.24	1.22	20.0	0.0	0.0
19.	A8	A9	49.0	400	0.400	1.36	1.45	1.40	49.0	0.0	0.0
20.	A9	***D.C.-07***	9.0	400	0.400	1.45	1.46	1.46	9.0	0.0	0.0
21.	A10	A11	33.0	400	0.400	1.20	1.26	1.23	33.0	0.0	0.0
22.	A11	***D.C.-04***	3.0	400	0.400	1.26	1.26	1.26	3.0	0.0	0.0
23.	***D.C.-04***	***R.P.-04***	3.0	400	0.400	1.26	1.27	1.27	3.0	0.0	0.0
24.	***R.P.-04***	A12	8.0	400	0.400	1.20	1.21	1.21	8.0	0.0	0.0
25.	A12	A13	30.0	400	0.400	1.21	1.27	1.24	30.0	0.0	0.0
26.	A13a	A13	25.0	400	0.400	1.20	1.24	1.22	25.0	0.0	0.0
27.	A13	A14	51.0	400	0.400	1.27	1.36	1.31	51.0	0.0	0.0
28.	A14	***D.C.-05***	8.0	400	0.400	1.36	1.37	1.36	8.0	0.0	0.0

S.No.	Line No.		Length	Size of Pipe		Depth			EXCAVATION		
						Start	End	Avg.	0.0 -1.5	1.5 - 3.0	3.0 - 4.5
-	From	To	(mtr.)	(mm)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)	(mtr.)
29.	***D.C.-05***	***R.P.-05***	2.0	400	0.400	1.37	1.37	1.37	2.0	0.0	0.0
30.	***R.P.-05***	A15	5.0	400	0.400	1.20	1.21	1.20	5.0	0.0	0.0
31.	A15	A16	43.0	400	0.400	1.21	1.28	1.25	43.0	0.0	0.0
32.	A16	***D.C.-07***	3.0	400	0.400	1.28	1.29	1.29	3.0	0.0	0.0
33.	A17	A18	58.0	400	0.400	1.20	1.30	1.25	58.0	0.0	0.0
34.	A18	***D.C.-06***	3.0	400	0.400	1.30	1.31	1.30	3.0	0.0	0.0
35.	***D.C.-06***	***R.P.-06***	2.0	400	0.400	1.31	1.31	1.31	2.0	0.0	0.0
36.	***R.P.-06***	A19	3.0	400	0.400	1.20	1.21	1.20	3.0	0.0	0.0
37.	A19	A20	57.0	400	0.400	1.21	1.31	1.26	57.0	0.0	0.0
38.	A20	***D.C.-07***	12.0	400	0.400	1.31	1.33	1.32	12.0	0.0	0.0
39.	***D.C.-07***	***R.P.-07***	2.0	500	0.500	1.56	1.56	1.56	0.0	2.0	0.0
40.	***R.P.-07***	**Over Flow To HUDA**	12.0	400	0.400	1.20	1.22	1.21	12.0	0.0	0.0
	Commercial Part										
41.	A21	A22	100.0	400	0.400	1.20	1.38	1.29	100.0	0.0	0.0
42.	A22a	A22	19.0	400	0.400	1.20	1.23	1.22	19.0	0.0	0.0
43.	A22	A23	8.0	400	0.400	1.38	1.39	1.38	8.0	0.0	0.0
44.	A23a	A23	144.0	400	0.400	1.20	1.45	1.33	144.0	0.0	0.0
45.	A23	***D.C.-08***	2.0	400	0.400	1.45	1.46	1.45	2.0	0.0	0.0
46.	***D.C.-08***	***R.P.-08***	2.0	400	0.400	1.46	1.46	1.46	2.0	0.0	0.0
47.	***R.P.-08***	**Over Flow To HUDA**	8.0	400	0.400	1.20	1.21	1.21	8.0	0.0	0.0
Total			**1185.0**						**1183.0**	**2.0**	**0.0**

Excavation Depth			
Description	(0.0 - 1.5)	(1.5 - 3.0)	(3.0 - 4.5)
400 mm Dia pipe	1183.0	0.0	0.0
500 mm Dia pipe	0.0	2.0	0.0

TITLE : ROAD QUANTITY SHEET

MATERIAL STATEMENT FOR ROAD

AREA OF METALLED ROAD

S.NO.	ROAD NAME		LENGTH (m)	6 M WIDE	7 M WIDE	12 M WIDE	Metal Portion (m)	AREA
-	FROM	TO						
1	R-1	R-1	94.00	94.00			6.00	564.00
2.	R-2	R-2	46.00	46.00			6.00	276.00
3.	R-3	R-3	43.00	43.00			6.00	258.00
4	R-4	R-4	111.00	111.00			6.00	666.00
5	R-5	R-5	48.00	48.00			6.00	288.00
6	R-6	R-6	129.00	129.00			6.00	774.00
7	R-7	R-7	70.00	70.00			6.00	420.00
8	R-8	R-8	98.00	98.00			6.00	588.00
9	R-9	R-9	55.00	55.00			6.00	330.00
10	R-10	R-10	62.00	62.00			6.00	372.00
11	R-11	R-11	60.00	60.00			6.00	360.00
12	R-12	R-12	50.00	50.00			6.00	300.00
13	R-13	R-13	65.00	65.00			6.00	390.00
14	R-14	R-14	84.00	84.00			6.00	504.00
15	R-15	R-15	43.00	43.00			6.00	258.00
16	R-16	R-16	87.00	87.00			6.00	522.00
17	R-17	R-17	20.00	20.00			6.00	120.00
TOTAL			**1165.00**			.		**6990.00**
ADD 10% FOR CURVES			**116.5**					**699.00**
TOTAL			**1281.50**					**7689.00**
SAY			**1282.00**					**7689.00**

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY FOR AN AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

TITLE : TUBE WELL WATER SUPPLY DESIGN

S.No.	Line No.		Average Demand	Peak Demand @ 1.5 Times	Flow Rate	Length	Head Loss	Total Head Loss	Velocity	Pipe Dia
-	From	To	klph.	klph.	lpm.	mtr.	mtr./ mtr.	mtr.	m/sec	mm
1	**Tube Well 01**	T1	35.48	53.22	886.99	6.0	0.064	0.38	1.881	100
2.	T1	T2	35.48	53.22	886.99	125.0	0.064	7.98	1.881	100
3.	**Tube Well 02**	T2	35.48	53.22	886.99	6.0	0.064	0.38	1.881	100
4.	T2	T3	70.96	106.44	1773.98	17.0	0.032	0.54	1.672	150
5.	**Tube Well 03**	T3	35.48	53.22	886.99	124.0	0.064	7.92	1.881	100
6.	T3	***UGT.***	106.44	159.66	2660.97	38.0	0.068	2.58	2.508	150
	Commercial Part									
7.	**Tube Well 04**	***UGT.***	1.12	1.68	27.95	72.0	0.027	1.96	0.579	32

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY FOR AN AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

TITLE : HYDRAULIC DESIGN CHART FOR MUNICIPAL WATER SUPPLY CONNECTION LINE FROM HUDA

S.No	Line No.		Average Demand		Peak Demand @ 1.5 Times	Flow Rate	Pipe Length	Head Loss	Total Head Loss	Velocity	Pipe Dia
-	From	To	kld.	kl/hr.	lph.	lpm.	mtr.	mtr./ mtr.	mtr.	m/sec	mm
1	***HUDA***	***UGT.***	851.51	38.7	58.1	967.6	109.0	0.075	8.18	2.052	100
	Commercial Part										
1	***HUDA***	***UGT.***	26.83	1.2	1.8	30.5	64.0	0.000	0.01	0.065	100

Note : HUDA supply line calculation has been done as / 22 hours.

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY FOR AN AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

(Pump Riser Calculation Sheet)

Domestic Water Supply Design Calculation For Towers, Commercial, Community Building / Creche

Line No.		Probable demand (lps)	Probable demand (cum/hr)	Assumed pipe dia. (mm)	Head loss (mtr./mtr.)	Pipe length (mtr.)	Eq. Length fitts (%)	Eq. Length (mtr.)	Total length (mtr.)	Head loss line (mtr.)	Head loss prog (mtr.)	Velocity (m/sec)	Pump Head Available at ground level	Residual Head Available at Ground LVL	Residual Head Available at inlet of tank	Maximum Tower Height From Pump Room To OHT
1	1A	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
UGT	*D1*	39.422	141.92	**150**	0.055	37.0	5	1.85	38.85	2.117	2.117	2.230	94.20	92.08	-	-
D1	*D2*	19.711	70.96	**150**	0.015	30.0	5	1.50	31.50	0.476	14.092	1.115	92.08	91.61	-	-
D2	D2a	17.549	63.18	**100**	0.088	130.0	5	6.50	136.50	11.975	21.889	2.233	91.61	79.63	-	-
D2a	D3a	15.234	54.84	**100**	0.068	110.0	5	5.50	115.50	7.797	30.401	1.939	79.63	71.84	-	-
D3a	D3	14.077	50.68	**100**	0.058	139.0	5	6.95	145.95	8.512	40.061	1.791	71.84	63.32	-	-
D2	D3	16.391	59.01	**100**	0.077	119.0	5	5.95	124.95	9.660	40.061	2.086	91.61	81.95	-	-
D1	D1a	8.115	29.22	**100**	0.021	172.0	5	8.60	180.60	3.798	43.859	1.033	92.08	88.28	-	-
Commercial Part															-	-
UGT	D4	1.242	4.47	**32**	0.167	32.0	5	1.60	33.60	5.621	49.480	1.544	44.90	39.28	-	-

For Housing part

Flow Rate	**39.422**	lps
or	**2365.3**	**LPM**
No. of Pumps (4 W + 1 S)	**591.3**	**LPM**
Say	**600.0**	**LPM**
Maximum Building Height	85.2	m
Pump Head	**94.20**	m
Pump HP	20.6	HP
Say	**21.0**	**HP**

For Commercial part

Flow Rate	**1.242**	lps
or	**74.5**	**LPM**
No. of Pumps (1 W + 1 S)	**74.5**	**LPM**
Say	**80.0**	**LPM**
Maximum Building Height	35.9	m
Pump Head	**44.90**	m
Pump HP	1.2	HP
Say	**2.0**	**HP**

Flushing Water Supply Design Calculation For Towers, Commercial, Community Building / Creche

Line No.		Probable demand (lps)	Probable demand (cum/hr)	Assumed pipe dia. (mm)	Head loss (mtr./mtr.)	Pipe length (mtr.)	Eq. Length fitts (%)	Eq. Length (mtr.)	Total length (mtr.)	Head loss line (mtr.)	Head loss prog (mtr.)	Velocity (m/sec)	Pump Head Available at ground level	Residual Head Available at Ground LVL	Residual Head Available at inlet of tank	Maximum Tower Height From Pump Room To OHT
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
STP	*F1*	19.350	69.66	**150**	0.015	40.0	5	2.00	42.00	0.613	0.613	1.094	94.20	93.59	-	-
F1	*F2*	15.380	55.37	**100**	0.069	76.0	5	3.80	79.80	5.483	6.096	1.957	93.59	88.10	-	-
F2	F2a	13.991	50.37	**100**	0.058	130.0	5	6.50	136.50	7.871	13.967	1.780	88.10	80.23	-	-
F2a	F3a	12.602	45.37	**100**	0.048	110.0	5	5.50	115.50	5.488	19.454	1.604	88.10	82.62	-	-
F3a	F3	8.898	32.03	**100**	0.025	139.0	5	6.95	145.95	3.640	23.094	1.132	80.23	76.59	-	-
F2	F3	10.287	37.03	**100**	0.033	119.0	5	5.95	124.95	4.077	27.171	1.309	82.62	78.54	-	-
F1	F1a	9.176	33.03	**100**	0.026	126.0	5	6.30	132.30	3.493	30.664	1.168	76.59	73.10	-	-
Commercial Part															-	-
STP	F4	0.669	2.41	**32**	0.053	107.0	5	5.35	112.35	5.975	5.975	0.831	73.10	67.13	-	-

Flow Rate		**19.350**	lps
	or	**1161.0**	**LPM**
No. of Pumps (2 W + 1 S)		**580.5**	**LPM**
Say		**590.0**	**LPM**
Maximum Building Height		85.2	m
Pump Head		**94.20**	m
Pump HP		20.3	HP
Say		**21.0**	**HP**

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

TITLE : HYDRAULIC SEWAGE CHART

S.No.	Line No.		Gross Water Requirement (Load on Line)	Sewage Flow (Self Load on Line) LPD	Sewage Flow (Self Load on Line) KLD	Previous Load	Progressive Discharge	Progressive Discharge (Average)	Progressive Discharge (Peak)	Infilteration @ 25% Av. Discharge	Total Discharge	Length	Pipe Size	Slope (1 in)	Fall	Velocity	Capacity of Pipe	Levels at Start (mtr)			Levels at End (mtr)			Manhole Depth at Start	Manhole Depth at End	Average Depth
	From	To	(lps.)	80%	1000	(kld.)	(kld.)	(lps.)	(lps.)	(lps.)	(lps.)	(mtr.)	(mm)	(mm)	(mtr.)	(m/s) (v)	(lps.)	FRL	FSL	IL	FRL	FSL	IL	(mtr.)	(mtr.)	(mtr.)
1.	S1	S2	322575	258060	258.06	0.00	258.06	2.99	8.96	0.75	9.71	139.0	200	140	0.99	0.76	24.03	227.300	226.300	226.10	227.300	225.31	225.11	1.20	2.19	1.70
2.	S2a	S2	161288	129030	129.03	0.00	129.03	1.49	4.48	0.37	4.85	63.0	200	140	0.45	0.76	24.03	227.300	226.300	226.10	227.300	225.85	225.65	1.20	1.65	1.42
3.	S2	S3	0	0	0.00	387.09	387.09	4.48	13.44	1.12	14.56	26.0	250	190	0.14	0.76	37.41	227.300	225.307	225.06	227.300	225.17	224.92	2.24	2.38	2.31
4.	S3a	S3	386718	309374	309.37	0.00	309.37	3.58	10.74	0.90	11.64	133.0	200	140	0.95	0.76	24.03	227.300	226.300	226.10	227.300	225.35	225.15	1.20	2.15	1.67
5.	S3	S4	0	0	0.00	696.46	696.46	8.06	24.18	2.02	26.20	80.0	300	245	0.33	0.76	53.56	227.300	225.170	224.87	227.300	224.84	224.54	2.43	2.76	2.59
6.	S4a	S4	339195	271356	271.36	0.00	271.36	3.14	9.42	0.79	10.21	109.0	200	140	0.78	0.76	24.03	227.300	226.300	226.10	227.300	225.52	225.32	1.20	1.98	1.59
7.	S4	S5	0	0	0.00	967.82	967.82	11.20	33.60	2.80	36.41	40.0	400	360	0.11	0.76	95.16	227.300	224.844	224.44	227.300	224.73	224.33	2.86	2.97	2.91
8.	S5	***STP.***	0	0	0.00	967.82	967.82	11.20	33.60	2.80	36.41	6.0	400	360	0.02	0.76	95.16	227.300	224.733	224.33	227.300	224.72	224.32	2.97	2.98	2.98
	Commercial part		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.	S6	S7	41280	33024	33.02	0.00	33.02	0.38	1.15	0.10	1.24	94.0	200	140	0.67	0.76	24.03	227.300	226.300	226.10	227.300	225.63	225.43	1.20	1.87	1.54
10.	S7	***STP.***	0	0	0.00	33.02	33.02	0.38	1.15	0.10	1.24	5.0	200	140	0.04	0.76	24.03	227.300	225.629	225.43	227.300	225.59	225.39	1.87	1.91	1.89

Formula Used:

Peak factor is considered as 3 times for population upto 20,000 persons & above 20,000 person peak factor is considered 2.5 times.

Velocity(m/s)=(1/n)x(A/P)^(2/3)*(1/slope)^.5

n=.015 for RCC pipe (Manning's Coefficient)

A=Area of x-section of pipe in sqm.

P =Wetted Perimeter in m

Capacity of pipe(lps) =Area of x-section of pipe in sqm x velocity in m/s x1000x1/2(Sewers are designed to run half full)

Abbreviation Used:

IL=Invert level of pipe

FSL=Full supply level

FRL=Formation Road Level

CL=Connection Level

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

LOAD ON SEWAGE LINES

			Residential Sewage Load						Non Residential Sewage Load		Residential + Non Residential Load		
S.No.	Name of Sewer Line		Apartment	Population @ 5 persons / Unit	Water Reuirement @ 172.5 Ltr/day/Person	Service Person	Population @ 2 persons / Unit	Water Reuirement @ 172.5 Ltr/day/Person	Amenity	Water Reuirement @ Lumsum / day	Gross Water Requirement (Load on Line)	Sewage Flow (Self Load on Line)	Sewage Flow (Self Load on Line)
			Unit	**Nos.**	**lpd.**	**Unit**	**Nos.**	**lpd.**	**sqm.**	**lpd.**	**lpd.**	**lpd.**	**kld.**
-	From	To	-	5	172.5	-	2	172.5	-	-	-	80%	1000
1.	S1	S2	374	1870	322575	0	0	0	-	0	322575	258060	258.06
2.	S2a	S2	187	935	161287.5	0	0	0	-	0	161288	129030	129.03
3.	S2	S3	0	0	0	0	0	0	-	0	0	0	0.00
4.	S3a	S3	443	2215	382087.5	0	0	0	Community/Aganwadi	4630	386718	309374	309.37
5.	S3	S4	0	0	0	0	0	0	-	0	0	0	0.00
6.	S4a	S4	386	1930	332925	0	0	0	Commercial - 02	6270	339195	271356	271.36
7.	S4	S5	0	0	0	0	0	0	-	0	0	0	0.00
8.	S5	***STP.***	0	0	0	0	0	0	-	0	0	0	0.00
	Commercial part		-	-	-	-	-	-	-	-	-	-	-
9.	S6	S7	0	0	0	0	0	0	Commercial - 01	41280	41280	33024	33.02
10.	S7	***STP.***	0	0	0	0	0	0	-	0	0	0	0.00
-	-	-	1390	6950	**1198875**	**0**	**0**	**0**	-	**52180.00**	**1251055.00**		**1049.90**

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY OVER AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

TITLE : HYDRAULIC STORM WATER DESIGN CHART

																		Manhole Depth		
S.No.	Line No.		Length	Catchment Area (Sqm.)			Discharge @ 45 mm/hr rainfall	Pipe dia	Slope 1 in	Velocity m/sec.	Capacity of pipe	Fall in line	Levels at start (mtr.)			Levels at End (mtr.)			Depth (mtr.)		Avg.
-	From	To	(mtr.)	Self	Progg.	Total	60% runoff (lps)	(mm)	(mm)	m/sec.	lps.	mtr.	FRL	FSL	IL	FRL	FSL	IL	Start	End	Depth
1.	A1	A2	61.0	1470.0	0.0	1470.0	11.03	400	570	0.60	75.63	0.11	227.300	226.50	226.10	227.300	226.39	225.99	1.20	1.31	1.25
2.	A2	***D.C.-01***	3.0	100.0	1470.0	1570.0	11.78	400	570	0.60	75.63	0.01	227.300	226.39	225.99	227.300	226.39	225.99	1.31	1.31	1.31
3.	***D.C.-01***	***R.P.-01***	2.0	0.0	1570.0	1570.0	11.78	400	570	0.60	75.63	0.00	227.300	226.39	225.99	227.300	226.38	225.98	1.31	1.32	1.31
4.	***R.P.-01***	A3	6.0	0.0	785.0	785.0	5.89	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.21
5.	A3	A4	39.0	1210.0	785.0	1995.0	14.96	400	570	0.60	75.63	0.07	227.300	226.49	226.09	227.300	226.42	226.02	1.21	1.28	1.24
6.	A4a	A4	36.0	1120.0	0.0	1120.0	8.40	400	570	0.60	75.63	0.06	227.300	226.50	226.10	227.300	226.44	226.04	1.20	1.26	1.23
7.	A4	A5	44.0	1370.0	3115.0	4485.0	33.64	400	570	0.60	75.63	0.08	227.300	226.42	226.02	227.300	226.34	225.94	1.28	1.36	1.32
8.	A5	***D.C.-02***	2.0	70.0	4485.0	4555.0	34.16	400	570	0.60	75.63	0.00	227.300	226.34	225.94	227.300	226.34	225.94	1.36	1.36	1.36
9.	***D.C.-02***	***R.P.-02***	2.0	0.0	4555.0	4555.0	34.16	400	570	0.60	75.63	0.00	227.300	226.34	225.94	227.300	226.34	225.94	1.36	1.36	1.36
10.	***R.P.-02***	A6	15.0	0.0	2277.5	2277.5	17.08	400	570	0.60	75.63	0.03	227.300	226.50	226.10	227.300	226.47	226.07	1.20	1.23	1.21
11.	A6	A7	22.0	690.0	2277.5	2967.5	22.26	400	570	0.60	75.63	0.04	227.300	226.47	226.07	227.300	226.44	226.04	1.23	1.26	1.25
12.	A7a	A7b	133.0	4120.0	0.0	4120.0	30.90	400	570	0.60	75.63	0.23	227.300	226.50	226.10	227.300	226.27	225.87	1.20	1.43	1.32
13.	A7b	***D.C.-03***	2.0	70.0	4120.0	4190.0	31.43	400	570	0.60	75.63	0.00	227.300	226.27	225.87	227.300	226.26	225.86	1.43	1.44	1.44
14.	***D.C.-03***	***R.P.-03***	2.0	0.0	4190.0	4190.0	31.43	400	570	0.60	75.63	0.00	227.300	226.26	225.86	227.300	226.26	225.86	1.44	1.44	1.44
15.	***R.P.-03***	A7c	7.0	0.0	2095.0	2095.0	15.71	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.21
16.	A7c	A7	42.0	1300.0	2095.0	3395.0	25.46	400	570	0.60	75.63	0.07	227.300	226.49	226.09	227.300	226.41	226.01	1.21	1.29	1.25
17.	A7	A8	43.0	1330.0	6362.5	7692.5	57.69	400	570	0.60	75.63	0.08	227.300	226.41	226.01	227.300	226.34	225.94	1.29	1.36	1.32
18.	A8a	A8	20.0	620.0	0.0	620.0	4.65	400	570	0.60	75.63	0.04	227.300	226.50	226.10	227.300	226.46	226.06	1.20	1.24	1.22
19.	A8	A9	49.0	1020.0	8312.5	9332.5	69.99	400	570	0.60	75.63	0.09	227.300	226.34	225.94	227.300	226.25	225.85	1.36	1.45	1.40
20.	A9	***D.C.-07***	9.0	280.0	9332.5	9612.5	72.09	400	570	0.60	75.63	0.02	227.300	226.25	225.85	227.300	226.24	225.84	1.45	1.46	1.46
21.	A10	A11	33.0	1030.0	0.0	1030.0	7.73	400	570	0.60	75.63	0.06	227.300	226.50	226.10	227.300	226.44	226.04	1.20	1.26	1.23
22.	A11	***D.C.-04***	3.0	100.0	1030.0	1130.0	8.48	400	570	0.60	75.63	0.01	227.300	226.44	226.04	227.300	226.44	226.04	1.26	1.26	1.26
23.	***D.C.-04***	***R.P.-04***	3.0	0.0	1130.0	1130.0	8.48	400	570	0.60	75.63	0.01	227.300	226.44	226.04	227.300	226.43	226.03	1.26	1.27	1.27
24.	***R.P.-04***	A12	8.0	0.0	565.0	565.0	4.24	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.21

S.No.	Line No.		Length	Catchment Area (Sqm.)			Discharge @ 45 mm/hr rainfall	Pipe dia	Slope 1 in	Velocity m/sec.	Capacity of pipe	Fall in line	Levels at start (mtr.)			Levels at End (mtr.)			Manhole Depth		
																			Depth (mtr.)		Avg.
-	From	To	(mtr.)	Self	Progg.	Total	60% runoff (lps)	(mm)	(mm)	m/sec.	lps.	mtr.	FRL	FSL	IL	FRL	FSL	IL	Start	End	Depth
25.	A12	A13	30.0	930.0	565.0	1495.0	11.21	400	570	0.60	75.63	0.05	227.300	226.49	226.09	227.300	226.43	226.03	1.21	1.27	1.24
26.	A13a	A13	25.0	780.0	0.0	780.0	5.85	400	570	0.60	75.63	0.04	227.300	226.50	226.10	227.300	226.46	226.06	1.20	1.24	1.22
27.	A13	A14	51.0	1580.0	2275.0	3855.0	28.91	400	570	0.60	75.63	0.09	227.300	226.43	226.03	227.300	226.34	225.94	1.27	1.36	1.31
28.	A14	***D.C.-05***	8.0	250.0	3855.0	4105.0	30.79	400	570	0.60	75.63	0.01	227.300	226.34	225.94	227.300	226.33	225.93	1.36	1.37	1.36
29.	***D.C.-05***	***R.P.-05***	2.0	0.0	4105.0	4105.0	30.79	400	570	0.60	75.63	0.00	227.300	226.33	225.93	227.300	226.33	225.93	1.37	1.37	1.37
30.	***R.P.-05***	A15	5.0	0.0	2052.5	2052.5	15.39	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.20
31.	A15	A16	43.0	1330.0	2052.5	3382.5	25.37	400	570	0.60	75.63	0.08	227.300	226.49	226.09	227.300	226.42	226.02	1.21	1.28	1.25
32.	A16	***D.C.-07***	3.0	100.0	3382.5	3482.5	26.12	400	570	0.60	75.63	0.01	227.300	226.42	226.02	227.300	226.41	226.01	1.28	1.29	1.29
33.	A17	A18	58.0	1800.0	0.0	1800.0	13.50	400	570	0.60	75.63	0.10	227.300	226.50	226.10	227.300	226.40	226.00	1.20	1.30	1.25
34.	A18	***D.C.-06***	3.0	100.0	1800.0	1900.0	14.25	400	570	0.60	75.63	0.01	227.300	226.40	226.00	227.300	226.39	225.99	1.30	1.31	1.30
35.	***D.C.-06***	***R.P.-06***	2.0	0.0	1900.0	1900.0	14.25	400	570	0.60	75.63	0.00	227.300	226.39	225.99	227.300	226.39	225.99	1.31	1.31	1.31
36.	***R.P.-06***	A19	3.0	0.0	950.0	950.0	7.13	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.20
37.	A19	A20	57.0	1770.0	950.0	2720.0	20.40	400	570	0.60	75.63	0.10	227.300	226.49	226.09	227.300	226.39	225.99	1.21	1.31	1.26
38.	A20	***D.C.-07***	12.0	380.0	2720.0	3100.0	23.25	400	570	0.60	75.63	0.02	227.300	226.39	225.99	227.300	226.37	225.97	1.31	1.33	1.32
39.	***D.C.-07***	***R.P.-07***	1.0	0.0	16195.0	16195.0	121.46	500	650	0.65	128.40	0.00	227.300	226.24	225.74	227.300	226.24	225.74	1.56	1.56	1.56
40.	***R.P.-07***	**Over Flow To HUDA**	12.0	0.0	8097.5	8097.5	60.73	400	570	0.60	75.63	0.02	227.300	226.50	226.10	227.300	226.48	226.08	1.20	1.22	1.21
	Commercial Part																				
41.	A21	A22	100.0	2300.0	0.0	2300.0	17.25	400	570	0.60	75.63	0.18	227.300	226.50	226.10	227.300	226.32	225.92	1.20	1.38	1.29
42.	A22a	A22	19.0	590.0	0.0	590.0	4.43	400	570	0.60	75.63	0.03	227.300	226.50	226.10	227.300	226.47	226.07	1.20	1.23	1.22
43.	A22	A23	8.0	250.0	2890.0	3140.0	23.55	400	570	0.60	75.63	0.01	227.300	226.32	225.92	227.300	226.31	225.91	1.38	1.39	1.38
44.	A23a	A23	144.0	4460.0	0.0	4460.0	33.45	400	570	0.60	75.63	0.25	227.300	226.50	226.10	227.300	226.25	225.85	1.20	1.45	1.33
45.	A23	***D.C.-08***	2.0	70.0	7600.0	7670.0	57.53	400	570	0.60	75.63	0.00	227.300	226.25	225.85	227.300	226.24	225.84	1.45	1.46	1.45
46.	***D.C.-08***	***R.P.-08***	2.0	0.0	7670.0	7670.0	57.53	400	570	0.60	75.63	0.00	227.300	226.24	225.84	227.300	226.24	225.84	1.46	1.46	1.46
47.	***R.P.-08***	**Over Flow To HUDA**	8.0	0.0	3835.0	3835.0	28.76	400	570	0.60	75.63	0.01	227.300	226.50	226.10	227.300	226.49	226.09	1.20	1.21	1.21
				32590.0																	

S.No.	Line No.		Length	Catchment Area (Sqm.)			Discharge @ 45 mm/hr rainfall	Pipe dia	Slope 1 in	Velocity m/sec.	Capacity of pipe	Fall in line	Levels at start (mtr.)			Levels at End (mtr.)			Manhole Depth		
																			Depth (mtr.)		Avg.
-	From	To	(mtr.)	Self	Progg.	Total	60% runoff (lps)	(mm)	(mm)	m/sec.	lps.	mtr.	FRL	FSL	IL	FRL	FSL	IL	Start	End	Depth

Formula Used:

Velocity(m/s)=(1/n)x(A/P)^(2/3)*(1/slope)^.5

n=.015 for RCC pipe (Manning's Coefficient)

A=Area of x-section of pipe in sqm.

P =Wetted Perimeter in m

Capacity of pipe (lps) =Area of x-section of pipe in sqm x velocity in m/s x1000x1/2 (Storm water are designed to run full flow)

Abbreviation Used:

IL=Invert level of pipe

FSL=Full supply level

FRL=Formation Road Level

CL=Connection Level

PROJECT : PROPOSED BUILDING PLANS OF AFFORDABLE GROUP HOUSING COLONY FOR AN AREA MEASURING 10.02847 ACRE AT SECTOR - 68, GURUGRAM

(A) Calculations for Infiltration Storm Water

	Rainfall Intensity for Design	**0.045**	**m/hr**
	Total Net Plot Area	32466.830	Sqm
a.)	Ground Coverage/Terrace Area	8387.880	Sqm
b.)	Proposed Greens Area	5236.810	Sqm
c.)	Road Area/Paved Area	18842.140	Sqm

1	**For Roof / Terrace only**		
(i)	Average Runoff co-efficient for terraces and other built-up areas.	80%	
(ii)	Area-(a.) considered (For Ground Coverage/Terrace Area only)	8387.88	m^2
(iii)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.80 x 0.045)	**301.96**	**m^3/hr**
2	**For Greens Area on Stilt & Podium**		
(i)	Average Runoff co-efficient for terraces and other built-up areas.	20%	
(ii)	Area-(a.) considered (Whereas earth filling on Basement top)	5236.81	m^2
(iii)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.2 x 0.045)	**47.13**	**m^3/hr**
3	**For road & paved areas:**		
(i)	Average Runoff co-efficient for road & paved area	60%	
(ii)	Area-(c.) considered (For Road Area/Paved Area)	18842.14	m^2
(iii)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.60 x 0.045)	**508.74**	**m^3/hr**
5	**Total Volume Generated per hour (1+2+3)**	**857.83**	**m^3/hr**
	For 15 minute holding capacity	214.46	**m^3**
6	**Size of the Desilting Chamber**		
i)	Length (L) of Desilting Chamber	3.00	***m***
ii)	Width (W) of Desilting Chamber	1.50	***m***
iii)	Depth of Desilting Chamber	1.25	***m***
iv)	Volume of 1 Desilting Chamber	5.63	***m3***
7	**Size of the Wells**		
i)	Dia of Recharge well	3.00	***m***
ii)	Water Depth of Recharge well	2.00	***m***
iii)	Volume of 1 Infiltration well	14.13	***m3***
iv)	500 mm layer of coarse sand, 500 mm layer of gravel, 500 mm layer of boulders	1.50	***m***
v)	Volume of 1.5 m depth of coarse sand, gravel and boulders	7.07	***m^3***
vi)	Water absorption in coarse sand, gravel and boulders assumed @ 50%	3.53	***m3***
vii)	Absortion capacity of Recharge pit @ 60% of yeild capacity of borewell		
viii)	Yeild capacity of borewell (Assumed)	30.00	m^3/hr
ix)	Water absorption @ 60%	18.00	m^3/hr
x)	Absorption capacity in 15 minutes	4.50	*m3*
xi)	Total capacity of Recharge Pit	27.79	*m3*
xii)	Number of Infiltration Wells Provided	8.00	*Nos.*
xiii)	Total Rainwater holding/Absorbing capacity	222.30	*m3*
ivx)	Surplus Rainwater Disposal to City Drain	-7.84	*m3*