DESIGN AND COST ESTIMATE
For
EXTERNAL DEVELOPMENT WORKS

(WATER SUPPLY, ROADS, SEWERAGE, STREET LIGHTING, STORM WATER DRAINAGE AND HORTICULTURE)

PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

Submitted by

BETTERCHOICE REALTORS PVT. LTD.

PROJECT REPORT /ESTIMATE FOR PROVIDING WATER SUPPLY, ROADS, SEWERAGE, STORM WATER DRAINAGE, STREET LIGHTING AND HORTICULTURE IN RESPECT OF 10.83125 ACRES AFFORDABLE PLOTTED COLONY IN SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX.

REPORT

The Haryana Government has prepared a master plan for development of Gurugram Manesar Urban Complex. **Ms. BETTERCHOICE REALTORS PVT. LTD.** has decided to develop a part of the area in this master plan and has named this part as 10.83125 Acres Affordable Residential plotted colony. This colony is located in sector 99-A of HSVP, Gurugram. License has already been granted for by D.T.C.P drawing No. -------- of -------- to be read with License ---------- -------- DATED ------ . The brief details of the colony are as under:

WATER SUPPLY

1. SOURCE

The source of water supply in this area is tubewells at present as the underground water is potable and fit for human consumption. Moreover water is available at reasonable depth. The average yield of tubewell with 40-45 m strainers will be about 22500 litre per hour. The recharging of underground 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 tube wells required for the above area has been worked out and the tubewells will be bored in tune with growth of demand to avoid absolence of the tubewells. The ultimate requirement of tubewells includes provisions of 10% stand by. Ultimately, water shall be supplied Haryana Shehri Vikas Pradhikaran, Gurugram.

It has been proposed to construct underground tanks of capacity as per attached details for domestic purpose. The underground tanks will be filled up from the HSVP riser and then pumped to the tanks of each plot proposed on the terrace of the building. Water supply system has been designed as per Hazen William's formula.

2. DESIGN

The scheme has been designed for approved population of 3438 persons. The rate of water supply per head per day has been taken as 172.5 litres (150 + 15 %) as per HSVP norms. In addition to above necessary provision of water for community area, shopping centres, parks etc. have been taken into account for calculating the maximum quantity of water requirement.

3. PUMP CHAMBERS AND PUMPING MACHINERY

It is proposed to equip each tubewell with an electrically driven set ejecto type or submersible pump capable of delivering of 22500 litre per hour. It is also proposed to equip required 2 Nos. pumping set with stand by diesel engins/gen set engines for operation during failure of electricity.

4. UNDER GROUND STORAGE

Underground storage tank provision has been made for 430 KL capacity in two compartments, which caters for the Raw and Domestic requirement. In addition to this one no. Recycled water tank capacity of 260 KL shall be proposed in STP pump room to cater the Flushing and Horticulture demand.

5. BOOSTING STATION

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

6. DISTRIBUTION SYSTEM

The distribution system for this development has been designed to supply @ 112.125 litre per head her day for drinking water and 60.375 liter per head per day for flushing @ 3 times the average rate of flow on 'Hazen William' formula with C-100. Necessary provision for laying C.I. / D.I. pipes only conforming to relevant IS standards along with valves and specials has been made in this estimate. The minimum terminal head at any point in this system will be minimum 28.0 meters so that it can serve the 4 storied constructions envisaged in the plan. Minimum pipe diameter for distribution is kept as 100 mm dia.

7. RISING MAINS

Rising mains from HSVP water main or sector road to water works have also been proposed and provision has been made in this estimate.

8. SEWERAGE

The sewer lines have been designed for three times average D.W.F. in relation to water supply demand. It has been assumed that about 80% of the daily water requirement shall find its way into the proposed sewer. Sewer lines shall be laid to a gradient maintaining minimum 2.50 ft/sec. self-cleaning velocity at ultimate peak discharge. Necessary provision for laying S.W.

sewer lines with required number of manholes has been made in the estimate.

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

STORM WATER DRAINAGE

The storm water drainage is being designed to carry 6.25mm rainfall per hour. Also suitable provisions are contemplated in our scheme to ensure better recharging of underground water table in the area R.C.C. Hume pipes drain with minimum 400mm dia is proposed in this area.

9. ROADS

The roads in the colony have been planned in such a way that minimum widths of the roads are 12m & 9m interlock Paver block pavement

10. STREET LIGHTING

The provision has been made on lump sum basis.

11. HORTICULTURE

The usual provision of road side plantation of tree guards has been made for all roads. The parks shall be developed by providing lawns etc.

12. SPECIFICATIONS

The work will be carried out in accordance with the standard specifications of P.H. Department as laid down by HSVP & Haryana Government.

13. RATES

Estimate for providing services in this pocket has been prepared on the recent market rates.

14. COST

The total cost of development works in the scheme including various P.H. & B & R Services works out to **Rs. 866.0 lacs** which include 3% contingencies and P.E. charges and 49 % Departmental charges also.

The cost per gross acre for this works out to **Rs. 79.95 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 where-so-ever indicated.

1. DESIGN CALCULATION

		Daily Water Requirement	
		Domestic	**Flushing**
A)	Plotted	@112.125 lpd	@60.375 lpd
	Plots = 191 nos.		
	Population @ 18 persons/plot = 3438		
	Daily Water Requirement	385486	207569
B)	U.D. Area	@112.125 lpd	@60.375 lpd
	Area = 0.14 Acres		
	Population @ 100 persons/acre = 14		
	Daily Water Requirement	1570	845
C)	Commercial		
	(Area = 0.2920 Acre @ 25000 ltr/acre/far		
	=0.2920 x 25000 x 1.75 = 12775 lpd		
	Domestic @ 55%, Flushing @ 45% =	7026	5749
D)	Community Centre		
	(Area = 1.084Acre @ 25000 ltr/acre/far		
	=1.084 x 25000 x 1.75 = 47425 lpd		
	Domestic @55%, Flushing @ 45% =	26084	21341
E)	Milk & Veg Booth		
	Lump sum = 5000 lpd		
	Domestic @55%, Flushing @ 45% =	2750	2250
	Total	**422916 lpd**	**237755 lpd**
	Say	**423 kld**	**238 kld** **(1)**

F) Green

(Area = 0.840 Acre @ 25000 ltr/acre

= 0.840 x 25000 — 21000 lpd

Total Green Area Requirement — **Say 21 kld (2)**

G) Road Washing

(Area = 2.6168 @ 5000 ltr/acre)

= 2.6168x5000 — 13084 lpd

Total Road washing requirement — **Say 15 kld (3)**

Total Daily Water Demand (1) + (2) + (3) = 423 kld 274 kld

H) Tube well

Assuming working hours of tube wells		12 hours / day
Assuming discharge/hour of each tube well		22.50 KL/hours
Total Domestic water demand	=	423 KLD
No. of tube well required 423/12x22.5	=	1.56
Add 10% standby		0.15
Total	=	1.71
Say	**=**	**2 Nos.**

It is proposed to provide 2 nos. tube well for cater the present and future requirement.

I) Pumping Machinery for Tube Well

Gross working load	= 45.0 m
Average fall in S.L.	= 3.0 m
Depression head	= 9.0 m
Friction loss in main	= 5.0 m

Total	= 62.0 m

With 60% efficiency

BHP = 22500x62x1

60x60x75x0.6 = 8.61 H.P.

SAY = 10 HP

J) Underground Water Tanks

Raw Water Tank

Water Requirement for Domestic Use = 423 kld

Capacity of Under Ground Tank @ half day req. = 423 / 2 = 211.50 cum

Say 215 cum

Domestic Water Tank

Water Requirement for Domestic Use = 423 kld

Capacity of Under Ground Tank @ half day req. = 423 / 2 = 211.50 cum

Say 215 cum

Flushing Water Tank in STP Room

Water Requirement for Flushing Use = 264 kld

Capacity of Under Ground Tank @ One day req. = 260 cum

Say 260 cum

It is proposed to construct Raw water tank of capacity 215 KL, Domestic water tank of capacity 215 KL and Flushing water tank of 260 KL capacity.

K. BOOSTING MACHINERY

(1)	**PUMPS FOR DOMESTIC WATER SUPPLY**		
(i)	Potable Water Requirement Per Day	423	KL
(ii)	Pumping Duration Per Day	8	Hrs.
(iii)	Suction Lift	0	M.
(iv)	Clear Head Required	28	M
(v)	Residual Head	5	M
(vi)	Friction Head Loss	7	M
(vii)	Total Head Required	40	M

(viii)	No. of Pumps Working	2	Nos.
(ix)	Discharge of each Pump = 423 / 8 / 2 = 26.43 cum/hr = 440.63 lpm say 445 lpm each	445	LPM
(x)	Power Required of each pump (445 x 40 / 4500 x 0.60) = 6.52 HP, say 7.50 HP each	7.5	HP
It is proposed to provide 3 No. Pumps (2 Working + 1 Stand by of 7.5 HP each			
(2)	**PUMPS FOR FLUSHING WATER SUPPLY**		
(i)	Flushing Water Requirement Per Day	259	KL
(ii)	Pumping Duration Per Day	8	Hrs.
(iii)	Suction Lift	0	M.
(iv)	Clear Head Required	28	M
(v)	Residual Head	5	M
(vi)	Friction Head Loss	12	M
(vii)	Total Head Required	45	M
(viii)	No. of Pumps Working	2	No.
(ix)	Discharge of each Pump = 259 / 8 / 2 = 16.18 cum/hr = 269.79 lpm say 270 lpm each	270	LPM
(x)	Power Required of each pump (270 x 45 / 4500 x 0.60) = 4.49 HP, say 4.50 HP each	4.50	HP
It is proposed to provide 3 No. Pumps (2 Working + 1 Stand by of 4.50 HP each)			

L) Capacity of DG Sets

H.P. of Tubewell Pump	10 x 2	=	20.0 H.P.
H.P. of Domestic Pump	7.5x 2	=	15.0 H.P.
H.P. of Flushing Pump	4.5x 2	=	9.0 H.P.
Total			44 H.P.
Or 44 x 0.746 x 1.50			49.20 KVA
For Lighting			5.00 KVA
Total			**54.20 KVA**

Say 55 KVA

Requirement of 55 KVA capacity will be added in to the main D.G. set to provide stand by supply.

M) Capacity of Sewage Treatment Plant

Daily Domestic Water Requirement	**=**	423 kld	
Sewage Flow @ 80 %	=	338.40 kld	(1)
Daily Flushing Water Requirement	=	238 kld	
Sewage Flow @ 80 %	=	190.40 kld	(2)
Total Sewage Flow (1)+(2)	=	528.80 kld	
Add 10% marginal factor	=	52.88 kld	
Total	=	581.68 kld	
Capacity of Sewage Treatment Plant	**=**	**590 kld**	

FINAL ABSTRACT OF COST

		Amount (Rs. In Lakh)
Sub Work No. I	Water Supply	187.00
Sub Work No. II	Sewerage	109.45
Sub Work No. III	Storm Water Drainage	68.30
Sub Work No. IV	Road and Footpath	307.35
Sub Work No. V	Street Lighting	24.92
Sub Work No. VI	Horticulture Work	6.50
Sub Work No. VII	Maintenance charges for 10 years i/c resurfacing of roads after 1st 5 years & 2nd 5 years	162.48
	TOTAL	866.00

Devdopment cost per acre (10.83125) is coming out to be 866 / 10.83125 = 79.95 lakhs.

ABSTRACT OF COST (WATER SUPPLY)

Sub Work No. 1

	Amount (Lakh.)
Sub Head No. I Water Supply Head Works	63.75
Sub Head No. II Pumping Machinery	27.75
Sub Head No. III Rising Main From HSVP	5.00
Sub Head No. IV Distribution System	25.35
Total	121.85
P.E. & Contingency Charges @ 3 %	3.65
Total	125.50
Departmental, price escalation, unforeseen & adm. charges @ 49 %	61.49
Total	**186.99 Lakh**
Say	**187.00 Lakh**

(C.O. to final abstract of cost)

Sub Work I — **Water Supply**
Sub Head I — **Head Works**

		Unit	Amount (Lakh)
1	Boring and installing 21" i/d Tube wells with reverse / direct rotary rig complete with pipe and strainer to depth of about 120 m complete.		
	2 Nos. @ 10,00,000/- each	Each	20.00
2	Provision for construction of chamber as per standard design of PWD / HSVP of size 4.95 x 4.25 m for housing Tube wells.		
	2 Nos. @ 4,00,000/- each	Each	8.00
3	Provision for rising mains, connecting tubewells with water main C.I//D.I/ G.I.and bye-pass arrangements.		
	a) 100 mm dia - 265 M @ 1200/- per mtr	M	3.18
4	Construction of boosting chambers along with U.G. tanks & chambers complete in all respect.		
	215 Domestic + 215 Raw + 260 Flushing =690 KL @ 4500/- per KL	KL	31.05
5	Provision for sluice valves (L.S.)		0.50
6	Provision for carriage of materials & other foreseen items (L.S.)		1.00
		Total	63.73
		Say	**63.75 Lakh**

(C.O. to abstract of cost of Sub - work No. 1)

Sub Work I — **Water Supply**
Sub Head II — **Pumping Machinery**

		Unit	Amount (Lakh)
1	Supply and installation of electrically driven Submersible Pumping sets in TWs complete with lowering pipes, submersible cables, control panels and other accessories on tube wells Discharge 22.5 kl/hr @ 60 m Head, with 10 HP motor.		
	2 Nos. @ 2,50,000/- each	Each	5.00
2	Supply and installation of electrically driven Pumping sets, complete including cost of control panels for boosting station.		
	a) Domestic Water Pumps (2 working + 1 stand by) capacity 7.50 H.P 3 Nos. @ 1,50,000/- each	Each	4.50
	b) Flushing Water Pumps (2 working + 1 stand by) Capacity 4.50 H.P. 3 Nos. @ 1,25,000/- each	Each	3.75
3	Provision for diesel engine generator set for stand by arrangements for T.W. / domestic water/ flushing water pump complete with gear head arrangement of 55 KVA capacities. L.S.	Each	7.00
4	Provision for Chlorination plant complete. (L.S.)	Each	1.00
5	Provision for making foundations & erection of pumping machinery. (L.S.)	L.S.	1.00
6	Provision for pipes, valves & specials inside boosting chamber (L.S.)	L.S.	1.50
7	Provision for electric services connection including electric fittings for boosting chambers etc. (including cost of transformer) (L.S.)	L.S.	3.00
8	Provision for carriage of materials & other foreseen items. (L.S.)		1.00
	Total		**27.75**

(C.O. to abstract of cost of Sub - work No. I)

Sub Work I **Water Supply**
Sub Head III **Rising Mains From HSVP**

		Unit	Amount (Lakh)
1	Providing, laying, jointing and testing pipe lines including cost of excavation complete in all respects. D.I. K-7 Pipe		
	a) 100 mm dia - 270 mtrs @ Rs. 1250 /- per mtr	MTR.	3.37
2	Providing and fixing Butterfly / sluice valves including cost of surface boxes and masonary chambers etc. complete in all respects.		
	a) 100 mm dia - 1 No. @ Rs. 12000/- each	Each	0.12
3	Providing and fixing indicating plates for sluice valve and air valves.		
	1 No. @ Rs. 1000/- each	Each	0.01
4	Provision for making connection with HSVP main line on master road. (L.S.)	Each	1.00
5	Provision for cutting the roads and making good to its original conditions.	Each	0.50
	Total		5.00
	Say		**5.0 Lakh**

(C.O. to abstract of cost of Sub - work No. I)

Sub Work I — **Water Supply**
Sub Head IV — **Domestic and Flushing Distribution System**

		Unit	Amount (Lakh)
1	Providing, laying , jointing & testing C.I. / D.I. / G.I. pipe lines including fittings, valves, cost of excavation complete in all respects.		
	(i) 100 mm dia - 833 M @ Rs. 1250/- per mtr	M	10.41
	(ii) 150 mm dia - 177 M @ Rs. 1600/- per mtr	M	2.83
2	Providing, laying , jointing & testing PVC pipe lines including fittings, valves, cost of excavation complete in all respects.		
	(i) 90 OD - 399 M @ Rs. 650/- per mtr	M	2.59
	(ii) 110 OD - 628 M @ Rs. 950/- per mtr	M	5.97
3	Provision and fixing fire hydrants complete with brick masonry chamber.		
	7 Nos. @ Rs. 10000/- each	Each	0.70
4	Providing and fixing Butterfly / Sluice valves including cost of brick masonry chambers complete in all respect.		
	(i) 80 mm dia - 2 Nos. @ 9500 /- each	Each	0.19
	(ii) 100 mm dia - 6 Nos. @ 12000/- each	Each	0.72
	(iii) 150 mm dia - 2 Nos. @ 16000/- each	Each	0.32
5	Providing and fixing indicating plates for sluice valve and air valves.		
	21 Nos. @ Rs. 1000/- each	Each	0.21
6	Providing and fixing Air valve / scour valve including the cost of brick masonry chamber.		
	4 Nos. @ Rs. 10000/- each	Each	0.40
7	Provision for cutting the roads and making good to its original conditions. (L.S.)	Each	0.50
8	Provision for carriage of materials & other foreseen items. (L.S.)	L.S.	0.50
	Total		**25.34**
	Say		**25.35 Lakh**

(C.O. to abstract of cost of Sub - work No. I)

Sub Work II		**Sewerge Scheme**	
		Unit	**Amount (Lakh)**
1	Providing, jointing, cutting & testing S.W. pipe Class 'A' and lowering into trenches including cost of excavation, bed concrete cost of manholes, erecting / fixing vent shafts as per norms etc. complete in all respects.		
	(i) 200 mm dia i/d S.W. Pipes		
	Av. Depth upto 2 m - 365 M @ Rs. 800/- per M	M	2.92
	Av. Depth upto 4 m - 0 M @ Rs. 950/- per M	M	0.00
	(ii) 250 mm dia i/d S.W. Pipes		
	Av. Depth upto 2 m - 0 M @ Rs. 1000/- per M	M	0.00
	Av. Depth upto 4 m - 195 M @ Rs. 1250/- per M	M	2.44
2	Provision for providing oblique junctions / Lamp holes. (L.S.)	L.S.	1.00
3	Provision for timbering and shoring etc. (L.S.)	L.S.	0.50
4	Provision for making connection with HSVP sewer. (L.S.)	L.S.	1.50
5	Provision of Sewage Treatmet Plant. Capacity - 590 KLD @ Rs. 10500/- per KLD	L.S.	61.95
6	Provision for cutting roads and carriage of materials etc., and other unforeseen charges. L.S.	L.S.	1.00
	Total		71.31
	P.E. & Contingency Charges @ 3 %		2.14
	Total		73.45
	Departmental, price escalation, unforeseen & adm charges @ 49 %		35.99
	Total		109.44
	SAY		**109.45 Lakh**

(C.O. to final abstract of cost)

Sub Work III		**Storm Water Drain**	
		Unit	**Amount (Lakh)**
1	Providing, lowering, laying and jointing R.C.C.pipes class NP-3 and specials with cement joints in trenches including cost of manholes Chambers, excavation of trenches & manholes, back filling and disposal of surplus earth etc. complete in all respects.		
a)	(i) 400 mm dia pipe - Av. Depth upto 2 m = 886 M @ Rs. 1800/- per M	M	15.95
	(ii) 450 mm dia pipe - Av. Depth upto 2 m = 40 M @ Rs. 2500/- per M	M	1.00
	(iii) 500 mm dia pipe - Av. Depth upto 2 m = 68 M @ Rs. 3000/- per M	M	2.04
2	Provision of lighting, watching and temporary diversion of traffic. L.S.	L.S.	1.00
3	Provision for timbering and shoring etc. L.S.	L.S.	0.50
4	Provision for road gullies with 250 mm dia pipe connection. L.S.	Each	3.50
5	Provision for rain water harvestng pits. 7 Nos. @ Rs. 2,50,000/- each	Each	17.50
6	Provision for cutting roads and carriage of materials etc., and other unforeseen charges. L.S.	L.S.	1.00
7	Provisimon for making connection with HSVP Storm on master road. L.S.	L.S.	2.00
	Total		44.49
	P.E. & Contingency Charges @ 3 %		1.33
	Total		45.82
	Departmental, price escalation, unforeseen & adm charges @ 49 %		22.45
	Total		68.28
	Say		**68.30 Lakh**

(C.O. to final abstract of cost)

Sub Work IV **ROAD WORK**

			Amount (Rs.) lakh
1.	Provision for leveling and earth filling		
	As per site conditions.		
	2.6168 Acres @ 14.0 lacs / Acre		36.63
2.	Providing and laying GSB 125 mm thick /		
	WMM 175 mm thick, Sand bed of 30 mm with paver		
	Block of 80 mm thick on it.		
	10590 sq m @ Rs 1400/- per sqm		148.26
3.	Providing for kerbs of M 20 Grade		
	(Kerb both side of roads)		
	Kerbs 1111 m x 2 x Rs. 500/- per mtr		11.11
4.	Provision for guidemap and other unforeseen items L.S		0.50
5.	Provision for Plot indicators L.S		0.50
6.	Provision for demarcating burgees L.S		0.50
7.	Provision for traffic arrangement L.S		2.00
8.	Provision for making approach to each plot L.S		
	@ Rs. 10000/- per acre x 2.6168		0.26
9.	Provision for carriage of material and unforeseen items		0.50
	Total		200.26 Lakh
	Add 3% Contingencies		6.0
			206.26
	Add 49% Departmental charges		101.06
		Total	307.32
		Say	**Rs. 307.35 Lakh**

(C.O. to abstract of cost of Sub-work No. 4)

Sub Work V

STREET LIGHT

		Amount (Rs. In Lakh)
1.	Providing street lighting on internal Roads as per standard specification in 10.83125 acre area Rs. 1,50,000/ per acre 10.83125 x 1,50,000/- = 16.25	16.25
	P.E & contingency charges @3%	0.48
	Total	**16.73**
	Department escalation unforeseen and Administrator charges @ 49%	8.19
	Total	**24.92**
	SAY	**24.92 Lakh**

Sub Work VI **HORTICULTURE**

Amount (Rs. In Lakh)

1. Development of Lawn area

a) Trenching the ordinary soil up to depth of 60 em. Including removal and packing of serviceable material and disposing at a lead of 50 m and making up the trenched area to proper level by filling with earth mixed with manure including cost of imported earth and manure.

b) Rough dressing of trenched area.

c) Grassing with "doob grass" including watering and maintenance of lawns free from weeds and fit for moving rows 7.50 em in either direction including for hedges and grill and barbed wire fencing around park and green belts (as per HSVP Norms)

Area 0.840 Acres Rs, 1,50,000/ per acre 1.26

2. Planting or trees with tree guards on Roads at 40 intervals

Lenght of 9 m wide Road = 914 M

No. of trees @12 m c/c 914 x 2/12 = 152 Nos.

Lenght of 12 m wide Road = 197 M

No. of trees @12 m c/c 197 x 2/12 = 33 Nos.

Total no. of trees = 152 + 33 = 185 Nos.

Cost of the tree

Excavation Rs. 60/-

Manure Rs. 90/-

Tree plants Rs. 150/-

Tree guards Rs. 1300/-

Total cost of one tree = 1600/-

Total amount of trees = 185 x 1600 =	2.96
Total	**4.22**
P.E & contingency charges @3%	0.12
Total	**4.36**
Department escalation unforeseen and Administrator charges @ 49%	2.13
Total	**6.49**
SAY	**6.50 Lakh**

Sub Work VII

MAINTENANCE CHARGES AND RESRURFACING OF ROADS

Amount (Rs. In Lakh)

2nd Phase after 5 yrs of Ist phase

1. Provision for maintenance charges for water supply, sewerage, storm water drainage, roads, streetlights, horticulture etc. complete including operation and establishment charges as per HSVP norms after completion and resurfacing of roads after 10 years. 10.83125 acres @ Rs. 6.50 lacs per acre	70.40
2. Provision of roads after 1st five years of MTC of 15 % area of Paver block and its joints 1589 Sqm @ Rs. 900/- per sqm	14.30
3. Provision of roads after 10 years of MTC of 20 % area of Paver block and its joints 2118 Sqm @ Rs. 1000/- per sqm	21.18
Total	**105.88**
P.E & contingency charges @3%	3.17
Total	**109.05**
Department escalation unforeseen and Administrator charges @ 49%	53.43
Total	**162.48**
SAY	**162.48 Lakh**

DESIGN CALCULATIONS

FOR

DEVELOPMENT WORK

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE : DAILY WATER REQUIREMENT CHART

DESCRIPTION	TOTAL	POPULATION	BASIS OF DAILY WATER REQUIREMENT	TOTAL DAILY WATER REQUIREMENT IN LTRS.	BASIS OF DAILY DOMESTIC WATER REQUIREMENT	DAILY DOMESTIC WATER REQUIREMENT	BASIS OF DAILY FLUSHING WATER REQUIREMENT	DAILY FLUSHING WATER REQUIREMENT
GENERAL PLOTS	191	@18 PERSON/PLOT 3438	@172.50 LTR / PERSON	593055	@112.125 LTR / PERSON	385486	@ 60.375 LTR / PERSON	207569
U.D. AREA	0.14	@100 PERSON/ACRE 14	@172.50 LTR / PERSON	2415	@112.125 LTR / PERSON	1570	@ 60.375 LTR / PERSON	845
COMMERCIAL S1 (600 SQM.)	0.148		@ 25000 LTRS / ACRS. / FAR	6475	@ 55 % OF DWR	3561	@ 45 % OF DWR	2914
COMMERCIAL S2 (420 SQM.)	0.104		@ 25000 LTRS / ACRS. / FAR	4550	@ 55 % OF DWR	2503	@ 45 % OF DWR	2048
COMMERCIAL S3 (161.49 SQM.)	0.04		@ 25000 LTRS / ACRS. / FAR	1750	@ 55 % OF DWR	963	@ 45 % OF DWR	788
COMMUNITY CENTRE (1.084 ACRES)	1.084		@ 25000 LTRS / ACRS. / FAR	47425	@ 55 % OF DWR	26084	@ 45 % OF DWR	21341
MILK AND VEG BOOTH	1		5,000 lpd	5000	@ 55 % OF DWR	2750	@ 45 % OF DWR	2250
			TOTAL (IN LTRS.)	660670	TOTAL (IN LTRS.)	422916	TOTAL (IN LTRS.)	237755
			SAY (KLD)	**661**	**SAY (KLD)**	**423**	**SAY (KLD)**	**238**
SEWAGE FLOW & STP CAPACITY								
SEWAGE FLOW @ 80 % OF DAILY WATER DEMAND								529
ADD 10% FOR MARGINAL FACTOR								53
TOTAL SEWAGE FLOW								582
CAPACITY OF SEWAGE TREATMENT PLANT (KLD)								**590**
RECYCLED WATER AVAILABLE FROM STP (KLD)								476
DAILY FLUSHING WATER REQUIREMENT (KLD)								238
RECYCLED WATER REQUIREMENT FOR GREEN AREA @ 25000 LTRS/ACRE = (0.840 x 25000) = 21000 LTRS., SAY 21 KLD								21
RECYCLED WATER REQUIREMENT FOR ROAD WASHING @ 5000 LTRS/ACRE = 2.6168X5000 = 13084, SAY 15 KLD								15
EXCESS RECYCLED WATER OVERFLOW TO HSVP SEWER (KLD)								202
UNDER GROUND WATER TANKS CAPACITY								
DOMESTIC WATER TANK @ 1 DAY STORAGE IN KL								**2 x 215 KL**
FLUSHING WATER TANK @ 1 DAY STORAGE IN KL								**2 x 130 KL**

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE : LOAD ON DOMESTIC WATER SUPPLY LINES

Line No.	General Plots		Others Land		Total Population	Daily Domestic Water Requirement. @ 112.125 lpcd	Non Residential Load				Gross Water Requirement (Self Load on Line) LPD
	Nos.	Population @ 18 persons / Plot.	Area In Acres	Population			Area In Acres	Type of Building	Basis of Domestic Water Requirement LPD	Total Water Requirement. LPD	
		(a)		(b)	(c)=(a)+(b)	(d)				(e)	(f)=(d)+(e)
W1-W2	0	0		0	0	0					0
W2-W3	32	576		0	576	64584					64584
W3-W4	3	54		0	54	6055	0.040	Commercial S3	13750	963	9520
									13.75 KL/Acre/FAR		
							0.104	Commercial S2	13750	2503	
									13.75 KL/Acre/FAR		
W3-W5	4	72		0	72	8073					8073
W5-W6	43	774		0	774	86785					86785
W6-W7	25	450	0.14	14	464	52026					52026
W6-W10	0	0		0	0	0					0
W5-W8	4	72		0	72	8073					8073
W8-W9	3	54		0	54	6055	0.148	Commercial S1	13750	3561	9616
									13.75 KL/Acre/FAR		
W8-W10	44	792		0	792	88803					88803
W10-W11	33	594		0	594	66602	1.084	Community	13750	26084	95436
									13.75 KL/Acre/FAR		
		0		0	0	0		Milk Booth	2750	2750	
									Lump sum		
	191				3452	387055.5				35860	**422916**

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

Title : Design of Domestic Water Supply Lines

S.N0	LINE NO.	SELF LOAD ON LINES	PREVIOUS LOAD ON LINES	TOTAL LOAD ON LINES	PEAK FACTOR	PEAK FLOW	FLOW RATE	FLOW RATE	LENGTH OF PIPE IN MTR.	INCLUDING FITTINGS @ 15 %	DIA OF PIPE	VALUE OF 'C'	HEAD LOSS MTR/ MTR	TOTAL HEAD LOSS	VELOCITY	ELEVATION AT START	HYDRAULIC LVL AT START	HEAD AT START	ELEVATION AT END	HYDRAULIC LVL AT END	HEAD AT END	REMARKS
		LPD	LPD	LPD		LPD	LPH	LPM	MTR.	MM	MM		MTR.	MTR.	M/SEC	MTR.	MTR.	MTR.	MTR.	MTR.	MTR.	
1	W1-W2	0	422916	422916	3	1268747	52864	881.07	10	12	150	100	0.009	0.101	0.83	-4.375	35.63	**40.00**	0.625	35.52	34.9	PUMP ROOM
2	W2-W3	64584	358332	422916	3	1268747	52864	881.07	129	148	150	100	0.009	1.299	0.83	0.625	35.52	34.90	0.300	34.23	33.9	AT GROUND
3	W3-W4	9520	0	9520	3	28559	1190	19.83	52	60	100	100	0.000	0.003	0.04	0.300	34.23	33.93	0.300	34.22	33.9	AT GROUND
4	W3-W5	8073	340739	348812	3	1046435	43601	726.69	38	44	150	100	0.006	0.268	0.68	0.300	34.23	33.93	0.300	33.96	33.7	AT GROUND
5	W5-W6	86785	75885	162670	3	488009	20334	338.90	183	210	100	100	0.011	2.262	0.72	0.300	33.96	33.66	0.625	31.70	31.1	AT GROUND
6	W6-W7	52026	0	52026	3	156078	6503	108.39	142	163	100	100	0.001	0.213	0.23	0.625	31.70	31.07	0.800	31.48	30.7	AT GROUND
7	W6-W10	0	23859	23859	3	71577	2982	49.71	40	46	100	100	0.000	0.014	0.11	0.625	31.70	31.07	0.575	31.68	31.1	AT GROUND
8	W5-W8	8073	169996	178069	3	534207	22259	370.98	40	46	100	100	0.013	0.585	0.79	0.300	33.96	33.66	0.300	33.37	33.1	AT GROUND
9	W8-W9	9616	0	9616	3	28848	1202	20.03	50	58	100	100	0.000	0.003	0.04	0.300	33.37	33.07	0.300	33.37	33.1	AT GROUND
10	W8-W10	88803	71577	160380	3	481140	20048	334.13	183	210	100	100	0.010	2.204	0.71	0.300	33.37	33.07	0.575	31.17	30.6	AT GROUND
11	W10-W11	95436	0	95436	3	286308	11930	198.83	143	164	100	100	0.004	0.658	0.42	0.575	31.68	31.11	0.750	31.02	30.3	AT GROUND

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TUBE WELL LINES									
1	TUBE WELL - 1 TO U.G.T.	22.50	33.75	562.50	10	0.027	0.27	1.19	100
2	TUBE WELL - 2 TO U.G.T.	22.50	33.75	562.50	255	0.027	7.01	1.19	100

TITLE :- DESIGN OF HSVP RISING MAIN.

S.N0	LINE NO	AVERAGE DEMAND	PEAK DEMAND @ 1.5 TIMES	FLOW RATE	LENGTH OF PIPE	HEAD LOSS MTR/ MTR	TOTAL HEAD LOSS	VELOCITY	DIA OF PIPE
		KLD	KLD	LPM	MTR.	MTR.	MTR.	M/SEC	MM
1	MAIN - U.G.T.	422.92	634.37	440.54	270	0.01747	4.72	0.93	100

Project : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE :- Domestic Water Supply Material Statement

S.N0	LINE NO.	LENGTH OF LINES	DIA OF RISER	PIPE DIA IN MM								VALVES ON LINES							
			MM	250	200	150	100	80	65	32	25	250	200	150	100	80	65	32	25
1	W1-W2	10	150	0	0	10	0	0	0	0	0			1					
2	W2-W3	129	150	0	0	129	0	0	0	0	0								
3	W3-W4	52	100	0	0	0	52	0	0	0	0								
4	W3-W5	38	150	0	0	38	0	0	0	0	0			1					
5	W5-W6	183	100	0	0	0	183	0	0	0	0				1				
6	W6-W7	142	100	0	0	0	142	0	0	0	0								
7	W6-W10	40	100	0	0	0	40	0	0	0	0				1				
8	W5-W8	40	100	0	0	0	40	0	0	0	0				1				
9	W8-W9	50	100	0	0	0	50	0	0	0	0								
10	W8-W10	183	100	0	0	0	183	0	0	0	0								
11	W10-W11	143	100	0	0	0	143	0	0	0	0								
TOTAL		**1010**		**0**	**0**	**177**	**833**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**0**	**0**	**0**	**0**
TUBEWELL LINES																			
1	TUBE WELL - 1 TO U.G.T.	10	100	0	0	0	10	0	0	0	0			1					
2	TUBE WELL - 2 TO U.G.T.	255	100	0	0	0	255	0	0	0	0			1					
HSVP RISING MAIN																			
1	HSVP MAIN	270	100	0	0	0	270	0	0	0	0			1					

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE : LOAD ON FLUSHING WATER SUPPLY LINES

Line No.	General Plots		Others Land		Total Population	Daily Flushing Water Requirement. @ 60.375 lpcd	Non Residential Load				Gross Water Requirement (Self Load on Line) LPD
	Nos.	Population @ 18 persons / Plot.	Area In Acres	Population			Area In Acres	Type of Building	Basis of Flushing Water Requirement LPD	Total Water Requirement. LPD	
		(a)		(b)	(c)=(a)+(b)	(d)				(e)	(f)=(d)+(e)
F1-F2	0	0		0	0	0	0.112	Green	25000	2800	2800
									25 KL / Acre		
F2-F3	33	594		0	594	35863	0.057	Green	25000	1425	37288
									25 KL / Acre		
F3-F4	2	36		0	36	2174	0.183	Green	25000	4575	9584
									25 KL / Acre		
							0.040	Commercial (S3)	11250	788	
									11.25 KL/Acre/FAR		
							0.104	Commercial (S2)	11250	2048	
									11.25 KL/Acre/FAR		
F3-F5	5	90		0	90	5434					5434
F5-F6	44	792		0	792	47817					47817
F6-F7	24	432	0.140	14	446	26927					26927
F5-F8	3	54		0	54	3260	0.183	Green	25000	4575	7835
									25 KL / Acre		
F8-F9	2	36		0	36	2174	0.080	Green	25000	2000	7087
									25 KL / Acre		
							0.148	Commercial (S1)	11250	2914	
									11.25 KL/Acre/FAR		
F8-F10	45	810		0	810	48904	0.100	Green	25000	2500	51404
									25 KL / Acre		
F6-F10	0	0		0	0	0					0

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE : LOAD ON FLUSHING WATER SUPPLY LINES

Line No.	General Plots		Others Land		Total Population	Daily Flushing Water Requirement. @ 60.375 lpcd	Non Residential Load				Gross Water Requirement (Self Load on Line) LPD
	Nos.	Population @ 18 persons / Plot.	Area In Acres	Population			Area In Acres	Type of Building	Basis of Flushing Water Requirement LPD	Total Water Requirement. LPD	
		(a)		(b)	(c)=(a)+(b)	(d)				(e)	(f)=(d)+(e)
F10-F11	33	594		0	594	35863	0.100	Green	25000	2500	61954
									25 KL / Acre		
								Milk Booth	2250	2250	
									Lump sum		
							1.084	Community	11250	21341	
									11.25 KL/Acre/FAR		
										Total	**258130**

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

Title : Design of Flushing Water Supply Lines

S.N0	LINE NO.	SELF LOAD ON LINES	PREVIOUS LOAD ON LINES	TOTAL LOAD ON LINES	PEAK FACTOR	PEAK FLOW	FLOW RATE	FLOW RATE	LENGTH OF PIPE IN MTR.	INCLUDING FITTINGS @ 15 %	DIA OF PIPE	VALUE OF 'C'	HEAD LOSS MTR/ MTR	TOTAL HEAD LOSS	VELOCITY	ELEVATION AT START	HYDRAULIC LVL AT START	HEAD AT START	ELEVATION AT END	HYDRAULIC LVL AT END	HEAD AT END	REMARKS
		LPD	LPD	LPD		LPD	LPH	LPM	MTR.	MM	MM		MTR.	MTR.	M/SEC	MTR.	MTR.	MTR.	MTR.	MTR.	MTR.	
1	F1-F2	2800	255330	258130	3	774389	32266	537.77	10	12	100	120	0.018	0.207	1.14	-5.875	39.13	**45.00**	0.625	38.92	38.29	PUMP ROOM
2	F2-F3	37288	218042	255330	3	765989	31916	531.94	147	169	100	120	0.018	2.988	1.13	0.625	38.92	38.29	0.300	35.93	35.63	AT GROUND
3	F3-F4	9584	0	9584	3	28751	1198	19.97	34	39	100	120	0.000	0.002	0.04	0.300	35.93	35.63	0.300	35.93	35.63	AT GROUND
4	F3-F5	5434	203025	208458	3	625375	26057	434.29	57	66	100	120	0.012	0.796	0.92	0.300	35.93	35.63	0.300	35.13	34.83	AT GROUND
5	F5-F6	47817	26927	74744	3	224233	9343	155.72	190	219	100	120	0.002	0.397	0.33	0.300	35.13	34.83	0.625	34.74	34.11	AT GROUND
6	F6-F7	26927	0	26927	3	80782	3366	56.10	134	154	80	120	0.001	0.125	0.19	0.625	34.74	34.11	0.825	34.61	33.79	AT GROUND
7	F5-F8	7835	120445	128280	3	384841	16035	267.25	40	46	80	120	0.015	0.674	0.89	0.300	35.13	34.83	0.300	34.46	34.16	AT GROUND
8	F8-F9	7087	0	7087	3	21262	886	14.77	50	58	80	120	0.000	0.004	0.05	0.300	34.46	34.16	0.300	34.46	34.16	AT GROUND
9	F8-F10	51404	61954	113358	3	340073	14170	236.16	190	219	100	120	0.004	0.859	0.50	0.300	34.46	34.16	0.625	33.60	32.98	AT GROUND
10	F6-F10	0	0	0	3	0	0	0.00	40	46	80	120	0.000	0.000	0.00	0.625	34.74	34.11	0.625	34.74	34.11	AT GROUND
11	F10-F11	61954	0	61954	3	185862	7744	129.07	135	155	80	120	0.004	0.591	0.43	0.625	33.60	32.98	0.800	33.01	32.21	AT GROUND

PROJECT : PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD

TITLE :- Flushing Water Supply (Material Statement)

S.N0	LINE NO.	LENGTH OF LINES	DIA OF RISER	PIPE DIA IN MM								VALVES ON LINES							
			MM	250	200	150	100	80	65	32	25	250	200	150	100	80	65	32	25
1	F1-F2	10	100	0	0	0	10	0	0	0	0				1				
2	F2-F3	147	100	0	0	0	147	0	0	0	0								
3	F3-F4	34	100	0	0	0	34	0	0	0	0								
4	F3-F5	57	100	0	0	0	57	0	0	0	0								
5	F5-F6	190	100	0	0	0	190	0	0	0	0				1				
6	F6-F7	134	80	0	0	0	0	134	0	0	0								
7	F5-F8	40	80	0	0	0	0	40	0	0	0					1			
8	F8-F9	50	80	0	0	0	0	50	0	0	0								
9	F8-F10	190	100	0	0	0	190	0	0	0	0				1				
10	F6-F10	40	80	0	0	0	0	40	0	0	0					1			
11	F10-F11	135	80	0	0	0	0	135	0	0	0								
TOTAL		**1027**		**0**	**0**	**0**	**628**	**399**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**0**	**0**	**0**

PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

TITLE : LOAD ON SEWAGE LINES

Name of Sewer Line	Plot (General)		U.D. Area		Total Population	Daily Water Requirement @ 172.50 lpcd (LPD)	Non Residential Load				Gross Water Requirement (LPD)	Sewage Flow @ 80% of Gross Water Requirement (LPD)	Sewage Flow (Self Load on Line) KLD
	Nos.	Population @ 18 persons / Plot.	Area in Acres	Population @ 100 persons / Acres			Area In Acres	Type of Building	Basis of Water Requirement LPD	Water Requirement LPD			
		(a)		(b)	(c) = (a) + (b)	(d) = (c) x 172.50							
S1-S2	33	594	0	0	594	102465	1.084	50% Load of Community	@ 25000 ltr / acrs. / FAR	23712.50	131178	104942	**104.94**
								Milk and Veg Booth	5,000 lpd	5000.00			
S2-S4	45	810	0	0	810	139725					139725	111780	**111.78**
S3-S4	2	36	0	0	36	6210	0.148	Commercial	@ 25000 ltr / acrs. / FAR	6475.00	12685	10148	**10.15**
S4-S7	2	36	0	0	36	6210					6210	4968	**4.97**
S5-S6	23	414	0.14	14	428	73830	1.084	50% Load of Community	@ 25000 ltr / acrs. / FAR	23712.50	97543	78034	**78.03**
S6-S7	45	810	0	0	810	139725					139725	111780	**111.78**
S7-S9	6	108	0	0	108	18630					18630	14904	**14.90**
S8 - S9	2	36	0	0	36	6210	0.104	Commercial	@ 25000 ltr / acrs. / FAR	4550.00	12510	10008	**10.01**
							0.040	Commercial	@ 25000 ltr / acrs. / FAR	1750.00			
S9-S10	33	594	0	0	594	102465					102465	81972	**81.97**
S10-STP 1	0	0	0	0	0	0					0	0	**0.00**
TOTAL	191	3438			3452	595470					660670	528536	529

PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

SEWERAGE HYDRAULIC DESIGN

LINE NO.	SEWAGE FLOW	Previous Load	Progressive Discharge	Progressive Discharge (Peak)	Infilteration @ 500 L/KM/CM of Pipe Dia	Total Discharge	Total Discharge	Length of line	Dia of Pipe	Average Slope 1 IN	Fall in Line	Value of (n)	Velocity Flowing Full	Capacity of Pipe Flowing Full (Q)	Capacity of Pipe Flowing 1/2 flow (Q)	Levels at Start		Levels at End		Manhole Depth		Remarks
																Ground Lvl. at Start	Invert Lvl at Start	Ground lvl at End	Invert lvl at End	U/End	L/End	
	KLD	KLD	KLD	KLD	KLD	KLD	LPS	mtr	mm		mtr		m/sec	lps	lps	mtr	mtr	mtr	mtr			
S1-S2	104.94	0.000	104.94	314.83	1.46	316.29	3.66	146	200	190	0.77	0.013	0.76	23.80	11.90	0.750	-0.85	0.575	-1.62	1.60	2.19	
S2-S4	111.78	104.942	216.72	650.17	1.86	652.03	7.55	186	200	190	0.98	0.013	0.76	23.80	11.90	0.575	-1.62	0.300	-2.60	2.19	2.90	
S3-S4	10.15	0.000	10.15	30.44	0.36	30.80	0.36	36	200	190	0.19	0.013	0.76	23.80	11.90	0.300	-1.20	0.300	-1.39	1.50	1.69	
S4-S7	4.97	226.870	231.84	695.51	0.40	695.91	8.05	40	200	190	0.21	0.013	0.76	23.80	11.90	0.300	-2.60	0.300	-2.81	2.90	3.11	
S5-S6	78.03	0.000	78.03	234.10	1.26	235.36	2.72	126	200	190	0.66	0.013	0.76	23.80	11.90	0.800	-0.80	0.625	-1.46	1.60	2.09	
S6-S7	111.78	78.034	189.81	569.44	2.07	571.51	6.61	207	200	190	1.09	0.013	0.76	23.80	11.90	0.625	-1.46	0.300	-2.55	2.09	2.85	
S7-S9	14.90	421.652	436.56	1309.67	0.71	1310.38	15.17	57	250	235	0.24	0.013	0.79	38.81	19.40	0.300	-2.86	0.300	-3.10	3.16	3.40	
S8 - S9	10.01	0.000	10.01	30.02	0.57	30.59	0.35	57	200	190	0.30	0.013	0.76	23.80	11.90	0.300	-1.20	0.300	-1.50	1.50	1.80	
S9-S10	81.97	446.564	528.54	1585.61	1.73	1587.33	18.37	138	250	235	0.59	0.013	0.79	38.81	19.40	0.300	-3.10	0.625	-3.69	3.40	4.31	
S10-STP 1	0.00	528.536	528.54	1585.61	0.06	1585.67	18.35	5	250	235	0.02	0.013	0.79	38.81	19.40	0.625	-3.69	0.625	-3.71	4.31	4.33	

SEWERAGE QUANTITY SHEETS

Name of Sewer Line	Length of line	Dia of Pipe	Depth of Line			Line Depth Upto 2.0 Mtr				Line Depth 2.0 Mtr. to 4.0 Mtr				Line Depth 4.0 Mtr. to 6.0 Mtr				Line Depth 6.0 Mtr. to 8.0 Mtr			
	MTR	MM	U/End	L/End	Average Depth	200 Dia	250 Dia	300 Dia	400 Dia	200 Dia	250 Dia	300 Dia	400 Dia	200 Dia	250 Dia	300 Dia	400 Dia	200 Dia	250 Dia	300 Dia	400 Dia
S1-S2	146	200	1.60	2.19	1.90	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2-S4	186	200	2.19	2.90	2.55	0	0	0	0	186	0	0	0	0	0	0	0	0	0	0	0
S3-S4	36	200	1.50	1.69	1.59	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S4-S7	40	200	2.90	3.11	3.00	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
S5-S6	126	200	1.60	2.09	1.84	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S6-S7	207	200	2.09	2.85	2.47	0	0	0	0	207	0	0	0	0	0	0	0	0	0	0	0
S7-S9	57	250	3.16	3.40	3.28	0	0	0	0	0	57	0	0	0	0	0	0	0	0	0	0
S8 - S9	57	200	1.50	1.80	1.65	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S9-S10	138	250	3.40	4.31	3.86	0	0	0	0	0	138	0	0	0	0	0	0	0	0	0	0
S10-STP 1	5	250	4.31	4.33	4.32	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
TOTAL						**365**	**0**	**0**	**0**	**433**	**195**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**

TITLE : STORM WATER DRAIN HYDRAULIC DESIGN

S.No	Line From	Line To.	Length of Line in mtr.	Self Area in sq mtr.	Self Area (Hec)	Previous area in hec.	Total Area (Hec)	Rain Fall mm/hr	Discharge in lps	Pipe Dia in mm	Slope 1 in	Velocity m/sec.	Cap of pipe in lps.	Fall in line mtr.	Road level at Start	H.F.L at Start	Invert Level at Start	Road level at end	H.F.L at End	Invert Level at End	Depth at Start	Depth at End
1	FROM MH	D9	144	9200	0.920	1.797	2.717	6.25	47.17	400	550	0.61	76.99	0.26	0.625	-0.842	-1.242	0.300	-1.104	-1.504	1.87	1.80
2	D8	D9	44	2375	0.238	0.000	0.238	6.25	4.12	400	550	0.61	76.99	0.08	0.300	-0.800	-1.200	0.300	-0.880	-1.280	1.50	1.58
3	D9	D15	40	720	0.072	2.955	3.027	6.25	52.55	400	550	0.61	76.99	0.07	0.300	-1.104	-1.504	0.300	-1.177	-1.577	1.80	1.88
4	D10	D12	81	5440	0.544	0.078	0.622	6.25	10.80	400	550	0.61	76.99	0.15	0.800	-0.400	-0.800	0.675	-0.547	-0.947	1.60	1.62
5	D12	D14	50	1285	0.129	0.726	0.855	6.25	14.84	400	550	0.61	76.99	0.09	0.675	-0.547	-0.947	0.625	-0.638	-1.038	1.62	1.66
6	D14	D15	185	7490	0.749	0.855	1.604	6.25	27.84	400	550	0.61	76.99	0.34	0.625	-0.638	-1.038	0.300	-0.975	-1.375	1.66	1.67
7	D15	D18	40	860	0.086	4.630	4.716	6.25	81.88	450	625	0.62	98.87	0.06	0.300	-1.177	-1.627	0.300	-1.241	-1.691	1.93	1.99
8	D16	D17	134	7875	0.788	0.000	0.788	6.25	13.67	400	550	0.61	76.99	0.24	0.750	-0.450	-0.850	0.575	-0.694	-1.094	1.60	1.67
9	D17	D18	193	8085	0.809	0.788	1.596	6.25	27.71	400	550	0.61	76.99	0.35	0.575	-0.694	-1.094	0.300	-1.045	-1.445	1.67	1.74
10	D18	D20	54	1830	0.183	6.312	6.495	6.25	112.77	500	700	0.63	123.73	0.08	0.300	-1.241	-1.741	0.000	-1.318	-1.818	2.04	1.82
11	D19	D20	15	900	0.090	0.000	0.090	6.25	1.56	400	550	0.61	76.99	0.03	0.300	-0.900	-1.300	0.000	-0.927	-1.327	1.60	1.33
12	D20	**OUTFALL**	14	100	0.010	6.585	6.595	6.25	114.51	500	700	0.63	123.73	0.02	0.000	-1.318	-1.818	0.000	-1.338	-1.838	1.82	1.84

PROPOSED AFFORDABLE PLOTTED COLONY UNDER DDJAY OVER AN AREA MEASURING 10.83125 ACRE FALLING IN THE REVENUE ESTATE OF VILLAGE - DHANKOT , TEH. KADIPUR, SECTOR 99-A, GURUGRAM MANESAR URBAN COMPLEX BEING DEVELOPED BY BETTERCHOICE REALTORS PVT. LTD.

Title : Storm Water Drainage Qty Sheet

S.No	Line From	Line To	Length in mtr.	Pipe dia	Depth at Start	Depth at End	Average Depth	Pipe Upto 2mtr Depth					Pipe from 2 to 4 mtr Depth				
								400 Dia	450 Dia	500 Dia	600 Dia	700 Dia	400 Dia	450 Dia	500 Dia	600 Dia	700 Dia
1	FROM MH	D9	144	400	1.87	1.80	1.84	144	0	0	0	0	0	0	0	0	0
2	D8	D9	44	400	1.50	1.58	1.54	44	0	0	0	0	0	0	0	0	0
3	D9	D15	40	400	1.80	1.88	1.84	40	0	0	0	0	0	0	0	0	0
4	D10	D12	81	400	1.60	1.62	1.61	81	0	0	0	0	0	0	0	0	0
5	D12	D14	50	400	1.62	1.66	1.64	50	0	0	0	0	0	0	0	0	0
6	D14	D15	185	400	1.66	1.67	1.67	185	0	0	0	0	0	0	0	0	0
7	D15	D18	40	450	1.93	1.99	1.96	0	40	0	0	0	0	0	0	0	0
8	D16	D17	134	400	1.60	1.67	1.63	134	0	0	0	0	0	0	0	0	0
9	D17	D18	193	400	1.67	1.74	1.71	193	0	0	0	0	0	0	0	0	0
10	D18	D20	54	500	2.04	1.82	1.93	0	0	54	0	0	0	0	0	0	0
11	D19	D20	15	400	1.60	1.33	1.46	15	0	0	0	0	0	0	0	0	0
12	D20	OUTFALL	14	500	1.82	1.84	1.83	0	0	14	0	0	0	0	0	0	0
TOTAL								**886**	**40**	**68**	**0**	**0**	**0**	**0**	**0**	**0**	**0**