DESIGN AND COST ESTIMATE
For
EXTERNAL DEVELOPMENT WORKS

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

PROPOSED DDJAY COLONY LIC. AREA LAND MEASURING 17.31875 ACRES IN SECTOR 93, VILLAGE WAZIPUR, TEHSIL-HARSARU, DISTRICT-GURUGRAM, DEVELOPED BY SIGNATURE BUILDERS PVT. LTD.

Submitted by

SIGNATURE BUILDERS PVT. LTD.

PROJECT REPORT /ESTIMATE FOR PROVIDING WATER SUPPLY, ROADS, SEWERAGE, STORM WATER DRAINAGE, STREET LIGHTING AND HORTICULTURE IN RESPECT OF 17.31875 ACRES DDJAY COLONY IN SECTOR 93, VILLAGE WAZIPUR, TEHSIL-HARSARU, DISTRICT - GURUGRAM.

REPORT

The Haryana Government has prepared a master plan for development of Gurugram area.

Ms. SIGNATURE BUILDERS PVT. LTD. has decided to develop a part of the area in this master plan and has named this part as 17.31875 Acres DDJAY colony. This colony is located in Sector 93 of HSVP, Gurugram. License has already been granted for by D.T.C.P drawing No. 8869 to be read with License No. 210, DATED 22/12/2022. 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 4500 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, Commercial building and parks etc. have been taken into account for calculating the maximum quantity of water requirement.

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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 420 KL capacity in two compartments, which caters for the Raw and Domestic requirement. 100 KL dedicated storage tank for Fire Fighting is also purposed. Water for domestic purpose shall over flow from the fire tank so that the water in the fire compartment also remains fresh. In addition to this, one no. Recycled water tank capacity of 280 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.

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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.

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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. 1235.12 lakh** which include 3% contingencies and P.E. charges and 49 % Departmental charges also.

The cost per gross acre for this works out to **Rs. 71.31 Lakh / 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 = 250 nos.		
	Population @ 18 persons/plot = 4500		
	Daily Water Requirement	504563	271688
B)	Other's land	@112.125 lpd	@60.375 lpd
	Area = 1.0 Acres		
	Population @ 100 persons/acre = 100		
	Daily Water Requirement	11213	6038
C)	Commercial		
	(Area = 0.693 Acre @ 25000 ltr/acre/far		
	=0.693 x 25000 x 1.75 = 30319 lpd		
	Domestic @ 55%, Flushing @ 45% =	16675	13643
D)	Community Facility - 1		
	(Area = 0.787Acre @ 25000 ltr/acre/far		
	=0.787 x 25000 x 1.0 = 19665 lpd		
	Domestic @55%, Flushing @ 45% =	10816	8849
E)	Community Facility - 2		
	(Area = 0.945Acre @ 25000 ltr/acre/far		
	=0.945 x 25000 x 1.0 = 23635 lpd		
	Domestic @55%, Flushing @ 45% =	12999	10636
	Total	**556265 lpd**	**310853 lpd**

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	Say	**557 kld**	**311 kld**	**(1)**
F)	Green			
	(Area = 1.348 Acre @ 25000 ltr/acre			
	= 1.348 x 25000		33700 lpd	
	Total Green Area Requirement		**Say 34 kld**	**(2)**
G)	Road Washing			
	(Area = 4.41 @ 5000 ltr/acre)			
	= 4.41x5000		22050 lpd	
	Total Road washing requirement		**Say 23 kld**	**(3)**
	Total Daily Water Demand (1) + (2) + (3)	**= 557 kld**	**368 kld**	

H) Tube well

Assuming working hours of tube wells	14 hours / day
Assuming discharge/hour of each tube well	22.50 KL/hours
Total Domestic water demand	= 557 KLD
No. of tube well required 557/14x22.5	= 1.76
Add 10% standby	0.17
Total	= 1.93
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	

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BHP = 22500x62x1

60x60x75x0.6 = 8.61 H.P.

SAY = 10 HP

J) Underground Water Tanks

Raw Water Tank

Water Requirement for Domestic Use = 557 kld

Gross storage proposed for 18 hrs. = 418 kld

Capacity of Under Ground Raw water tank @ half day req. = 418 / 2 = 209 cum

Say 210 cum

Domestic Water Tank

Water Requirement for Domestic Use = 557 kld

Gross storage proposed for 18 hrs. = 418 kld

Capacity of Under Ground Domestic water tank @ half day req. = 418 / 2 = 209 cum

Say 210 cum

Fire Water Tank

Total population = 4500

For Fire $100\sqrt{P}$= $100\sqrt{4.50}$ = 212 KL

Storage proposed for $1/3^{rd}$ of total capacity = 70.67 KL

Say = 100 KL

Total = 210 + 210 + 100 = 520 KL

Flushing Water Tank in STP Room

Water Requirement for Flushing Use = 368 kld

Capacity of Under Ground Tank @ 18 hrs. storage = 276 cum

Say 280 cum

It is proposed to construct Raw water tank of capacity 210 KL, Domestic water tank of capacity 210 KL, Fire water tank 100 KL and Flushing water tank of 280 KL capacity.

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K. BOOSTING MACHINERY

(1)	PUMPS FOR DOMESTIC WATER SUPPLY		
(i)	Potable Water Requirement Per Day	557	KL
(ii)	Pumping Duration Per Day	8	Hrs.
(iii)	Suction Lift	0	M.
(iv)	Clear Head Required	30	M
(v)	Residual Head	5	M
(vi)	Friction Head Loss	11	M
(vii)	Total Head Required	46	M
(viii)	No. of Pumps Working	2	Nos.
(ix)	Discharge of each Pump = 557 / 8 / 2 = 34.81 cum/hr = 580.21 lpm say 580 lpm each	445	LPM
(x)	Power Required of each pump (580 x 46 / 4500 x 0.60) = 9.66 HP, say 10.0 HP each	10.0	HP
It is proposed to provide 3 No. Pumps (2 Working + 1 Stand by of 10.0 HP each			
(2)	**PUMPS FOR FLUSHING WATER SUPPLY**		
(i)	Flushing Water Requirement Per Day	345	KL
(ii)	Pumping Duration Per Day	6	Hrs.
(iii)	Suction Lift	0	M.
(iv)	Clear Head Required	30	M
(v)	Residual Head	5	M
(vi)	Friction Head Loss	10	M
(vii)	Total Head Required	45	M
(viii)	No. of Pumps Working	2	No.
(ix)	Discharge of each Pump = 345 / 6 / 2 = 28.75 cum/hr = 479.17 lpm say 480 lpm each	270	LPM
(x)	Power Required of each pump (480 x 45 / 4500 x 0.60) = 8.00 HP, say 10.0 HP each	10.0	HP
It is proposed to provide 3 No. Pumps (2 Working + 1 Stand by of 10.0 HP each)			

L) Capacity of DG Sets

H.P. of Tubewell Pump	10 x 2	=	20.0 H.P.
H.P. of Domestic Pump	10x 2	=	20.0 H.P.
H.P. of Flushing Pump	10x 2	=	20.0 H.P.
Total			60.0 H.P.
Or 60 x 0.746 x 1.50			67.10 KVA
For Lighting			5.00 KVA
Total			**72.10 KVA**
			Say 75 KVA

Requirement of 75 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	=	557 kld	
Sewage Flow @ 80 %	=	445.60 kld	(1)
Daily Flushing Water Requirement	=	311 kld	
Sewage Flow @ 80 %	=	248.80 kld	(2)
Total Sewage Flow (1)+(2)	=	694.40 kld	
Capacity of Sewage Treatment Plant	=	**695 kld**	

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FINAL ABSTRACT OF COST

		Amount (Rs. In Lakh)
Sub Work No. I	Water Supply	231.50
Sub Work No. II	Sewerage	147.05
Sub Work No. III	Storm Water Drainage	125.20
Sub Work No. IV	Road and Footpath	412.97
Sub Work No. V	Street Lighting	39.85
Sub Work No. VI	Horticulture Work	10.50
Sub Work No. VII	Maintenance charges for 10 years i/c resurfacing of roads after 1st 5 years & 2nd 5 years	268.05
	TOTAL	1235.12

Devdopment cost per acre (17.31875) is coming out to be 1235.12 / 17.31875 = 71.31 lakhs.

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ABSTRACT OF COST (WATER SUPPLY)

Sub Work No. 1

	Amount (Lakh.)
Sub Head No. I Water Supply Head Works	68.75
Sub Head No. II Pumping Machinery	34.50
Sub Head No. III Rising Main From HSVP	2.75
Sub Head No. IV Distribution System	44.85
Total	150.85
P.E. & Contingency Charges @ 3 %	4.52
Total	155.37
Departmental, price escalation, unforeseen & adm. charges @ 49 %	76.13
Total	**231.50 Lakh**
Say	**231.50 Lakh**

(C.O. to final abstract of cost)

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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 - 260 M @ 1250/- per mtr	M	3.25
4	Construction of boosting chambers along with U.G. tanks complete in all respect.		
	210 KL Domestic + 210 KL Raw + 100 KL Fire + 280 KL Flushing = 800 KL @ 4500/- per KL	KL	36.00
5	Provision for sluice valves (L.S.)		0.50
6	Provision for carriage of materials & other foreseen items (L.S.)		1.00
		Total	68.75
		Say	**68.75 Lakh**

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

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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 10.0H.P 3 Nos. @ 2,00,000/- each	Each	6.00
	b) Flushing Water Pumps (2 working + 1 stand by) Capacity 10.0H.P. 3 Nos. @ 2,00,000/- each	Each	6.00
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 75 KVA capacities. L.S.	Each	10.00
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	**34.50 Lakh**

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

Sub Work I
Sub Head III

Water Supply 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-9 Pipe		
	a) 100 mm dia - 90 mtrs @ Rs. 1250 /- per mtr	MTR.	1.12
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	2.75
		Say	**2.75 Lakh**

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

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Sub Work I
Sub Head IV

Water Supply
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 - 1455 M @ Rs. 1250/- per mtr	M	18.19
	(ii) 150 mm dia - 384 M @ Rs. 1600/- per mtr	M	6.14
2	Providing, laying , jointing & testing PVC pipe lines including fittings, valves, cost of excavation complete in all respects.		
	(i) 75 OD - 367 M @ Rs. 550/- per mtr	M	2.02
	(ii) 90 OD - 714 M @ Rs. 650/- per mtr	M	4.64
	(iii) 110 OD - 424 M @ Rs. 950/- per mtr	M	4.03
	(iv) 160 OD - 291 M @ Rs. 1200/- per mtr	M	3.49
3	Provision and fixing fire hydrants complete with brick masonry chamber.		
	13 Nos. @ Rs. 10000/- each	Each	1.30
4	Providing and fixing Butterfly / Sluice valves including cost of brick masonry chambers complete in all respect.		
	(i) 65 mm dia - 3 Nos. @ 7500 /- each	Each	0.23
	(ii) 80 mm dia - 3 Nos. @ 9500 /- each	Each	0.29
	(iii) 100 mm dia - 11 Nos. @ 12000/- each	Each	1.32
	(iv) 150 mm dia - 6 Nos. @ 16000/- each	Each	0.96
5	Providing and fixing indicating plates for sluice valve and air valves.		
	44 Nos. @ Rs. 1000/- each	Each	0.44
6	Providing and fixing Air valve / scour valve including the cost of brick masonry chamber.		
	8 Nos. @ Rs. 10000/- each	Each	0.80
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	44.84
		Say	**44.85 Lakh**

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

Sub Work II — **Sewerage 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 - 564 M @ Rs. 800/- per M	M	4.51
	Av. Depth upto 4 m - 703 M @ Rs. 950/- per M	M	6.68
	(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 - 0 M @ Rs. 1250/- per M	M	0.00
	Av. Depth upto 6 m -157 M @ Rs. 1600/- per M	M	2.51
	(iii) 300 mm dia i/d S.W. Pipes		
	Av. Depth upto 2 m - 0 M @ Rs. 1250/- per M	M	0.00
	Av. Depth upto 4 m - 0 M @ Rs. 1500/- per M	M	0.00
	Av. Depth upto 6 m - 257 M @ Rs. 2000/- per M	M	5.14
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 - 695 KLD @ Rs. 10500/- per KLD	L.S.	72.98
6	Provision for cutting roads and carriage of materials etc., and other unforeseen charges. L.S.	L.S.	1.00
	Total		95.82
	P.E. & Contingency Charges @ 3 %		2.87
	Total		98.69
	Departmental, price escalation, unforeseen & adm charges @ 49 %		48.36
	Total		147.05
	SAY		**147.05 Lakh**

(C.O. to final abstract of cost)

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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 = 1061 M @ Rs. 1800/- per M	M	19.10
	(ii) 450 mm dia pipe - Av. Depth upto 2 m = 0 M @ Rs. 2500/- per M	M	0.00
	(iii) 500 mm dia pipe - Av. Depth upto 2 m = 0 M @ Rs. 3000/- per M	M	0.00
b)	(i) 400 mm dia pipe - Av. Depth upto 4 m = 495 M @ Rs. 2250/- per M	M	11.14
	(ii) 450 mm dia pipe - Av. Depth upto 4 m = 0 M @ Rs. 2900/- per M	M	0.00
	(iii) 500 mm dia pipe - Av. Depth upto 4 m = 209 M @ Rs. 3500/- per M	M	7.32
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. 12 Nos. @ Rs.3,00,000/- each	Each	36.00
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 road. master L.S.	L.S.	2.00
	Total		81.55
	P.E. & Contingency Charges @ 3 %		2.45
	Total		84.00
	Departmental, price escalation, unforeseen & adm charges @ 49 %		41.16
	Total		125.16
			125.20 Lakh

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	Sub Work IV				Road Work	
S. No.	**Description**	**Unit**	**Qty**	**Rate (Rs.)**	**Amount (Rs.)**	
1	Provision for leveling & earth filling as per site condition 4.58 acre @ 175000/acre	Acres	4.5800	175000	801500.00	
2	Construction of 6m wide road by:-					
	i) Providing 200 mm thick GSB					
	ii) 250 mm thick WMM					
	iii) 50 mm thick DBM					
	iv) 40 mm thick BC	Sq. mtr.	11577.0	1500	17365500.00	
3	Provision for kerb stone of 6m wide road with complete specification.6 mtrs wide road (1808 x 2 =3616 M)	mtr.	3616.0	600	2169600.00	
4	Provision for foot path of precast conc. (Area = 6072 sqm.) 80mm thick over cement concrete 1:4:8	Sq. mtr.	6072.00	1000	6072000.00	
5	Provision for Carriage of material	LS.		100000.00	100000.00	
6	Provision for traffic lighting and guide map/ indicators	LS.		200000.00	200000.00	
7	Provision for tower indicator	LS.		100000.00	100000.00	
8	Provision for demarc above and unformation items	LS.		100000.00	100000.00	
				Total	**26908600.00**	
	Add 3% contingencies				807258.00	
					27715858.00	
				Total	277.16	Lakh
	Add 49 % department charges				135.81	Lakh
				SAY	**412.97**	**Lakh**

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Sub Work V

STREET LIGHT

	Amount (Rs. In Lakh)
1. Providing street lighting on internal Roads as per standard specification in 17.31875 acre area Rs. 1,50,000/ per acre 17.31875 x 1,50,000/- = 2597812/-	25.97
P.E & contingency charges @3%	0.77
Total	26.74
Department escalation unforeseen and Administrator charges @ 49%	13.10
Total	39.84
SAY	**39.85 Lakh**

(C.O. to abstract of cost of Sub-work No. 5)

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Sub Work VI **HORTICULTURE**

Amount (Rs. In Lakh)

1. Development of Lawn area

a) Trenching the ordinary soil up to depth of 60 cm. 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 cm in either direction including for hedges and grill and barbed wire fencing around park and green belts (as per HSVP Norms)

Area 1.348 Acres Rs, 1,50,000/ per acre 2.02

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

Lenght of 9 m wide Road = 1529 M

No. of trees @12 m c/c 1529 x 2/12 = 255 Nos.

Lenght of 12 & 18 m wide Road = 279 M

No. of trees @12 m c/c 279 x 2/12 = 47 Nos.

Total no. of trees = 255 + 47 = 302 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/-

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Total amount of trees = 302 x 1600 =	4.83
Total	6.85
P.E & contingency charges @3%	0.20
Total	7.05
Department escalation unforeseen and Administrator charges @ 49%	3.45
Total	10.50
SAY	**10.50 Lakh**

(C.O. to abstract of cost of Sub-work No. 6)

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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. 17.31875 acres @ Rs. 6.50 lacs per acre	112.57
2. Provision of roads after 1st five years of MTC of 15 % area of Paver block and its joints 2780 Sqm @ Rs. 900/- per sqm	25.02
3. Provision of roads after 10 years of MTC of 20 % area of Paver block and its joints 3707 Sqm @ Rs. 1000/- per sqm	37.07
Total	174.66
P.E & contingency charges @3%	5.23
Total	179.89
Department escalation unforeseen and Administrator charges @ 49%	88.14
Total	268.03
SAY	**268.05 Lakh**

Soni Consultants ★ Plumbing & Fire Suppression Consultants ★ New Delhi

DESIGN CALCULATIONS

FOR

DEVELOPMENT WORK

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	13	234		0	234	26237					26237
W2-W4	3	54		0	54	6055					6055
W4-W5	16	288		0	288	32292					32292
W4-W6	20	360		0	360	40365					40365
W6-W7	8	144		0	144	16146					16146
W6-W8	2	36		0	36	4037					4037
W8-W9	2	36		0	36	4037					4037
W8-W14	25	450		0	450	50456					50456
W9-W10	3	54		0	54	6055					6055
W9-W11	11	198	1.0	100	298	33413					33413
W11-W12	4	72		0	72	8073					8073
W11-W24	30	540		0	540	60548					60548
W12-W13	8	144		0	144	16146					16146
W12-W22	4	72		0	72	8073					8073
W13-W14	0	0		0	0	0					0
W13-W20	0	0		0	0	0					0
W14-W15	0	0		0	0	0					0

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)
W15-W16	6	108		0	108	12110					12110
W15-W17	0	0		0	0	0					0
W17-W18	6	108		0	108	12110					12110
W17-W19	0	0		0	0	0	0.693	Commercial	30319 25 KL/Acre/FAR	16675	16675
W20-W21	0	0		0	0	0	0.787	Community	13750 13.75 KL/Acre/FAR	10821	10821
W20-W22	8	144		0	144	16146					16146
W22-W23	4	72		0	72	8073					8073
W24-W25	10	180		0	180	20183					20183
W24-W26	5	90		0	90	10091					10091
W26-W27	24	432		0	432	48438					48438
W26-W28	5	90		0	90	10091					10091
W28-W29	17	306		0	306	34310	0.945	Community	13750 13.75 KL/Acre/FAR	12994	47304
W28-W30	16	288		0	288	32292					32292
	250				4600	515775				40490	**556265**

Soni Consultants * Plumbing & Fire Suppression Consultants * New Delhi

Title : Design of Domestic Water Supply Lines

S NO	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	556265	556265	3	1668796	69533	1158.89	45	52	150	100	0.015	0.753	1.09	-6.000	40.00	46.00	0.000	39.25	39.2	PUMP ROOM
2	W2-W3	26237	0	26237	3	78712	3280	54.66	58	67	100	100	0.000	0.024	0.12	0.000	39.25	39.25	0.000	39.22	39.2	AT GROUND
3	W2-W4	6055	523973	530028	3	1590084	66254	1104.23	73	84	150	100	0.013	1.116	1.04	0.000	39.25	39.25	0.000	38.13	38.1	AT GROUND
4	W4-W5	32292	0	32292	3	96876	4037	67.28	69	79	100	100	0.001	0.043	0.14	0.000	38.13	38.13	0.000	38.09	38.1	AT GROUND
5	W4-W6	40365	451316	491681	3	1475044	61460	1024.34	110	127	150	100	0.012	1.464	0.97	0.000	38.13	38.13	0.000	36.67	36.7	AT GROUND
6	W6-W7	16146	0	16146	3	48438	2018	33.64	37	43	100	100	0.000	0.006	0.07	0.000	36.67	36.67	0.000	36.66	36.7	AT GROUND
7	W6-W8	4037	431134	435170	3	1305511	54396	906.60	47	54	150	100	0.009	0.499	0.85	0.000	36.67	36.67	0.000	36.17	36.2	AT GROUND
8	W8-W9	4037	304743	308780	3	926339	38597	643.29	11	13	150	100	0.005	0.062	0.61	0.000	36.17	36.17	0.000	36.11	36.1	AT GROUND
9	W8-W14	50456	71898	122354	3	367063	15294	254.90	131	151	100	100	0.006	0.956	0.54	0.000	36.17	36.17	0.000	35.21	35.2	AT GROUND
10	W9-W10	6055	0	6055	3	18164	757	12.61	24	28	100	100	0.000	0.001	0.03	0.000	36.11	36.11	0.000	36.11	36.1	AT GROUND
11	W9-W11	33413	265275	298688	3	896065	37336	622.27	98	113	150	100	0.005	0.518	0.59	0.000	36.11	36.11	0.000	35.59	35.6	AT GROUND
12	W11-W12	8073	28256	36329	3	108986	4541	75.68	37	43	100	100	0.001	0.028	0.16	0.000	35.59	35.59	0.000	35.56	35.6	AT GROUND
13	W11-W24	80548	168399	248947	3	666840	28618	476.97	171	197	100	100	0.020	3.981	1.01	0.000	35.59	35.59	0.000	31.61	31.6	AT GROUND
14	W12-W13	16146	0	16146	3	48438	2018	33.64	50	58	100	100	0.000	0.009	0.07	0.000	35.56	35.56	0.000	35.55	35.6	AT GROUND
15	W12-W22	8073	4037	12110	3	36329	1514	25.23	36	41	100	100	0.000	0.004	0.05	0.000	35.56	35.56	0.000	35.56	35.6	AT GROUND
16	W13-W14	0	31004	31004	3	93011	3875	64.59	42	48	100	100	0.000	0.024	0.14	0.000	35.55	35.55	0.000	35.53	35.5	AT GROUND
17	W13-W20	0	31004	31004	3	93011	3875	64.59	7	8	100	100	0.000	0.004	0.14	0.000	35.55	35.55	0.000	35.55	35.5	AT GROUND
18	W14-W15	0	40894	40894	3	122683	5112	85.20	40	46	100	100	0.001	0.038	0.18	0.000	35.53	35.53	0.000	35.49	35.5	AT GROUND
19	W15-W16	12110	0	12110	3	36329	1514	25.23	45	52	100	100	0.000	0.005	0.05	0.000	35.49	35.49	0.000	35.48	35.5	AT GROUND
20	W15-W17	0	28785	28785	3	86354	3598	59.97	37	43	100	100	0.000	0.019	0.13	0.000	35.49	35.49	0.000	35.47	35.5	AT GROUND
21	W17-W18	12110	0	12110	3	36329	1514	25.23	45	52	100	100	0.000	0.005	0.05	0.000	35.47	35.47	0.000	35.47	35.5	AT GROUND

Title : Design of Domestic Water Supply Lines

S NO	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.	
22	W17-W19	16675	0	16675	3	50026	2084	34.74	54	62	100	100	0.000	0.010	0.07	0.000	35.47	35.47	0.000	35.46	35.5	AT GROUND
23	W20-W21	10821	0	10821	3	32464	1353	22.54	22	25	100	100	0.000	0.002	0.05	0.000	35.55	35.55	0.000	35.55	35.5	AT GROUND
24	W20-W22	16146	4037	20183	3	60548	2523	42.05	80	92	100	100	0.000	0.021	0.09	0.000	35.55	35.55	0.000	35.53	35.5	AT GROUND
25	W22-W23	8073	0	8073	3	24219	1009	16.82	31	36	100	100	0.000	0.001	0.04	0.000	35.53	35.53	0.000	35.53	35.5	AT GROUND
26	W24-W25	20183	0	20183	3	60548	2523	42.05	46	53	100	100	0.000	0.012	0.09	0.000	31.61	31.61	0.000	31.60	31.6	AT GROUND
27	W24-W26	10091	138125	148217	3	444650	18527	308.78	42	48	100	100	0.009	0.437	0.65	0.000	31.61	31.61	0.000	31.17	31.2	AT GROUND
28	W26-W27	48438	0	48438	3	145314	6055	100.91	108	124	100	100	0.001	0.142	0.21	0.000	31.17	31.17	0.000	31.03	31.0	AT GROUND
29	W26-W28	10091	79596	89687	3	269062	11211	186.85	43	49	100	100	0.004	0.176	0.40	0.000	31.17	31.17	0.000	30.99	31.0	AT GROUND
30	W28-W29	47304	0	47304	3	141912	5913	98.55	102	117	100	100	0.001	0.128	0.21	0.000	30.99	30.99	0.000	30.87	30.9	AT GROUND
31	W28-W30	32292	0	32292	3	96876	4037	67.28	98	113	100	100	0.001	0.061	0.14	0.000	30.99	30.99	0.000	30.93	30.9	AT GROUND

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TUBE WELL LINES									
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	TUBE WELL - 1 TO U.G.T.	22.50	33.75	562.50	15	0.02747	0.41	1.19	100
2	TUBE WELL - 2 TO U.G.T.	22.50	33.75	562.50	245	0.02747	6.73	1.19	100
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.	556.27	834.40	579.44	90	0.02903	2.61	1.23	100

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TITLE :- Domestic Water Supply (Material Statement)

S.NO	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	45	150	0	0	45	0	0	0	0	0			1					
2	W2-W3	58	100	0	0	0	58	0	0	0	0				1				
3	W2-W4	73	150	0	0	73	0	0	0	0	0			1					
4	W4-W5	69	100	0	0	0	69	0	0	0	0								
5	W4-W6	110	150	0	0	110	0	0	0	0	0								
6	W6-W7	37	100	0	0	0	37	0	0	0	0								
7	W6-W8	47	150	0	0	47	0	0	0	0	0			1					
8	W8-W9	11	150	0	0	11	0	0	0	0	0			1					
9	W8-W14	131	100	0	0	0	131	0	0	0	0				1				
10	W9-W10	24	100	0	0	0	24	0	0	0	0								
11	W9-W11	98	150	0	0	98	0	0	0	0	0								
12	W11-W12	37	100	0	0	0	37	0	0	0	0								
13	W11-W24	171	100	0	0	0	171	0	0	0	0				1				
14	W12-W13	50	100	0	0	0	50	0	0	0	0				1				
15	W12-W22	36	100	0	0	0	36	0	0	0	0								
16	W13-W14	42	100	0	0	0	42	0	0	0	0				1				
17	W13-W20	7	100	0	0	0	7	0	0	0	0								
18	W14-W15	40	100	0	0	0	40	0	0	0	0				1				
19	W15-W16	45	100	0	0	0	45	0	0	0	0								

TITLE :- Domestic Water Supply (Material Statement)

S.NO	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
20	W15-W17	37	100	0	0	0	37	0	0	0	0								
21	W17-W18	45	100	0	0	0	45	0	0	0	0								
22	W17-W19	54	100	0	0	0	54	0	0	0	0								
23	W20-W21	22	100	0	0	0	22	0	0	0	0								
24	W20-W22	80	100	0	0	0	80	0	0	0	0				1				
25	W22-W23	31	100	0	0	0	31	0	0	0	0								
26	W24-W25	46	100	0	0	0	46	0	0	0	0								
27	W24-W26	42	100	0	0	0	42	0	0	0	0				1				
28	W26-W27	108	100	0	0	0	108	0	0	0	0								
29	W26-W28	43	100	0	0	0	43	0	0	0	0								
30	W28-W29	102	100	0	0	0	102	0	0	0	0								
31	W28-W30	98	100	0	0	0	98	0	0	0	0								
TOTAL		1839		0	0	384	1455	0	0	0	0	0	0	4	8	0	0	0	0
TUBE WELL LINES																			
1	TUBE WELL - 1 TO U.G.T.	15	100	0	0	0	15	0	0	0	0				1				
2	TUBE WELL - 2 TO U.G.T.	245	100	0	0	0	245	0	0	0	0				1				
DESIGN OF HSVP RISING MAIN																			
1	MAIN - U.G.T.	90	100	0	0	0	90	0	0	0	0				1				

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	16	288		0	288	17388	0.371	Green G-6	25000	9275	26663
F2-F3	16	288		0	288	17388	0.072	Green G-1	25 KL / Acre 25000	1800	19188
F2-F4	21	378		0	378	22822			25 KL / Acre		22822
F4-F5	8	144		0	144	8694					8694
F4-F6	2	36		0	36	2174					2174
F6-F7	24	432		0	432	26082					26082
F6-F13	16	288	1.00	100	388	23426					23426
F7-F8	0	0		0	0	0					0
F7-F15	0	0		0	0	0	0.481	Green G-3	25000	12025	12025
F8-F9	6	108		0	108	6521			25 KL / Acre		6521
F8-F10	0	0		0	0	0					0
F10-F11	6	108		0	108	6521					6521
F10-F12	0	0		0	0	0	0.097	Green G-5	25000	2425	16068
							0.693	Commercial	25 KL / Acre 11250 11.25 KL/Acre/FAR	13643	
F13-F14	4	72		0	72	4347					4347
F13-F20	31	558		0	558	33689					33689
F14-F15	9	162		0	162	9781					9781
F14-F16	4	72		0	72	4347					4347
F15-F18	0	0		0	0	0					0

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)
F16-F17	4	72		0	72	4347					4347
F16-F18	8	144		0	144	8694	0.131	Green G-2	25000 25 KL / Acre	3275	11969
F18-F19	0	0		0	0	0	0.128	Green G-4	25000 25 KL / Acre	3200	12054
							0.787	Community - 1	11250 11.25 KL/Acre/FAR	8854	
F20-F21	10	180		0	180	10868					10868
F20-F22	5	90		0	90	5434					5434
F22-F23	23	414		0	414	24995					24995
F22-F24	5	90		0	90	5434					5434
F24-F25	17	306		0	306	18475	0.945	Community - 2	11250 11.25 KL/Acre/FAR	10631	29106
F24-F26	15	270		0	270	16301	0.069	Green G-7	25000 25 KL / Acre	1725	18026
										Total	**344578**

Soni Consultants ★ Plumbing & Fire Suppression Consultants ★ New Delhi

Design of Flushing Water Supply Lines

S NO	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	26663	317915	344578	4	1378314	57430	957.16	150	173	150	120	0.007	1.256	0.90	-6.500	38.50	45.00	0.000	37.24	37.24	PUMP ROOM
2	F2-F3	19188	0	19188	4	76752	3198	53.30	76	87	65	120	0.002	0.178	0.27	0.000	37.24	37.24	0.000	37.07	37.07	AT GROUND
3	F2-F4	22822	275906	298727	4	1194910	49788	829.80	109	125	150	120	0.006	0.701	0.78	0.000	37.24	37.24	0.000	36.54	36.54	AT GROUND
4	F4-F5	8694	0	8694	4	34776	1449	24.15	42	48	65	120	0.000	0.023	0.12	0.000	36.54	36.54	0.000	36.52	36.52	AT GROUND
5	F4-F6	2174	265038	267212	4	1068847	44535	742.25	32	37	150	120	0.005	0.167	0.70	0.000	36.54	36.54	0.000	36.38	36.38	AT GROUND
6	F6-F7	26082	47161	73243	4	292973	12207	203.45	111	128	100	120	0.003	0.381	0.43	0.000	36.38	36.38	0.000	36.00	36.00	AT GROUND
7	F6-F13	23426	168369	191795	4	767180	31966	532.76	125	144	100	120	0.018	2.548	1.13	0.000	36.38	36.38	0.000	33.83	33.83	AT GROUND
8	F7-F8	0	29109	29109	4	116436	4852	80.86	40	46	80	120	0.002	0.074	0.27	0.000	36.00	36.00	0.000	35.92	35.92	AT GROUND
9	F7-F15	12025	6027	18052	4	72208	3009	50.14	42	48	80	120	0.001	0.032	0.17	0.000	36.00	36.00	0.000	35.96	35.96	AT GROUND
10	F8-F9	6521	0	6521	4	26082	1087	18.11	31	36	65	120	0.000	0.010	0.09	0.000	35.92	35.92	0.000	35.91	35.91	AT GROUND
11	F8-F10	0	22569	22569	4	90356	3765	62.75	38	44	80	120	0.001	0.044	0.21	0.000	35.92	35.92	0.000	35.88	35.88	AT GROUND
12	F10-F11	6521	0	6521	4	26082	1087	18.11	31	36	65	120	0.000	0.010	0.09	0.000	35.88	35.88	0.000	35.87	35.87	AT GROUND
13	F10-F12	16068	0	16068	4	64274	2678	44.63	40	46	80	120	0.001	0.024	0.15	0.000	35.88	35.88	0.000	35.85	35.85	AT GROUND
14	F13-F14	4347	36471	40818	4	163271	6803	113.38	36	41	80	120	0.003	0.124	0.38	0.000	33.83	33.83	0.000	33.70	33.70	AT GROUND
15	F13-F20	33689	93863	127552	4	510207	21259	354.31	188	216	100	120	0.008	1.801	0.75	0.000	33.83	33.83	0.000	32.03	32.03	AT GROUND
16	F14-F15	9781	6027	15808	4	63231	2635	43.91	45	52	80	120	0.001	0.027	0.15	0.000	33.70	33.70	0.000	33.68	33.68	AT GROUND
17	F14-F16	4347	16316	20663	4	82652	3444	57.40	36	41	80	120	0.001	0.035	0.19	0.000	33.70	33.70	0.000	33.67	33.67	AT GROUND
18	F15-F18	0	12054	12054	4	48215	2009	33.48	21	24	80	120	0.000	0.008	0.11	0.000	33.68	33.68	0.000	33.67	33.67	AT GROUND
19	F16-F17	4347	0	4347	4	17388	725	12.08	38	44	65	120	0.000	0.006	0.06	0.000	33.67	33.67	0.000	33.66	33.66	AT GROUND
20	F16-F18	11969	0	11969	4	47876	1995	33.25	59	68	65	120	0.001	0.058	0.17	0.000	33.67	33.67	0.000	33.61	33.61	AT GROUND
21	F18-F19	12054	0	12054	4	48215	2009	33.48	35	40	65	120	0.001	0.035	0.17	0.000	33.61	33.61	0.000	33.58	33.58	AT GROUND

e : Design of Flushing Water Supply Lines

NO	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.	
2	F20-F21	10868	0	10868	4	43470	1811	30.19	55	63	65	120	0.001	0.045	0.15	0.000	32.03	32.03	0.000	31.98	31.98	AT GROUND
3	F20-F22	5434	77561	82995	4	331980	13833	230.54	42	48	80	120	0.011	0.538	0.76	0.000	32.03	32.03	0.000	31.49	31.49	AT GROUND
4	F22-F23	24995	0	24995	4	99981	4166	69.43	111	126	80	120	0.001	0.154	0.23	0.000	31.49	31.49	0.000	31.34	31.34	AT GROUND
5	F22-F24	5434	47132	52566	4	210264	8761	146.02	43	49	80	120	0.005	0.236	0.48	0.000	31.49	31.49	0.000	31.25	31.25	AT GROUND
6	F24-F25	29106	0	29106	4	116424	4851	80.85	115	132	80	120	0.002	0.212	0.27	0.000	31.25	31.25	0.000	31.04	31.04	AT GROUND
7	F24-F26	18026	0	18026	4	72105	3004	50.07	105	121	80	120	0.001	0.080	0.17	0.000	31.25	31.25	0.000	31.17	31.17	AT GROUND

Soni Consultants * Plumbing & Fire Suppression Consultants * New Delhi

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	150	150	0	0	150	0	0	0	0	0			1					
2	F2-F3	76	65	0	0	0	0	0	76	0	0						1		
3	F2-F4	109	150	0	0	109	0	0	0	0	0			1					
4	F4-F5	42	65	0	0	0	0	0	42	0	0								
5	F4-F6	32	150	0	0	32	0	0	0	0	0								
6	F6-F7	111	100	0	0	0	111	0	0	0	0				1				
7	F6-F13	125	100	0	0	0	125	0	0	0	0				1				
8	F7-F8	40	80	0	0	0	0	40	0	0	0					1			
9	F7-F15	42	80	0	0	0	0	42	0	0	0					1			
10	F8-F9	31	65	0	0	0	0	0	31	0	0								
11	F8-F10	38	80	0	0	0	0	38	0	0	0								
12	F10-F11	31	65	0	0	0	0	0	31	0	0								
13	F10-F12	40	80	0	0	0	0	40	0	0	0								
14	F13-F14	36	80	0	0	0	0	36	0	0	0								
15	F13-F20	188	100	0	0	0	188	0	0	0	0				1				
16	F14-F15	45	80	0	0	0	0	45	0	0	0					1			
17	F14-F16	36	80	0	0	0	0	36	0	0	0								
18	F15-F18	21	80	0	0	0	0	21	0	0	0								
19	F16-F17	38	65	0	0	0	0	0	38	0	0								

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
20	F16-F18	59	65	0	0	0	0	0	59	0	0						1		
21	F18-F19	35	65	0	0	0	0	0	35	0	0								
22	F20-F21	55	65	0	0	0	0	0	55	0	0								
23	F20-F22	42	80	0	0	0	0	42	0	0	0								
24	F22-F23	111	80	0	0	0	0	111	0	0	0								
25	F22-F24	43	80	0	0	0	0	43	0	0	0						1		
26	F24-F25	115	80	0	0	0	0	115	0	0	0								
27	F24-F26	105	80	0	0	0	0	105	0	0	0								
TOTAL		**1796**		**0**	**0**	**291**	**424**	**714**	**367**	**0**	**0**	**0**	**0**	**2**	**3**	**3**	**3**	**0**	**0**

TITLE : LOAD ON SEWAGE LINES

Name of Sewer Line	Plot (General)		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	Type of Building	Basis of Water Requirement LPD	Water Requirement LPD			
		(a)	(b)				(c)	(d) = (b)+(c)		
S1-S3	16	288	49680					49680	39744	**39.74**
S2-S3	17	306	52785	0.945	COMMUNITY - 02	@25000 LTRS/ACRE/FAR	23625.00	76410	61128	**61.13**
S3-S5	4	72	12420					12420	9936	**9.94**
S4-S5	23	414	71415					71415	57132	**57.13**
S5-S7	5	90	15525					15525	12420	**12.42**
S6-S7	10	180	31050					31050	24840	**24.84**
S7-S8	4	72	12420					12420	9936	**9.94**
S8-S14	27	486	83835					83835	67068	**67.07**
S9-S13	9	162	27945	0.787	COMMUNITY - 01	@25000 LTRS/ACRE/FAR	19675.00	47620	38096	**38.10**
S10-S12	4	72	12420					12420	9936	**9.94**
S11-S12	8	144	24840					24840	19872	**19.87**
S12-S13	4	72	12420					12420	9936	**9.94**
S13-S14	4	72	12420					12420	9936	**9.94**
S14-S16	10	180	31050	1.0	Other's Land	@100 PERSONS/ACRE	17250.00	48300	38640	**38.64**

1. E : LOAD ON SEWAGE LINES

ıme of Sewer Line	Plot (General)		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	Type of Building	Basis of Water Requirement LPD	Water Requirement LPD			
		(a)	(b)				(c)	(d) = (b)+(c)		
15-S16	2	36	6210					6210	4968	**4.97**
S16-S22	4	72	12420					12420	9936	**9.94**
S17-S19	0	0	0	0.693	COMMERCIAL	@25000 LTRS/ACRE/FAR	30319	30319	24255	**24.26**
18-S19	6	108	18630					18630	14904	**14.90**
S19-S21	0	0	0					0	0	**0.00**
S20-S21	6	108	18630					18630	14904	**14.90**
.1-S22	24	432	74520					74520	59616	**59.62**
2-S24	2	36	6210					6210	4968	**4.97**
23-S24	8	144	24840					24840	19872	**19.87**
S24-S26	21	378	65205					65205	52164	**52.16**
S25-S26	16	288	49680					49680	39744	**39.74**
5-S27	16	288	49680					49680	39744	**39.74**
7-STP	0	0	0					0	0	**0.00**
TOTAL	250	4500	776250				90868.75		693695.00	693.70

SEWAGE 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	
																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-S3	39.74	0.000	39.74	119.23	1.04	120.27	1.39	104	200	190	0.55	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.80	1.25	1.80
S2-S3	61.13	0.000	61.13	183.38	1.10	184.48	2.14	110	200	190	0.58	0.013	0.76	23.80	11.90	0.00	-1.80	0.00	-2.38	1.80	2.38
S3-S5	9.94	100.872	110.81	332.42	0.37	332.79	3.85	37	200	190	0.19	0.013	0.76	23.80	11.90	0.00	-2.38	0.00	-2.57	2.38	2.57
S4-S5	57.13	0.000	57.13	171.40	1.10	172.50	2.00	110	200	190	0.58	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.83	1.25	1.83
S5-S7	12.42	167.940	180.36	541.08	0.43	541.51	6.27	43	200	190	0.23	0.013	0.76	23.80	11.90	0.00	-2.57	0.00	-2.80	2.57	2.80
S6-S7	24.84	0.000	24.84	74.52	0.54	75.06	0.87	54	200	190	0.28	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.53	1.25	1.53
S7-S8	9.94	205.200	215.14	645.41	0.41	645.82	7.47	41	200	190	0.22	0.013	0.76	23.80	11.90	0.00	-2.80	0.00	-3.02	2.80	3.02
S8-S14	67.07	215.136	282.20	846.61	1.48	848.09	9.82	148	200	190	0.78	0.013	0.76	23.80	11.90	0.00	-3.02	0.00	-3.79	3.02	3.79
S9-S13	38.10	0.000	38.10	114.29	0.98	115.27	1.33	98	200	190	0.52	0.013	0.76	23.80	11.90	0.00	-1.80	0.00	-2.32	1.80	2.32
S10-S12	9.94	0.000	9.94	29.81	0.37	30.18	0.35	37	200	190	0.19	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.44	1.25	1.44
S11-S12	19.87	0.000	19.87	59.62	0.35	59.97	0.69	35	200	190	0.18	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.43	1.25	1.43
S12-S13	9.94	29.808	39.74	119.23	0.36	119.59	1.38	36	200	190	0.19	0.013	0.76	23.80	11.90	0.00	-1.44	0.00	-1.63	1.44	1.63
S13-S14	9.94	77.840	87.78	263.33	0.36	263.69	3.05	36	200	190	0.19	0.013	0.76	23.80	11.90	0.00	-2.32	0.00	-2.51	2.32	2.51
S14-S16	38.64	369.980	408.62	1225.86	1.23	1227.09	14.20	98	250	245	0.40	0.013	0.77	38.01	19.00	0.00	-3.84	0.00	-4.24	3.84	4.24
S15-S16	4.97	0.000	4.97	14.90	0.09	14.99	0.17	9	200	190	0.05	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.30	1.25	1.30
S16-S22	9.94	413.588	423.52	1270.57	0.33	1270.90	14.71	26	250	245	0.11	0.013	0.77	38.01	19.00	0.00	-4.24	0.00	-4.35	4.24	4.35
S17-S19	24.26	0.000	24.26	72.77	0.31	73.08	0.85	31	200	190	0.16	0.013	0.76	23.80	11.90	0.00	-1.80	0.00	-1.96	1.80	1.96
S18-S19	14.90	0.000	14.90	44.71	0.22	44.93	0.52	22	200	190	0.12	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.37	1.25	1.37

SEWAGE 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	
																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		
S19-S21	0.00	39.159	39.16	117.48	0.38	117.86	1.36	38	200	190	0.20	0.013	0.76	23.80	11.90	0.00	-1.96	0.00	-2.16	1.96	2.16
S20-S21	14.90	0.000	14.90	44.71	0.22	44.93	0.52	22	200	190	0.12	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.37	1.25	1.37
S21-S22	59.62	54.063	113.68	341.04	1.52	342.56	3.96	152	200	190	0.80	0.013	0.76	23.80	11.90	0.00	-2.16	0.00	-2.96	2.16	2.96
S22-S24	4.97	537.203	542.17	1626.51	0.41	1626.93	18.83	33	250	245	0.13	0.013	0.77	38.01	19.00	0.00	-4.35	0.00	-4.49	4.35	4.49
S23-S24	19.87	0.000	19.87	59.62	0.35	59.97	0.69	35	200	190	0.18	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.43	1.25	1.43
S24-S26	52.16	562.043	614.21	1842.62	1.65	1844.27	21.35	110	300	325	0.34	0.013	0.76	53.66	26.83	0.00	-4.54	0.00	-4.87	4.54	4.87
S25-S26	39.74	0.000	39.74	119.23	0.69	119.92	1.39	69	200	190	0.36	0.013	0.76	23.80	11.90	0.00	-1.25	0.00	-1.61	1.25	1.61
S26-S27	39.74	653.951	693.70	2081.09	2.13	2083.22	24.11	142	300	325	0.44	0.013	0.76	53.66	26.83	0.00	-4.87	0.00	-5.31	4.87	5.31
S27-STP	0.00	693.695	693.70	2081.09	0.08	2081.16	24.09	5	300	325	0.02	0.013	0.76	53.66	26.83	0.00	-5.31	0.00	-5.33	5.31	5.33

SEWERAGE QUANTITY SHEET

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			
	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
S1-S3	104	200	1.25	1.80	1.52	104	0	0	0	0	0	0	0	0	0	0	0
S2-S3	110	200	1.80	2.38	2.09	0	0	0	0	110	0	0	0	0	0	0	0
S3-S5	37	200	2.38	2.57	2.48	0	0	0	0	37	0	0	0	0	0	0	0
S4-S5	110	200	1.25	1.83	1.54	110	0	0	0	0	0	0	0	0	0	0	0
S5-S7	43	200	2.57	2.80	2.69	0	0	0	0	43	0	0	0	0	0	0	0
S6-S7	54	200	1.25	1.53	1.39	54	0	0	0	0	0	0	0	0	0	0	0
S7-S8	41	200	2.80	3.02	2.91	0	0	0	0	41	0	0	0	0	0	0	0
S8-S14	148	200	3.02	3.79	3.41	0	0	0	0	148	0	0	0	0	0	0	0
S9-S13	98	200	1.80	2.32	2.06	0	0	0	0	98	0	0	0	0	0	0	0
S10-S12	37	200	1.25	1.44	1.35	37	0	0	0	0	0	0	0	0	0	0	0
S11-S12	35	200	1.25	1.43	1.34	35	0	0	0	0	0	0	0	0	0	0	0
S12-S13	36	200	1.44	1.63	1.54	36	0	0	0	0	0	0	0	0	0	0	0
S13-S14	36	200	2.32	2.51	2.41	0	0	0	0	36	0	0	0	0	0	0	0
S14-S16	98	250	3.84	4.24	4.04	0	0	0	0	0	0	0	0	0	98	0	0
S15-S16	9	200	1.25	1.30	1.27	9	0	0	0	0	0	0	0	0	0	0	0
S16-S22	26	250	4.24	4.35	4.30	0	0	0	0	0	0	0	0	0	26	0	0
S17-S19	31	200	1.80	1.96	1.88	31	0	0	0	0	0	0	0	0	0	0	0
S18-S19	22	200	1.25	1.37	1.31	22	0	0	0	0	0	0	0	0	0	0	0
S19-S21	38	200	1.96	2.16	2.06	0	0	0	0	38	0	0	0	0	0	0	0
S20-S21	22	200	1.25	1.37	1.31	22	0	0	0	0	0	0	0	0	0	0	0
S21-S22	152	200	2.16	2.96	2.56	0	0	0	0	152	0	0	0	0	0	0	0
S22-S24	33	250	4.35	4.49	4.42	0	0	0	0	0	0	0	0	0	33	0	0
S23-S24	35	200	1.25	1.43	1.34	35	0	0	0	0	0	0	0	0	0	0	0

SEWERAGE QUANTITY SHEET																	
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			
	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
S24-S26	110	300	4.54	4.87	4.70	0	0	0	0	0	0	0	0	0	0	110	0
S25-S26	69	200	1.25	1.61	1.43	69	0	0	0	0	0	0	0	0	0	0	0
S26-S27	142	300	4.87	5.31	5.09	0	0	0	0	0	0	0	0	0	0	142	0
S27-STP	5	300	5.31	5.33	5.32	0	0	0	0	0	0	0	0	0	0	5	0
TOTAL						564	0	0	0	703	0	0	0	0	157	257	0

E : STORM WATER DRAIN HYDRAULIC DESIGN

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 (In Mtr.)	Depth at End (In Mtr.)	Type of Manhole
1	D1	D3	97	3914	0.391	0.000	0.391	6.25	6.80	400	550	0.61	76.99	0.18	0.000	-1.050	-1.450	0.000	-1.226	-1.626	1.45	1.63	A
2	D2	D3	100	7699	0.770	0.000	0.770	6.25	13.37	400	550	0.61	76.99	0.18	0.000	-1.400	-1.800	0.000	-1.582	-1.982	1.80	1.98	B
3	D3	D5	43	1270	0.127	1.161	1.288	6.25	22.37	400	550	0.61	76.99	0.08	0.000	-1.582	-1.982	0.000	-1.660	-2.060	1.98	2.06	B
4	D4	D5	45	4808	0.481	0.000	0.481	6.25	8.35	400	550	0.61	76.99	0.08	0.000	-1.050	-1.450	0.000	-1.132	-1.532	1.45	1.53	A
5	D5	D7	41	1094	0.109	1.769	1.879	6.25	32.62	400	550	0.61	76.99	0.07	0.00	-1.660	-2.06	0.00	-1.73	-2.13	2.06	2.13	B
6	D6	D7	45	6103	0.610	0.000	0.610	6.25	10.60	400	550	0.61	76.99	0.08	0.000	-1.050	-1.450	0.000	-1.132	-1.532	1.45	1.53	A
7	D7	D9	41	1000	0.100	2.489	2.589	6.25	44.95	400	550	0.61	76.99	0.07	0.000	-1.735	-2.135	0.000	-1.809	-2.209	2.13	2.21	B
8	D8	D9	18	501	0.050	0.000	0.050	6.25	0.87	400	550	0.61	76.99	0.03	0.000	-1.050	-1.450	0.000	-1.083	-1.483	1.45	1.48	A
9	D9	D15	130	4273	0.427	2.639	3.066	6.25	53.24	400	550	0.61	76.99	0.24	0.00	-1.81	-2.21	0.00	-2.05	-2.45	2.21	2.45	B
10	D10	D12	31	719	0.072	0.000	0.072	6.25	1.25	400	550	0.61	76.99	0.06	0.000	-1.050	-1.450	0.000	-1.106	-1.506	1.45	1.51	A
11	D11	D12	37	1338	0.134	0.000	0.134	6.25	2.32	400	550	0.61	76.99	0.07	0.00	-1.050	-1.45	0.00	-1.12	-1.52	1.45	1.52	A
12	D12	D14	36	876	0.088	0.206	0.293	6.25	5.09	400	550	0.61	76.99	0.07	0.000	-1.117	-1.517	0.000	-1.183	-1.583	1.52	1.58	A
13	D13	D14	36	1441	0.144	0.000	0.144	6.25	2.50	400	550	0.61	76.99	0.07	0.000	-1.050	-1.450	0.000	-1.115	-1.515	1.45	1.52	A
14	D14	D15	36	922	0.092	0.437	0.530	6.25	9.20	400	550	0.61	76.99	0.07	0.000	-1.183	-1.583	0.000	-1.248	-1.648	1.58	1.65	A
15	D15	D17	98	2488	0.249	3.596	3.845	6.25	66.75	400	550	0.61	76.99	0.18	0.00	-2.05	-2.45	0.00	-2.22	-2.62	2.45	2.62	B
16	D16	D17	23	646	0.065	0.000	0.065	6.25	1.12	400	550	0.61	76.99	0.04	0.000	-1.050	-1.450	0.000	-1.092	-1.492	1.45	1.49	A
17	D17	D27	12	229	0.023	3.909	3.932	6.25	68.27	400	550	0.61	76.99	0.02	0.000	-2.224	-2.624	0.000	-2.245	-2.645	2.62	2.65	B
18	D18	D20	105	5940	0.594	0.000	0.594	6.25	10.31	400	550	0.61	76.99	0.19	0.000	-1.300	-1.700	0.000	-1.491	-1.891	1.70	1.89	B
19	D19	D20	42	1750	0.175	0.000	0.175	6.25	3.04	400	550	0.61	76.99	0.08	0.000	-1.050	-1.450	0.000	-1.126	-1.526	1.45	1.53	A
20	D20	D22	38	0	0.000	0.769	0.769	6.25	13.35	400	550	0.61	76.99	0.07	0.000	-1.491	-1.891	0.000	-1.560	-1.960	1.89	1.96	B
21	D21	D22	42	2072	0.207	0.000	0.207	6.25	3.60	400	550	0.61	76.99	0.08	0.000	-1.050	-1.450	0.000	-1.126	-1.526	1.45	1.53	A
22	D22	D26	40	0	0.000	0.976	0.976	6.25	16.95	400	550	0.61	76.99	0.07	0.000	-1.560	-1.960	0.000	-1.633	-2.033	1.96	2.03	B

E : STORM WATER DRAIN HYDRAULIC DESIGN

o	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 (In Mtr.)	Depth at End (In Mtr.)	Type of Manhole
	D23	D25	29	1046	0.105	0.000	0.105	6.25	1.82	400	550	0.61	76.99	0.05	0.000	-1.050	-1.450	0.000	-1.103	-1.503	1.45	1.50	A
	D24	D25	22	3855	0.386	0.000	0.386	6.25	6.69	400	550	0.61	76.99	0.04	0.000	-1.300	-1.700	0.000	-1.340	-1.740	1.70	1.74	B
25	D25	D26	49	1093	0.109	0.490	0.599	6.25	10.41	400	550	0.61	76.99	0.09	0.000	-1.340	-1.740	0.000	-1.429	-1.829	1.74	1.83	B
	D26	D27	130	5956	0.596	1.576	2.171	6.25	37.70	400	550	0.61	76.99	0.24	0.00	-1.63	-2.03	0.00	-1.87	-2.27	2.03	2.27	B
27	D27	D29	46	735	0.074	6.103	6.177	6.25	107.24	500	650	0.65	128.40	0.07	0.000	-2.245	-2.745	0.000	-2.316	-2.816	2.75	2.82	C
28	D28	D29	35	1394	0.139	0.000	0.139	6.25	2.42	400	550	0.61	76.99	0.06	0.000	-1.050	-1.450	0.000	-1.114	-1.514	1.45	1.51	A
	D29	D31	110	4431	0.443	6.316	6.759	6.25	117.36	500	650	0.65	128.40	0.17	0.00	-2.32	-2.82	0.00	-2.49	-2.99	2.82	2.99	C
30	D30	D31	68	3256	0.326	0.000	0.326	6.25	5.65	400	550	0.61	76.99	0.12	0.00	-1.050	-1.45	0.00	-1.17	-1.57	1.45	1.57	A
31	D31	D33	43	0	0.000	7.085	7.085	6.25	123.01	500	650	0.65	128.40	0.07	0.00	-2.49	-2.99	0.00	-2.55	-3.05	2.99	3.05	C
32	D32	D33	87	4908	0.491	0.000	0.491	6.25	8.52	400	550	0.61	76.99	0.16	0.00	-1.050	-1.45	0.00	-1.21	-1.61	1.45	1.61	A
33	D33	OUT FALL	10	0	0.000	7.576	7.576	6.25	131.53	500	600	0.68	133.65	0.02	0.00	-2.55	-3.05	0.00	-2.57	-3.07	3.05	3.07	C

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	D1	D3	97	400	1.45	1.63	1.54	97	0	0	0	0	0	0	0	0	0
2	D2	D3	100	400	1.80	1.98	1.89	100	0	0	0	0	0	0	0	0	0
3	D3	D5	43	400	1.98	2.06	2.02	0	0	0	0	0	43	0	0	0	0
4	D4	D5	45	400	1.45	1.53	1.49	45	0	0	0	0	0	0	0	0	0
5	D5	D7	41	400	2.06	2.13	2.10	0	0	0	0	0	41	0	0	0	0
6	D6	D7	45	400	1.45	1.53	1.49	45	0	0	0	0	0	0	0	0	0
7	D7	D9	41	400	2.13	2.21	2.17	0	0	0	0	0	41	0	0	0	0
8	D8	D9	18	400	1.45	1.48	1.47	18	0	0	0	0	0	0	0	0	0
9	D9	D15	130	400	2.21	2.45	2.33	0	0	0	0	0	130	0	0	0	0
10	D10	D12	31	400	1.45	1.51	1.48	31	0	0	0	0	0	0	0	0	0
11	D11	D12	37	400	1.45	1.52	1.48	37	0	0	0	0	0	0	0	0	0
12	D12	D14	36	400	1.52	1.58	1.55	36	0	0	0	0	0	0	0	0	0
13	D13	D14	36	400	1.45	1.52	1.48	36	0	0	0	0	0	0	0	0	0
14	D14	D15	36	400	1.58	1.65	1.62	36	0	0	0	0	0	0	0	0	0
15	D15	D17	98	400	2.45	2.62	2.53	0	0	0	0	0	98	0	0	0	0
16	D16	D17	23	400	1.45	1.49	1.47	23	0	0	0	0	0	0	0	0	0
17	D17	D27	12	400	2.62	2.65	2.63	0	0	0	0	0	12	0	0	0	0
18	D18	D20	105	400	1.70	1.89	1.80	105	0	0	0	0	0	0	0	0	0
19	D19	D20	42	400	1.45	1.53	1.49	42	0	0	0	0	0	0	0	0	0
20	D20	D22	38	400	1.89	1.96	1.93	38	0	0	0	0	0	0	0	0	0
21	D21	D22	42	400	1.45	1.53	1.49	42	0	0	0	0	0	0	0	0	0

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
22	D22	D26	40	400	1.96	2.03	2.00	40	0	0	0	0	0	0	0	0	0
23	D23	D25	29	400	1.45	1.50	1.48	29	0	0	0	0	0	0	0	0	0
24	D24	D25	22	400	1.70	1.74	1.72	22	0	0	0	0	0	0	0	0	0
25	D25	D26	49	400	1.74	1.83	1.78	49	0	0	0	0	0	0	0	0	0
26	D26	D27	130	400	2.03	2.27	2.15	0	0	0	0	0	130	0	0	0	0
27	D27	D29	46	500	2.75	2.82	2.78	0	0	0	0	0	0	0	46	0	0
28	D28	D29	35	400	1.45	1.51	1.48	35	0	0	0	0	0	0	0	0	0
29	D29	D31	110	500	2.82	2.99	2.90	0	0	0	0	0	0	0	110	0	0
30	D30	D31	68	400	1.45	1.57	1.51	68	0	0	0	0	0	0	0	0	0
31	D31	D33	43	500	2.99	3.05	3.02	0	0	0	0	0	0	0	43	0	0
32	D32	D33	87	400	1:45	1.61	1.53	87	0	0	0	0	0	0	0	0	0
33	D33	OUT FALL	10	500	3.05	3.07	3.06	0	0	0	0	0	0	0	10	0	0
TOTAL								**1061**	**0**	**0**	**0**	**0**	**495**	**0**	**209**	**0**	**0**

ROAD AREA CALCULATION

ROADS No.	LENGTH (M)	WIDTH (M)	METAL PORTION IN (M)	AREA OF METAL PORTION (SQM.)	AREA 0F FOOTPATH (SQM.)
R1	66	9	6	396	198
R2	110	9	6	660	330
R3	33	9	6	198	99
R4	110	9	6	660	330
R5	159	9	6	954	477
R6	67	9	6	402	201
R7	15	9	6	90	45
R8	68	9	6	408	204
R9	67	9	6	402	201
R10	36	9	6	216	108
R11	128	9	6	768	384
R12	42	9	6	252	126
R13	154	9	6	924	462
R14	35	9	6	210	105
R15	82	9	6	492	246
R16	51	9	6	306	153
R17	219	9	6	1314	657
R18	23	9	6	138	69
R19	32	9	6	192	96
R20	32	9	6	192	96
R21	189	12	7	1323	945
R22	90	18	12	1080	540
TOTAL	**1808**			**11577**	**6072**