

SERVICE ESTIMATE REPORT

Date: 25/09/2024

REVISION: R0

M/S SWD GROUP HOUSING
SECTOR-69, GURUGRAM

MEP CONSULTANTS

DESIGN CENTRE CONSULTING ENGINEERS PVT. LTD.

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Riverday Infrastructure Private Limited



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PROJECT: PROPOSED BUILDING PLAN FOR MIXED LAND USE COLONY (98% RESIDENTIAL COMPONENT AND 2% COMMERCIAL COMPONENT) UNDER TOD POLICY OVER AN AREA MEASURING 11.66875 ACRES. (LICENSE NO 90 OF 2024 DATED 18.07.2024) IN THE REVENUE ESTATE OF VILLAGE FAZILPUR JHARSA & BADSHAHAPUR, SECTOR-69 GURUGRAM, BEING DEVELOPED BY RIVERDAY INFRASTRUCTURE PRIVATE LIMITED

REPORT

Gurugram town of Haryana State is situated on Delhi - Jaipur National Highway No.8 at a distance of 30 kms for Delhi. Being in the national capital Region, the town has fast developing tendency and potential. Further, it has also started sharing the growing Industrial load of Delhi. In order to relieve the growing pressure of population in National Capital of Delhi, Haryana Urban Development Authority has already developed residential sector which are inhabited to an extent. Further to the increasing demand HSVP has planned to develop new sectors at outskirts of Gurugram town. This report and estimate are for approval of 11.66875 acres Group Housing scheme in Sector-69, Gurugram.

WATER SUPPLY

The source of water supply shall be GMDA water supply connection, augmented through tube wells & HSVP. As the underground water is potable, provision for **four numbers** (3W & 1S) of Bore wells as per calculation. It has been proposed to construct underground tanks of capacity as per attached details and at location for domestic purpose and for fire protection. The underground tanks will be fed from the bore wells and GMDA supply from there water will be pumped to O.H. water tanks on the roof of the Buildings of Individual Towers. STP treated water will be used for Flushing & irrigation water supply and water will be fed from the STP, from there water will be pumped to O.H. water tanks on the roof of the Buildings of Individual Towers

DESIGN:

The scheme has been designed for population considering 2 BHK-Five persons, 3 BHK-Six persons, 4 BHK- Seven persons, club & commercial Building for each main dwelling unit and Four persons for each EWS. The rate of water supply (Domestic + Flushing) per capita / day has been taken as 172.5 lpcd for main dwelling unit and EWS.

PUMPING EQUIPMENTS

It has been proposed to install pumping set as described with standby of equal capacity. Standby electric power requirement is added to the main DG Sets in case of electricity failure.

SEWERAGE SCHEME

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This scheme is designed for sewer connecting to STP and bypass connection to GMDA sewer scheme.

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 domestic water supply and 100% of the flushing water supply shall find its way into the proposed sewer. Sewer lines shall be laid to a gradient maintaining minimum 2.46 ft/sec self-cleaning velocity. Sewer line up to 400 mm dia. has been designed to run half full and above 400 mm dia. has been designed to run three fourth full at peak flow. Necessary provision for laying S.W / RCC pipe sewer line, construction of required number of manholes etc. have been made in the estimate.

Necessary design statement for entire sewerage system has been prepared and attached with estimate. Manning's formula has been used for the design of sewerage system.

STORM WATER DRAINAGE

We proposed to lay underground R.C.C. (NP-3) pipe drains with required number of catch basins for disposal of storm water which will be connected to the Proposed GMDA storm drain on sector Road. R.C.C storm water line will be designed as per Manning's formula.

SPECIFICATIONS

The work will be carried out in accordance with the standard specifications of P.H as laid down by the Haryana Govt. / GMDA

Roads:

Roads have been provided to above zones and estimate is prepared as per revised specifications adopted by GMDA.

Street Lighting

Provision for streets lighting also has been made in the estimate.

Horticulture

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

Rates

The estimate has been prepared based on the present market rates.

Cost:

The total cost of the scheme, including cost of all services works out to be **Rs. 2117.15 lakhs** including 3% contingencies @ 49% departmental charges, price escalation, unforeseen & admin charges etc.

For RIVERDAY INFRASTRUCTURE PRIVATE LIMITED

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I. DESIGN CALCULATION (Standard Parcel)

I. Summary of total water (As per water calculation Sheet)

(A) Total of domestic and flushing requirement	=	1439 KLD
SAY	=	1439 KLD
(B) Domestic requirement	=	1044 KLD
(C) Flushing requirement	=	395 KLD
(D) Irrigation & Road washing	=	41 KLD

STP Capacity @ 80% of domestic & flushing water requirement (Excluding Horticulture, Water Body, Swimming Pool & Road Washing requirement)

II. SUMMARY & SOURCE OF WATER

i. Domestic water (From Borewell / GMDA)	=	1044 KLD
ii. Flushing water (From STP)	=	395 KLD
iii. Horticulture & Road Washing (From STP)	=	41 KLD
iv. Total Fresh Water Demand	=	1044 KLD

III. SUMMARY OF UGT

(i) Domestic water tank (One day requirement)	=	350 KLD
(ii) Firefighting water tank	=	700 KLD
(iii) Flushing & horticulture water tank (In STP)	=	265 KLD

Therefore, it is proposed to construct underground water storage @ one day requirement of the total domestic water capacity of Raw Water tank of **1 Nos x 350 KL** & domestic water tank of **1 Nos x 350 KL** for entire project and firefighting tank of **1 Nos x 700 KL** for entire project at one location marked on plan. Also, **1 x Nos x 265 KL** for Flushing & Horticulture purpose.

IV. BOREWELLS

a) Approx. discharge from each bore well	=	30.00 KL/hr
b) Operating time of bore wells	=	12 hrs/day
c) Total yield from each bore well	=	30.00x12 = 360.00 KLD
d) Total water requirement	=	1044 KLD
e) Number of bore wells	=	1044 / 360 = 2.9 Nos.
f) Standby	=	1.0 Nos.
<i>Total</i>	=	<i>3.9 Nos.</i>
<i>Say</i>	=	4.0 Nos.



Since the entire water to the proposed development is to be supplied by GMDA. So, it is proposed to install 4 numbers (3w +1s) of bore-wells as supplementary source of water.

V. PUMPING MACHINERY FOR BOREWELLS

Gross working head	=	80.00 mts.
Average fall in S.L.	=	03.05 mts.
Depression Head	=	06.10 mts.
Friction loss in main	=	03.05 mts.
TOTAL	=	92.20 mts.
SAY	=	100.00 mts.
HP (Each)	=	$\frac{30000 \times 100 \times 1}{60 \times 60 \times 75 \times 60\%}$
	=	18.51 HP, Say= 20 HP

VI. BOOSTING MACHINERY FOR DOMESTIC PUMP

Pumping hour @ 10 hours /day	=	1044 / 10 = 104.4
KL/hr	=	1740 lpm
	=	1740/3 = 580 lpm
Say	=	600 lpm (3W + 1S)
Gross working head		
Suction lift	=	10.5 meter
Friction loss	=	36.5 meter
Clear head required	=	200 meter
Total	=	247.0 meter
Say	=	265.00M
HP (Each)	=	$\frac{600 \times 265}{60 \times 75 \times 60\%}$
	=	58.88 HP, Say = 60

It is proposed to provide 4 Nos (3 Working + 1 Standby) of pumping sets of 600 lpm discharge at 265 Mtr. Head for Domestic Supply.

VII. BOOSTING MACHINERY FOR FLUSHING PUMP

a) Flushing & Irrigation Water Supply

Pumping hour @ 10 hours /day	=	436/ 10 = 43.6 KL/hr
	=	726.66 lpm
	=	726.66/2 = 363.33 lpm
Say	=	400 lpm (2W + 1S)

Gross working head
Suction lift
Friction loss
Clear head required

= 6.50 meter
= 16.50 meter
= 96.0 meter
Total = 119.0 meter
Say = 120.00M

$$\text{HP (Each)} = \frac{400 \times 265}{60 \times 75 \times 60\%} = 39.25 \text{ HP, Say} = 40 \text{ HP}$$

It is proposed to provide **3 Nos** (2 Working + 1 Standby) of pumping sets of **400 lpm** discharge at **265 Mtr.** Head for Flushing Supply.

VIII. PUMPS FOR FIRE PROTECTION

S.N O.	PARAMETERS	LOCATION	PUMP SETS					
			JOCKEY	MAIN	DIESEL	SPRINKLER	CURTAIN	UGT TO SERVICE FLOOR FIRE TANK FILLING
1			Pump room					
(a)	Discharge in lpm		180	2850	2850	2850	2850	2850
(b)	Head in meters		195 /240 / 285 M	195 /240 / 285 M	195 /240 / 285 M	125/175/220M	60 M	265 M
(c)	HP		20	300		300	75	300
(d)	Quantity in nos		2	1	2	1	2	2
2			Service Floor					
(a)	Discharge in lpm		180	2850	2850	2850		
(b)	Head in meters		60 M	60 M	60 M	60 M		
(c)	HP		5	75		75		
(d)	Quantity in nos		2	1	1	1		

IX. CAPACITY OF DG SETS

S.NO.	EQUIPMENT	QUANTITY	HP (EACH)	TOTAL HP
1	BOREWELL	4	20	80
2	FIRE JOCKEY	2	20	40
3	FIRE PUMP UGT TO SERVICE FLOOR FIRE TANK FILLING	2 (1W + 1S)	300	300
4	DOMESTIC PUMPS (1 SET)	4 (3W + 1S)	60	180
5	FLUSHNG & IRRIGATION PUMPS (1 SET)	3 (2W + 1S)	40	80
6	STP			150
7	EXTERNAL LIGHTING			15
8	SWIMMING POOL			15
	TOTAL			860.00
				640.7
				KW
				954.65
				KVA
		SAY		1000
				KVA

It is proposed to add **1000 KVA** capacity for above said machinery to the main DG set.

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ESTIMATE				
ABSTRACT OF COST				
SL NO	DESCRIPTION			AMOUNT (IN Lacs)
I.	SUB HEAD NO. I - WATER SUPPLY WORKS			Rs.719.40
II.	SUB HEAD NO. II - SEWERAGE SYSTEM			Rs.285.70
III.	SUB HEAD NO. III - STORM WATER DRAINAGE			Rs.119.30
IV.	SUB HEAD NO. IV - ROAD WORK (ROAD & FOOTPATH)			Rs.430.90
V.	SUB HEAD NO. V - STREET LIGHT			Rs.44.77
VI.	SUB HEAD NO. VI - LANDSCAPING			Rs.30.80
VII.	SUB HEAD NO. VII - MAINTENANCE			Rs.486.28
	GRAND TOTAL			Rs.2,117.15

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S.No	LINE NO		PIPE IN METER	PIPE DIAMETER	LENGTH OF PIPE (MTR.)						
	FROM	TO	LENGTH (MTR.)	MM	25 MM	32 MM	40 MM	50 MM	65 MM	80 MM	100 MM
1	1	2	53	100	-	-	-	-	-	-	53
2	2	3	87	100	-	-	-	-	-	-	87
3	3	4	69	100	-	-	-	-	-	-	69
4	4	5	69	100	-	-	-	-	-	-	69
5	5	6	64	100	-	-	-	-	-	-	64
6	6	9	17	100	-	-	-	-	-	-	17
7	7	8	43	50	-	-	-	43	-	-	-
8	8	9	41	65	-	-	-	-	41	-	-
9	9	10	51	100	-	-	-	-	-	-	51
10	10	11	38	100	-	-	-	-	-	-	38
11	11	12	56	100	-	-	-	-	-	-	56
12	12	13	50	100	-	-	-	-	-	-	50
13	13	14	30	100	-	-	-	-	-	-	30
14	14	21	105	100	-	-	-	-	-	-	105
15	1	15	76	100	-	-	-	-	-	-	76
16	15	16	84	100	-	-	-	-	-	-	84
17	16	17	102	100	-	-	-	-	-	-	102
18	17	18	72	100	-	-	-	-	-	-	72
19	18	20	33	100	-	-	-	-	-	-	33
20	19	20	15	32	-	15	-	-	-	-	-
21	20	21	28	100	-	-	-	-	-	-	28
22	21	26	29	100	-	-	-	-	-	-	29
23	22	23	15	32	-	15	-	-	-	-	-
24	23	24	60	40	-	-	60	-	-	-	-
25	24	25	28	65	-	-	-	-	28	-	-
26	25	26	20	80	-	-	-	-	-	20	-
27	26	STP	10	100	-	-	-	-	-	-	10
		TOTAL LENGTH	1345 mtr		0 mtr	30 mtr	60 mtr	43 mtr	69 mtr	20 mtr	1123 mtr
TOTAL GARDEN HYDRANT = 34 Nos											
25 DIA VERTICAL LENGTH											
						=	51	mtr			

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Project: SWD Group Housing Sect 69, Gurugram, Haryana

MB SHEET FOR ROAD

S. No.	LINE NO		Name of Road	6.0 M Wide Road	9.0 M Wide Road
	FROM	TO			
1	R01	R02	Fire Tender Path		158
2	R02	R03	Fire Tender Path		121
3	R03	R04	Fire Tender Path		55
4	R01	R05	Fire Tender Path		38
5	R05	R06	Fire Tender Path		95
6	R06	R07	Fire Tender Path		67
7	R07	R08	Fire Tender Path		79
8	R08	R09	Fire Tender Path		23
9	R09	R10	Fire Tender Path		36
10	R09	R04	Fire Tender Path		38
11	R10	R11	Fire Tender Path		44
12	R11	R14	Fire Tender Path		35
13	R04	R12	Fire Tender Path		42
14	R12	R13	Fire Tender Path		43
15	R13	R14	Fire Tender Path		46
16	R14	R15	close		47
17	R14	R16	close		39
18	R14	R17	Fire Tender Path	64	
19	R17	R18	Fire Tender Path	40	
20	R18	R19	Fire Tender Path	71	
21	R20	R21	Fire Tender Path	48	
22	R21	R22	Fire Tender Path	27	
23	R22	R23	Fire Tender Path	50	
24	R23	R20	close	27	
			TOTAL	327	1006
Grand Total Road Area				1962	9054
Add 10% for curves and Drop offs				2158.2	9959.4
Total Length of the Road				327	1006
Kerb Length (Both Side of The Road)				654	2012
Add 10% for Drop offs, parking width, curves				719.4	2213.2
			TOTAL	2877.6	12172.6

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Project: SWD Group Housing Sect 69, Gurugram, Haryana

Material Sheet For External Fire Hydrant System

S. NO.	FROM	TO	LENGTH	DIA.	DIA. OF PIPE		
					80MM	100MM	150MM
1	RING	EFH	550	80	550	-	-
2	RING	EFH	105	100	-	105	-
3	RING	PUMP ROOM	900	150			900
		TOTAL LENGTH 150 MM DIA	1555 mtr		550 mtr	105 mtr	900 mtr
		OR SAY	1560 mtr		550 mtr	105 mtr	900 mtr
TOTAL EXTERNAL FIRE HYDRANT = 32 Nos							
	80 DIA Vertical length			=	64	mtr	

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PROJECT: RESIDENTIAL BUILDING AT SECTOR 69, GURGAON
SUBJECT: WATER DEMAND CALCULATION SHEET

S. No.	Description	No. of Units	Population		Water Reqmnt		Total Water Requirement		Flow to Sewer (100% Flushing + 80% Domestic) LPD	OHT CAL. (Ltrs)	
			Population as per NBC-2016	Total	Flushing Water	Domestic Water	Flushing Water	Domestic Water		Flushing Water	Domestic Water
				No.	LPCD	LPCD	LPD	LPD			
I	RESIDENTIAL UNITS										
A	TOWER-A & F										
a)	TYPE-1 (4BHK + UTIL)	156	7	1092	45	127.5	49140	139230	160524		
b)	TYPE-2 (3BHK)	72	6	432	45	127.5	19440	55080	63504		
c)	TYPE-3 (3BHK+UTIL)	78	6	468	45	127.5	21060	59670	68796		
d)	TYPE-5 (2BHK)	6	5	30	45	127.5	1350	3825	4410		
d)	TYPE-7A (5BHK + UTIL)	2	8	16	45	127.5	720	2040	2352		
d)	TYPE-7B (5BHK + UTIL)	2	8	16	45	127.5	720	2040	2352		
	Subtotal for TOWER-1 Units	316		2054			92430	261885	301938	23108	65471
B	TOWER-B, C, D & E										
a)	TYPE-2A (3BHK WITH SERVICE DWELLING UNIT)	144	6	864	45	127.5	38880	110160	127008		
b)	TYPE-3 (3BHK+UTIL)	312	6	1872	45	127.5	84240	238680	275184		
c)	TYPE-4 (3BHK+UTIL)	156	6	936	45	127.5	42120	119340	137592		
c)	TYPE-6 (2BHK)	12	5	60	45	127.5	2700	7650	8820		
c)	TYPE-7C (4BHK + UTIL)	2	7	14	45	127.5	630	1785	2058		
c)	TYPE-7D (4BHK + UTIL)	2	7	14	45	127.5	630	1785	2058		
	Subtotal for TOWER-2 Units	628		3760			169200	479400	552720	21150	59925
G	RETAIL-1 (Incl. EWS units)										
a)	Ground Floor-Retail-1073 Sq.M.	1073	3.0 Sq.M/ Person	358	10	5	3580	1790	5012		
b)	Staff (10%)			36	20	25	720	900	1440		
c)	EWS units over Retail-01	162	4	648	45	127.5	29160	82620	95256		
	Subtotal for Retail-1			1042			33460	85310	101708	16730	42655
J	RETAIL-3 (Incl. Nursery School & EWS units)										
a)	Ground Floor-Retail-308 Sq.M.	308.00	3.0 Sq.M/ Person	103	10	5	1030	515	1442		
b)	Staff (10%)			11	20	25	220	275	440		
c)	Upper Floors-Nursery School-1126.14 Sq.M.	1126.14	4.0 Sq.M/ Person	282	10	5	2820	1410	3948		
d)	EWS units over Retail-03	73	4	292	45	127.5	13140	37230	42924		
	Subtotal for Retail-3			688			17210	39430	48754	8605	19715
K	CLUB BUILDING (Stand Alone)										
1	Ground Floor										
i	Banquet Hall & Pre-Function Hall	335		335							
i	Fixed Population		90% Of Population	34	20	25	670	837.5	1340		
ii	Floating Population		10% Of Population	302	10	5	3015	1507.5	4221		
iii	Kitchen For Banquet	LS						5000	4000		
iv	lounge For Senior Citizen	178	1.4 SQM / Person	127	10	5	1271.428571	635.7142857	1780		
2	First Floor										
a	Gym	152	1.4 SQM / Person	109							
i	Floating Population		90% Of Population	98	10	5	977.1428571	488.5714286	1368		
ii	Fixed Population		10% Of Population	11	20	25	217.1428571	271.4285714	434.2857143		
b	Kids Play Area (200 sqm)	200	1.4 SQM / Person	143							
i	Floating Population		90% Of Population	129	10	5	1285.714286	642.8571429	1800		
ii	Fixed Population		10% Of Population	14	20	25	285.7142857	357.1428571	571.4285714		
I	Restaurant/Bar	72	(1.2 Person per Seat)	86							
i	Floating Population		90% Of Population	104	15	55	1555.2	5702.4	6117.12		
ii	Fixed Population		10% Of Population	20	10	5	200	100	280		
3	Second Floor										
a	Spa & Salon	263	1.4 SQM / Person	188	10	5	1878.571429	939.2857143	2630		
b	Yoga	164	1.4 SQM / Person	117	10	5	1171.428571	585.7142857	1640		
	Subtotal for Club Building			1815			12527.34286	17068.11429	26181.83429	6264	8534
L	CLUB AREA (At Tower Terrace)										
a)	Club Fixed Population (10% of Total)	950.00	1.4 Sq.M/ Person	68	10	5	680	340	952		
b)	Club Floating Population (90% of Total)	950.00	1.4 Sq.M/ Person	611	20	25	12220	15275	24440		

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Design Calculation for Sewerage Water Pipe

S. no.	LINE	Plots	Total Water Requirement	Av. Sewer load 85% of Water Requirement	Peak Load @ 3x Av. Load	Subsoil infiltration @ 3x Av. Load	Self Discharge	Branch Discharge	Total Discharge (lps)	Length of line (m)	Dia. of Pipe (mm)	Slope (1 in)	Fall in Line (Mtr)	Capacity of Pipe (CFS)	Velocity (Vf) m/sec	v/q2f %	Actual velocity (v) m/sec	Check for carrying capacity	G. Level at Start	G. Level at End	Invert Level at Start	Invert Level at End	Drop Mtr	Total drop in Invert Mtr	Depth at Start	Depth at End	Type Of Manhole			
																												Name of Building	TO	FROM
1	51	52	TOWER A.B	344060	292451	877353	73113	950466	0	950466	35	250	250	0.14	48.91	0.77	0.22	0.33	0.80	0.613	OK	0.45	0.45	-0.45	-0.59	0.00	0.90	1.04	910	
2	52	53	TOWER C	169903	141868	425603	35467	950466	1411535	36.34	38	250	250	0.15	48.91	0.77	0.33	0.40	0.90	0.690	OK	0.45	0.45	-0.59	-0.74	0.00	1.04	1.19	910	
3	53	54	TOWER D	169903	141868	425603	35467	461070	1411535	187605	21.67	36	300	320	0.08	70.30	0.76	0.31	0.39	0.88	0.673	OK	0.45	0.45	-0.74	-0.82	0.00	1.19	1.27	910
4	54	55	TOWER E.F	344060	292451	877353	73113	950466	187605	2823071	32.67	38	300	320	0.12	70.30	0.76	0.46	0.88	0.98	0.749	OK	0.45	0.45	-0.82	-0.94	0.00	1.27	1.39	910
5	55	56					0	0	2823071	2823071	32.67	49	400	470	0.10	124.93	0.76	0.26	0.35	0.84	0.642	OK	0.45	0.45	-0.94	-1.04	0.00	1.39	1.49	910
6	56	57					0	0	2823071	2823071	32.67	52	400	470	0.11	124.93	0.76	0.26	0.35	0.84	0.642	OK	0.45	0.45	-1.04	-1.15	0.00	1.49	1.60	910
7	57	517					0	0	2823071	2823071	32.67	31	600	470	0.06	124.93	0.76	0.26	0.35	0.84	0.642	OK	0.45	0.45	-1.15	-1.22	0.00	1.60	1.67	910
8	58	59	CLUB BUILDING	29600	25160	75480	6290	81770	0	81770	0.95	58	300	300	0.19	72.61	0.79	0.01	0.07	0.30	0.327	OK	0.45	0.45	-0.45	-0.64	0.00	0.90	1.09	910
9	59	510					0	0	81770	81770	0.95	53	300	300	0.18	72.61	0.79	0.01	0.07	0.30	0.327	OK	0.45	0.45	-0.64	-0.82	0.00	1.09	1.27	910
10	510	511					0	0	81770	81770	0.95	48	400	470	0.10	124.93	0.76	0.01	0.07	0.30	0.329	OK	0.45	0.45	-0.82	-0.94	0.00	1.27	1.39	910
11	511	512					0	0	81770	81770	0.95	31	400	470	0.07	124.93	0.76	0.01	0.07	0.30	0.329	OK	0.45	0.45	-0.83	-1.04	0.00	1.39	1.49	910
12	512	513					0	0	81770	81770	0.95	33	400	470	0.07	124.93	0.76	0.01	0.07	0.30	0.329	OK	0.45	0.45	-1.17	-1.24	0.00	1.60	1.69	910
13	513	514	PRIMARY SCHOOL & EWS	39590	33652	100955	8413	109367	191137	2.21	27	400	470	0.06	124.93	0.76	0.02	0.10	0.40	0.306	OK	0.45	0.45	-1.24	-1.29	0.00	1.69	1.74	1120	
14	514	515	PRIMARY SCHOOL & EWS	39590	33652	100955	8413	109367	306505	3.46	35	400	470	0.07	124.93	0.76	0.03	0.13	0.46	0.352	OK	0.45	0.45	-1.29	-1.67	0.30	1.74	1.82	1120	
15	515	516	PRIMARY SCHOOL & EWS	39590	33652	100955	8413	109367	306505	409872	4.74	48	400	470	0.10	124.93	0.76	0.04	0.15	0.51	0.390	OK	0.45	0.45	-1.67	-1.77	0.00	2.12	2.22	1120
16	516	517					0	0	409872	409872	4.74	51	400	470	0.11	124.93	0.76	0.04	0.15	0.51	0.390	OK	0.45	0.45	-1.77	-1.88	5.69	2.22	7.93	1220
17	517A	517		56640	48144	144432	12036	156468	0	156468	1.81	15	250	250	0.06	48.91	0.77	0.04	0.15	0.51	0.391	OK	0.45	0.45	-7.48	-7.54	0.00	7.93	7.99	1300
17	517	517					0	0	3389411	3389411	39.23	28	400	470	0.06	124.93	0.76	0.31	0.39	0.88	0.673	OK	0.45	0.45	-7.48	-7.54	0.00	7.93	7.99	1320

Riverday Infrastructure Private Limited



Authorized Signatory

Project: SWD Group Housing Sect 69, Gurugram, Haryana

Hydraulic Calculation of Domestic Water Riser

[illegible]

Riverday Infrastructure Private Limited

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Project: SWD Group Housing Sector 69, Gurugram, Haryana

Design Calculation for Drainage Storm Water Pipe

Sl. No.	Node		Pipe	Length of Pipe	Terrace Area		Hard Area		Green Area		Total Area				Total Discharge		Diameter of Pipe	Slope	Velocity	Carrying capacity of Pipe	Check for carrying capacity	Ground Level		Fall in Line	Invert Level		Total drop in Invert as per Ramp slope	Invert Level	Depth		Diameter of manhole
	Start	End			Self M ²	Previous M ²	Self M ²	Previous M ²	Self M ²	Previous M ²	Terrace M ²	Hard M ²	Green M ²	6.25 mm/hr M ³ /S	LPS	Start Mtr.						End Mtr.	Start Mtr.		End Mtr.						
1	ST01	ST02	Circular Pipe	17.50	652.00										0.001	1.019	400	550	0.61	76.99	OK	0.45	0.45	0.032	-0.15			-0.18	0.60	0.63	910.00
2	ST02	ST04	Circular Pipe	50.00		652.00	790.00		485.00						0.002	2.242	400	550	0.61	76.99	OK	0.45	0.45	0.091	-0.18			-0.27	0.63	0.72	910.00
3	ST03	ST04	Circular Pipe	17.50	790.00										0.001	1.234	400	550	0.61	76.99	OK	0.45	0.45	0.032	-0.15			-0.18	0.60	0.63	910.00
4	ST04	ST05	Circular Pipe	29.00		1442.00	490.00	790.00	416.00	485.00					0.004	4.266	400	550	0.61	76.99	OK	0.45	0.45	0.053	-0.27			-0.33	0.72	0.78	910.00
5	ST05	ST06	Circular Pipe	2.00		1442.00				901.00	1442.00	1280.00	901.00		0.004	4.266	400	550	0.61	76.99	OK	0.45	0.45	0.004	-0.33			-0.33	0.78	0.78	910.00
6	ST06	ST08	Circular Pipe	16.00		1442.00		1280.00	103.00	901.00	1442.00	1280.00	1004.00		0.004	4.292	400	550	0.61	76.99	OK	0.45	0.45	0.029	-0.33			-0.36	0.78	0.81	910.00
7	ST07	ST08	Circular Pipe	18.00	525.00						525.00				0.001	0.820	400	550	0.61	76.99	OK	0.45	0.45	0.033	-0.15			-0.18	0.60	0.63	910.00
8	ST08	ST10	Circular Pipe	31.00		1967.00	241.00	1280.00	257.00	1004.00	1967.00	1521.00	1261.00		0.006	5.514	400	550	0.61	76.99	OK	0.45	0.45	0.056	-0.36			-0.41	0.81	0.86	910.00
9	ST09	ST10	Circular Pipe	18.00	1131.00						1131.00				0.002	1.767	400	550	0.61	76.99	OK	0.45	0.45	0.033	-0.15			-0.18	0.60	0.63	910.00
10	ST10	ST12	Circular Pipe	10.00		3098.00	813.00	1521.00		1261.00	3098.00	2334.00	1261.00		0.008	8.411	400	550	0.61	76.99	OK	0.45	0.45	0.018	-0.41			-0.43	0.86	0.88	910.00
11	ST11	ST12	Circular Pipe	59.00					521.00				521.00		0.000	0.136	400	550	0.61	76.99	OK	0.45	0.45	0.107	-0.15			-0.26	0.60	0.71	910.00
12	ST12	ST15	Circular Pipe	14.00		3098.00	157.00	2334.00		1782.00	3098.00	2491.00	1782.00		0.009	8.764	400	550	0.61	76.99	OK	0.45	0.45	0.025	-0.43			-0.46	0.88	0.91	910.00
13	ST13	ST14	Circular Pipe	62.00			523.00		816.00			523.00	816.00		0.001	0.939	400	550	0.61	76.99	OK	0.45	0.45	0.113	-0.15			-0.26	0.60	0.71	910.00
14	ST14A	ST14	Circular Pipe	32.00					178.00				178.00		0.000	0.046	400	550	0.61	76.99	OK	0.45	0.45	0.058	-0.15			-0.21	0.60	0.66	910.00
15	ST14	ST15	Circular Pipe	19.00			523.00		65.00	994.00		523.00	1059.00		0.001	1.002	400	550	0.61	76.99	OK	0.45	0.45	0.035	-0.26			-0.30	0.71	0.75	910.00
16	ST15	ST16	Circular Pipe	73.00		3098.00	441.00	3014.00		2841.00	3098.00	3455.00	2841.00		0.010	10.379	400	550	0.61	76.99	OK	0.45	0.45	0.133	-0.46			-0.59	0.91	1.04	910.00
17	ST16A	ST16	Circular Pipe	43.00					312.00				312.00		0.000	0.081	400	550	0.61	76.99	OK	0.45	0.45	0.078	-0.15			-0.23	0.60	0.68	910.00
18	ST16	ST17	Circular Pipe	20.00		3098.00	673.00	3455.00		3153.00	3098.00	4128.00	3153.00		0.011	11.395	400	550	0.61	76.99	OK	0.45	0.45	0.036	-0.59			-0.63	1.04	1.08	910.00
19	ST17A	ST17	Circular Pipe	20.00					66.00				66.00		0.000	0.017	400	550	0.61	76.99	OK	0.45	0.45	0.036	-0.15			-0.19	0.60	0.64	910.00
20	ST17	ST18	Circular Pipe	2.00		3098.00		4128.00		3219.00	3098.00	4128.00	3219.00		0.011	11.412	400	550	0.61	76.99	OK	0.45	0.45	0.004	-0.63			-0.63	1.08	1.08	910.00
21	ST18	ST19	Circular Pipe	47.00		3098.00	150.00	4128.00		3219.00	3098.00	4278.00	3219.00		0.012	11.621	400	550	0.61	76.99	OK	0.45	0.45	0.085	-0.63			-0.72	1.08	1.17	910.00
22	ST19	ST20	Circular Pipe	39.00	254.00	3098.00	150.00	4278.00		3219.00	3352.00	4428.00	3219.00		0.012	12.226	400	550	0.61	76.99	OK	0.45	0.45	0.071	-0.72			-0.79	1.17	1.24	910.00
23	ST20	ST54	Circular Pipe	23.00	284.00	3352.00	508.00	4428.00		3219.00	3636.00	4936.00	3219.00		0.013	13.375	400	550	0.61	76.99	OK	0.45	0.45	0.042	-0.79			-0.83	1.24	1.28	910.00

Sl. No.	Node		Pipe	Length of Pipe		Terrace Area		Hard Area		Green Area		Total Area				Total Discharge			Diameter of Pipe	Slope	Velocity	Carrying capacity of Pipe	Check for carrying capacity	Ground Level		Fall in Line	Invert Level	Total drop in Invert as per Ramp slope	Depth		Diameter of manhole		
	Start	End		Self	Previous	Self	Previous	Self	Previous	Terrace	Hard	Green	6.25 mm/hr	M³/s	LPS	Start	End	Mtr.						Mtr.	Start				End	Mtr.		Mtr.	Start
24	ST21	ST22	Circular Pipe	40.00				711.00					711.00				0.001	0.988	400	550	0.61	76.99	OK	0.45	0.45	0.073	-0.45		-0.52	0.90	0.97	910.00	
25	ST22	ST24	Circular Pipe	27.50				391.00	711.00				1102.00				0.002	1.531	400	550	0.61	76.99	OK	0.45	0.45	0.050	-0.52		-0.57	0.97	1.02	910.00	
26	ST23	ST24	Circular Pipe	18.00		425.00							425.00				0.001	0.664	400	550	0.61	76.99	OK	0.45	0.45	0.033	-0.15		-0.18	0.60	0.63	910.00	
27	ST24	ST26	Circular Pipe	35.00				425.00	1102.00	572.00			1314.00	572.00			0.003	2.638	400	550	0.61	76.99	OK	0.45	0.73	0.064	-0.57	-0.28	-0.91	1.02	1.64	910.00	
28	ST25	ST26	Circular Pipe	17.00				279.00					532.00	279.00			0.001	1.219	400	550	0.61	76.99	OK	0.73	0.73	0.031	0.13		0.09	0.60	0.63	910.00	
29	ST26	ST27	Circular Pipe	2.00					1593.00				572.00	1593.00			0.004	3.857	400	550	0.61	76.99	OK	0.73	0.73	0.004	-0.91		-0.92	1.64	1.64	910.00	
30	ST27	ST29	Circular Pipe	29.00				957.00	616.00	1593.00	116.00		572.00	2209.00	688.00		0.005	4.743	400	550	0.61	76.99	OK	0.73	0.73	0.053	-0.92		-0.97	1.64	1.69	910.00	
31	ST28	ST29	Circular Pipe	16.00		535.00							535.00				0.001	0.836	400	550	0.61	76.99	OK	0.73	0.73	0.029	0.13		0.10	0.60	0.63	910.00	
32	ST29	ST31	Circular Pipe	31.00				1492.00	144.00	2209.00	256.00		688.00	2353.00	944.00		0.006	5.845	400	550	0.61	76.99	OK	0.73	0.73	0.056	-0.97		-1.02	1.69	1.75	1220.00	
33	ST30	ST31	Circular Pipe	15.00		544.00							544.00	144.00			0.001	1.050	400	550	0.61	76.99	OK	0.73	0.73	0.027	0.13		0.10	0.60	0.63	910.00	
34	ST31	ST32	Circular Pipe	9.00				2036.00	144.00	2497.00	52.00		944.00	2036.00	2641.00		0.007	7.109	400	550	0.61	76.99	OK	0.73	0.73	0.016	-1.02		-1.04	1.75	1.77	1220.00	
35	ST32	ST33	Circular Pipe	2.00				2036.00		2641.00			996.00	2036.00	2641.00		0.007	7.109	400	550	0.61	76.99	OK	0.73	0.73	0.004	-1.04		-1.04	1.77	1.77	1220.00	
36	ST33	ST35	Circular Pipe	22.00				2036.00	230.00	2641.00	64.00		996.00	2036.00	2871.00	1060.00		0.007	7.445	400	550	0.61	76.99	OK	0.73	0.73	0.040	-1.04		-1.08	1.77	1.81	1220.00
37	ST34	ST35	Circular Pipe	15.00		533.00							533.00				0.001	0.833	400	550	0.61	76.99	OK	0.73	0.73	0.027	0.13		0.10	0.60	0.63	910.00	
38	ST35	ST37	Circular Pipe	27.00				2569.00	498.00	2871.00	296.00		1060.00	2569.00	3369.00	1356.00		0.009	9.046	400	550	0.61	76.99	OK	0.73	0.73	0.049	-1.08		-1.13	1.81	1.86	1220.00
39	ST36	ST37	Circular Pipe	14.50		554.00							554.00				0.001	0.866	400	550	0.61	76.99	OK	0.73	0.73	0.026	0.13		0.10	0.60	0.63	910.00	
40	ST37	ST38	Circular Pipe	2.00				3123.00		3369.00			1356.00	3123.00	3369.00	1356.00		0.010	9.912	400	550	0.61	76.99	OK	0.73	0.73	0.004	-1.13		-1.14	1.86	1.86	1220.00
41	ST38	ST40	Circular Pipe	23.00				3123.00	268.00	3369.00	220.00		1356.00	3123.00	3637.00	1576.00		0.010	10.341	400	550	0.61	76.99	OK	0.73	0.73	0.042	-1.14		-1.18	1.86	1.90	1220.00
42	ST39	ST40	Circular Pipe	33.00		801.00				311.00			801.00				0.001	1.333	400	550	0.61	76.99	OK	0.45	0.45	0.060	-0.15		-0.21	0.60	0.66	910.00	
43	ST40	ST41	Circular Pipe	40.50				3924.00	610.00	3637.00	331.00		1887.00	3924.00	4247.00	2218.00		0.013	12.607	400	550	0.61	76.99	OK	0.45	0.45	0.074	-1.18		-1.25	1.63	1.70	910.00
44	ST41	ST42	Circular Pipe	2.00				3924.00		4247.00			2218.00	3924.00	4247.00	2218.00		0.013	12.607	400	550	0.61	76.99	OK	0.45	0.45	0.004	-1.25		-1.26	1.70	1.71	1220.00
45	ST42	ST43	Circular Pipe	17.00				3924.00	100.00	4247.00	46.00		2218.00	3924.00	4347.00	2264.00		0.013	12.758	400	550	0.61	76.99	OK	0.45	0.73	0.031	-1.26	-0.28	-1.56	1.71	2.29	1220.00
46	ST43	ST44	Circular Pipe	37.00				348.00	347.00	4347.00			2264.00	4272.00	4694.00	2264.00		0.014	13.784	400	550	0.61	76.99	OK	0.73	0.73	0.067	-1.56		-1.63	2.29	2.35	1220.00
47	ST44	ST48	Circular Pipe	9.00		175.00	4272.00	98.00	4694.00			2264.00	4447.00	4790.00	2264.00		0.014	14.191	400	550	0.61	76.99	OK	0.73	0.45	0.016	-1.63	0.28	-1.92	2.35	2.37	1520.00	
48	ST45	ST47	Circular Pipe	32.00		175.00							175.00		372.00		0.001	0.790	400	550	0.61	76.99	OK	0.45	0.45	0.058	-0.15		-0.21	0.60	0.66	910.00	

Sl. No.	Node		Pipe	Length of Pipe	Terrace Area		Hard Area		Green Area		Total Area				Total Discharge			Diameter of Pipe	Slope	Velocity	Carrying capacity of Pipe	Check for carrying capacity	Ground Level		Fall in Line	Invert Level	Total drop in Invert as per Ramp slope	Depth			Diameter of manhole	
	Start	End			Self	M ²	Previous	Self	M ²	Previous	Self	M ²	Terrace	Hard	Green	6.25 mm/hr	M ³ /S						LPS	Start				Mtr.	End	Mtr.		Start
49	ST46	ST47	Circular Pipe	30.00		M ²			M ²	306.00			M ²		M ²			0.000	0.080	400	550	0.61	76.99	OK	0.45	0.45	0.055	-0.15	-0.20	0.60	0.65	910.00
50	ST47	ST48	Circular Pipe	20.00			175.00	558.00	372.00			306.00	175.00	930.00	306.00	0.002	1.645	400	550	0.61	76.99	OK	0.45	0.45	0.036	-0.21	-0.24	0.66	0.69	600.00		
51	ST48	ST49	Circular Pipe	49.00				4622.00	763.00	5720.00			2570.00	4622.00	6483.00	0.017	16.895	400	550	0.61	76.99	OK	0.45	0.45	0.089	-1.92	-2.01	2.37	2.46	1520.00		
52	ST49	ST50	Circular Pipe	2.00			4622.00		6483.00			2570.00	4622.00	6483.00	2570.00	0.017	16.895	400	550	0.61	76.99	OK	0.45	0.73	0.004	-2.01	-2.29	2.46	3.01	1520.00		
53	ST50	ST51	Circular Pipe	62.50			4622.00	947.00	6483.00	542.00	2570.00	4622.00	7430.00	3112.00	0.018	18.352	400	550	0.61	76.99	OK	0.73	0.73	0.114	-2.29	-2.40	3.01	3.13	1520.00			
54	ST51	ST52	Circular Pipe	2.00			4622.00		7430.00			3112.00	4622.00	7430.00	3112.00	0.018	18.352	400	550	0.61	76.99	OK	0.73	0.45	0.004	-2.40	-2.68	3.13	3.13	1520.00		
55	ST52	ST53	Circular Pipe	42.50			4622.00	251.00	7430.00	104.00	3112.00	4873.00	7827.00	3216.00	0.019	19.322	400	550	0.61	76.99	OK	0.45	0.45	0.077	-2.68	-2.76	3.13	3.21	1520.00			
56	ST53	ST54	Circular Pipe	54.00			4873.00	287.00	7827.00		3216.00	5160.00	8001.00	3216.00	0.020	20.013	400	550	0.61	76.99	OK	0.45	0.45	0.098	-2.76	-2.86	3.21	3.31	1520.00			
57	ST54	ST55	Circular Pipe	58.00			8796.00		12937.00		6435.00	8796.00	12937.00	6435.00	0.033	33.388	400	550	0.61	76.99	OK	0.15	0.45	0.105	-2.86	-3.26	3.01	3.71	1520.00			
58	ST55	ST56	Circular Pipe	2.00			8796.00		12937.00		6435.00	8796.00	12937.00	6435.00	0.033	33.388	400	550	0.61	76.99	OK	0.45	0.45	0.004	-3.26	-3.27	3.71	3.72	1520.00			
59	ST56	ST57	Circular Pipe	67.00			8796.00		12937.00		6435.00	8796.00	12937.00	6435.00	0.033	33.388	400	550	0.61	76.99	OK	0.45	0.45	0.122	-3.27	-3.39	3.72	3.84	1520.00			
60	ST57	External	Circular Pipe	5.00			8796.00		12937.00		6435.00	8796.00	12937.00	6435.00	0.033	33.388	400	550	0.61	76.99	OK	0.45	0.45	0.009	-3.39	-3.40	3.84	3.85	1520.00			
61	ST58	ST59	Circular Pipe	33.00			273.00		316.00	99.00		273.00	316.00	99.00	0.001	0.891	400	550	0.61	76.99	OK	0.45	0.45	0.060	-0.15	-0.21	0.60	0.66	910.00			
62	ST59	ST60	Circular Pipe	48.00			273.00		316.00	116.00	99.00	433.00	643.00	215.00	0.002	1.626	400	550	0.61	76.99	OK	0.45	0.45	0.087	-0.21	-0.30	0.66	0.75	910.00			
63	ST60	ST61	Circular Pipe	89.00			433.00		643.00		215.00	433.00	643.00	215.00	0.002	1.626	400	550	0.61	76.99	OK	0.45	0.45	0.162	-0.30	-0.46	0.75	0.91	910.00			
64	ST61	ST62	Circular Pipe	119.00			433.00		643.00	118.00	215.00	593.00	950.00	333.00	0.002	2.333	400	550	0.61	76.99	OK	0.45	0.45	0.216	-0.46	-0.68	0.91	1.13	910.00			
65	ST62	External	Circular Pipe	5.00			593.00		950.00		333.00	593.00	950.00	333.00	0.002	2.333	400	550	0.61	76.99	OK	0.45	0.45	0.009	-0.68	-0.68	1.13	1.13	910.00			

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Domestic Water Measurement Sheet

S. No.	Line		Proposed line dia.	Length of Pipe	Dia of pipe						
	From	To	MM	Mtr	32mm	40mm	50mm	65mm	80mm	100mm	150mm
1	D-01	D-03	80	39	-	-	-	-	39	-	-
2	D-02	D-03	80	15	-	-	-	-	15	-	-
3	D-03	D-05	100	39	-	-	-	-	-	39	-
4	D-04	D-05	80	15	-	-	-	-	15	-	-
5	D-05	D-07	100	47	-	-	-	-	-	47	-
6	D-06	D-07	80	15	-	-	-	-	15	-	-
7	D-07	D-09	100	30	-	-	-	-	-	30	-
8	D-08	D-09	80	15	-	-	-	-	15	-	-
9	D-09	D-11	150	34	-	-	-	-	-	-	34
10	D-10	D-11	80	15	-	-	-	-	15	-	-
11	D-11	D-15	150	6	-	-	-	-	-	-	6
12	D-12	D-14	50	70	-	-	70	-	-	-	-
13	D-13	D-14	65	56	-	-	-	56	-	-	-
14	D-14	D-15	80	136	-	-	-	-	136	-	-
15	D-15	D-17	150	28	-	-	-	-	-	-	28
16	D-16	D-17	50	17	-	-	17	-	-	-	-
17	D-17	UGT	150	10	-	-	-	-	-	-	10
TOTAL				587	0	0	87	56	250	116	78

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Hydraulic Calculation of Flushing Water Riser

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Project: SWD Group Housing Sect 69, Gurugram, Haryana

Flushing Water Measurement Sheet

S. No.	Line		Proposed line dia.	Length of Pipe Mtr	Dia of pipe							
	From	To	MM		25mm	32mm	40mm	50mm	65mm	80mm	100mm	150mm
1	D-01	D-03	50	39	-	-	-	39	-	-	-	-
2	D-02	D-03	50	15	-	-	-	15	-	-	-	-
3	D-03	D-05	65	39	-	-	-	-	39	-	-	-
4	D-04	D-05	50	15	-	-	-	15	-	-	-	-
5	D-05	D-07	65	47	-	-	-	-	47	-	-	-
6	D-06	D-07	50	15	-	-	-	15	-	-	-	-
7	D-07	D-09	80	30	-	-	-	-	-	30	-	-
8	D-08	D-09	50	15	-	-	-	15	-	-	-	-
9	D-09	D-11	80	34	-	-	-	-	-	34	-	-
10	D-10	D-11	50	15	-	-	-	15	-	-	-	-
11	D-11	D-13	80	6	-	-	-	-	-	6	-	-
12	D-12	D-13	40	56	-	-	56	-	-	-	-	-
13	D-13	D-15	100	136	-	-	-	-	-	-	136	-
14	D-14	D-15	40	57	-	-	57	-	-	-	-	-
15	D-15	D-16	150	25	-	-	-	-	-	-	-	25
16	D-16	STP	150	20	-	-	-	-	-	-	-	20
TOTAL				564	0	0	113	114	86	70	136	45

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