

SUBJECT: CALCULATIONS FOR INFILTRATION STRUCTURES

S. NO.	DESCRIPTION	DETAILS	UNITS
1	<u>For Roof/Terrace only</u>		
(i)	Average Runoff co-efficient for terraces and other built-up areas.	0.9	
(ii)	Area-1 considered (For Terrace/Roof Only)	1,567	m ²
(iii)	One Hour Intensity of rainfall considered (Peak)	30	mm/hour
(iv)	Infiltration well capacity design period	30	minutes
(v)	Net run off for which holding is required for infiltration	30	mm
(vi)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.9 x 0.030 x Well Design Period) ----- (A)	21.15	m ³
2	<u>For Paved/Road Area</u>		
(i)	Average Runoff co-efficient for landscaped, green and other open areas.	0.65	
(ii)	Area-2 considered	5,938	m ²
(iii)	One Hour Intensity of rainfall considered (Peak)	30	mm/hour
(iv)	Infiltration well capacity design period	30	Minutes
(v)	Net run off percent area for which holding is required for infiltration	30	mm
(vi)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.65 x 0.030 x Well Design Period) ----- (B)	57.90	m ³
3	<u>For landscaped, greens and other open areas</u>		
(i)	Average Runoff co-efficient for landscaped, green and other open areas.	0.2	
(ii)	Area-2 considered	2,500	m ²
(iii)	One Hour Intensity of rainfall considered (Peak)	30	mm/hour
(iv)	Infiltration well capacity design period	30	Minutes
(v)	Net run off percent area for which holding is required for infiltration	30	mm
(vi)	Theoretical Volume of Infiltration Wells required. Approximately (Total Area x 0.25 x 0.030 x Well Design Period) ----- (C)	7.50	m ³
	<u>Design of Infiltration Wells</u>		
(i)	Total Volume of Infiltration Wells Required (A+B+C)	86.55	m ³
(ii)	Dimensions of One Infiltration Well	5.0 m X 1.5 m & 3.5m Effective Depth	m ³
(iii)	Volume of One Well	26.25	
(iv)	Thus, no of Infiltrations Well Required	3.297	
(v)	No. of Infiltration Wells Provided	4	

Note : The no. of Harvesting Pits and their sizes may change, depending upon the actual Site plan Storm water layouts and various other constraints. However, in all cases, the total volume of the Infiltration Wells shall remain the same.

SUBJECT: RAINWATER HARVESTING POTENTIAL
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Sl. No.	Description	Area Considered (in m ²)	Total Annual Rainfall Considered (mm)	Harvesting Surface Run off coefficient	Total Volume of rain water available for Harvesting (m ³)
1	Water Available from Terraces and other roof-top surfaces	1 567	616	0.90	869
2	Paved Surfaces, Roads & other Built-Up Areas	5 938	616	0.65	2 378
3	Lawns, Gardens & all other Horticultural Areas	2 500	616	0.20	308
	TOTAL (in m³)	10 005			3 554
	SAY in ML Per year				4

1.14 Brief for Major Equipment

1.14.1 Pumps

Pumps shall be vertical, centrifugal directly coupled to motor. Provision of pump with pump head & base of cast iron and other parts in SS 304 shall be made. Impeller shall be hydraulically balanced and keyed to shaft. Pump base shall be mounted on a concrete foundation, projecting at least 15 CM above finished floor level. The pumps base shall be set on vibration elimination pad. The pump shall be lubricated in strict accordance with the manufacturer's instructions and shall be factory aligned prior to shipment. All motors and bases shall be painted with approved finish shop coat of paint. The pump shall be selected for the lowest operating noise level and shall be complete with flexible connections, valves, and pressure gauges.

1.14.2 Piping Materials

Following Pipe materials shall be used for various applications :

Use	Location	Material	Code
Water Supply	Inside Toilet	cPVC SDR-11	ASTM D-2846
Water Supply	Pump Room, Inside shaft, Terrace, basement	GI Class 'C'	IS: 1239
Water Supply	External	HDPE	IS: 4984
Municipal Water Supply	External	HDPE	IS: 4984

Garden Hydrants	External	uPVC Pressure threaded	ASTM D-1785
Soil, Waste, Vent	Basement Ceiling	PP	EN:12056
Rainwater	Basement Ceiling	PP	EN:12056
Soil, Waste, Vent	Vertical	uPVC SWR	IS: 13592
Rainwater	Vertical	uPVC Class-III	IS: 4985
Soil, Waste	Inside Toilet	uPVC Class-III	IS: 4985
Drainage, Sewage Sump Risers	Basements	GI Class 'C'	IS: 1239
Sewerage	External	Stoneware (SW)	IS: 651
Storm	External	RCC 'NP2'	IS:458

Contractor shall provide all sleeves, openings, hangers, inserts shall be provided during the construction by making such provisions in the structure as necessary.

All pipes clamps, supports and hangers shall be galvanized. Factory made prefabricated clamps shall be preferred. Contractor may fabricate the clamps of special nature and galvanize them after fabrication but before installation. All nuts, bolts, washers and other fasteners shall be factory galvanized.

1.14.3 Valves

All valves (gate, globe, check, safety) shall be of Stainless Steel suitable for the particular service as specified. All valves shall be of the particular duty and design as specified. Valves shall either be of screwed type or flanged type, as specified, with suitable flanges and non-corrosive bolts and gaskets. Tail pieces as required shall be supplied along with valves. Gate, globe and check valves shall conform to ASTM specifications.

Sluice valves, where specified shall be flanged sluice valves of cast iron body. The spindle, valve seat and wedge nuts shall be gunmetal. They shall generally have non-rising spindle and shall be of the particular duty and design as specified. The valves shall be supplied with suitable flanges, non-corrosive bolts and gaskets.

Ball valves with floats to be fixed in storage tanks shall consist of cast brass lever arm having copper balls (26 SWG) screwed to the arm integrally. The copper ball shall have bronze welded seams. The closing/ opening mechanism incorporating the piston and cylinder shall be non-corrosive metal and include washers. The size and construction of ball valves and float shall be suitable for desired working pressure operating the supply system. Where called for brass valves shall be supplied with brass hexagonal back nuts to secure them to the tanks and a socket to connect to supply pipe.

S. No.	Type of Valve	Size	Construction	Ends
a.	Isolating Valve	15 mm to 50 mm 65 mm and above	Gun Metal Gun Metal	Screwed Flanged
b.	Sluice Valve & Butterfly Valve	65 mm and above	Cast Iron	Flanged
c.	G.M. non return valve	15 mm to 50 mm 65 mm above	Gun Metal Gun Metal	Screwed Flanged
d.	Flap Type – Non return valve	65 mm and above	Cast Iron	Flanged

All valves shall be suitable for the working pressure involved.

Pressure Reducing Valve Set

Each pressure reducing valve set shall be complete with pressure reducing or pressure regulating valve, isolating valves, pressure gauges on inlet and outlet, pressure relief valve on outlet and filter on inlet.

Each pressure reducing valve shall contain loading neoprene diaphragm and a full floating, self-aligning, ignition resistant seat and shall be of the single stage, pressure reduction type with provision for manually adjusting the delivery pressure. The valve shall be failed safe to the lowest pressure.

Valves shall be capable of operating and maintaining automatically the respective delivery pressure and flow rates as indicated and shall not be liable to creep. Valves shall also be capable of maintaining the pre-set downstream pressure under static condition.

The filter on each inlet to a pressure reducing valve shall be of replaceable porous sintered metal type.

Pressure Gauge

The pressure gauge shall be constructed of die cast aluminium and stove enameled. It shall be weather proof with an IP 55 enclosure. It shall be stainless steel Burden tube type pressure gauge with a scale range from 0 to 16 Kg/ cm square. Each pressure gauge shall have a siphon tube connection. The shut off arrangement shall be by Ball Valve.

1.15 Power Requirement for Plumbing & Drainage System

S. No.	Description	Power Requirement (KW)
1.	Filter Feed Pump (1W+1S)	3.75
2.	Domestic OHT filling Skid Mounted Hydro-pneumatic pump – All Towers (2W+1S)	11.2
3.	Terrace Booster Sets – All Towers (2W+2S)	3
4.	Pool Make-up Pump (1W+1S)	0.75
5.	Basement Sump Pump (10W)	22.4
6.	Tubewell Pump (2W+1S)	4.5
7.	STP - 200 KLD	35
	TOTAL	80.6 KW