

Design Of Water Distribution System

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The objectives of the water supply system are :

1. To provide whole some water to the consumers for drinking purpose.
2. To supply adequate quantity to meet at least the minimum needs of the individuals
3. To make adequate provisions for emergencies like fire fighting, festivals, meeting etc
4. To make provision for future demands due to increase in population, increase in standard of living, storage and conveyance Water Supply Engineering
5. To prevent pollution of water at source, storage and conveyance.
6. To maintain the treatment units and distribution system in good condition with adequate staff and materials
7. To design and maintain the system that is economical and reliable.

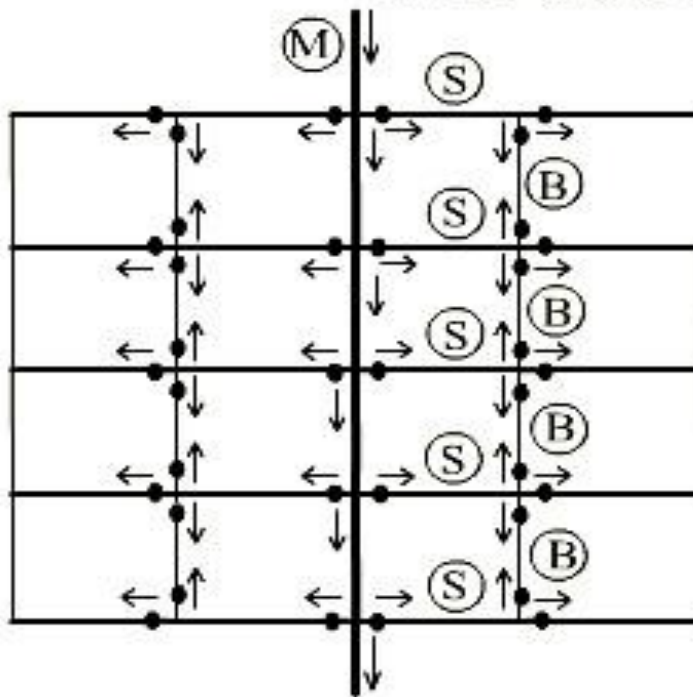
Layouts of Distribution Networks

The distribution pipes are generally laid below the road pavements and as such their layouts will generally follow the layouts of the roads .There are 4 different types of pipe networks.

1. Dead end system
2. **Grid iron system**
3. Ring system
4. Radial system

Grid Iron System

Grid-iron System



- Ⓜ : Main Pipe
- ⓑ : Branch
- Ⓢ : Sub Mains
- : Cut off Valves

Grid Iron System

In this system, the mains, sub mains and branches are all inter connected with each other. In fact, in a well planned city or a town, the roads are generally developed in a grid-iron pattern, and the pipe lines in such places can follow them easily.

Advantages

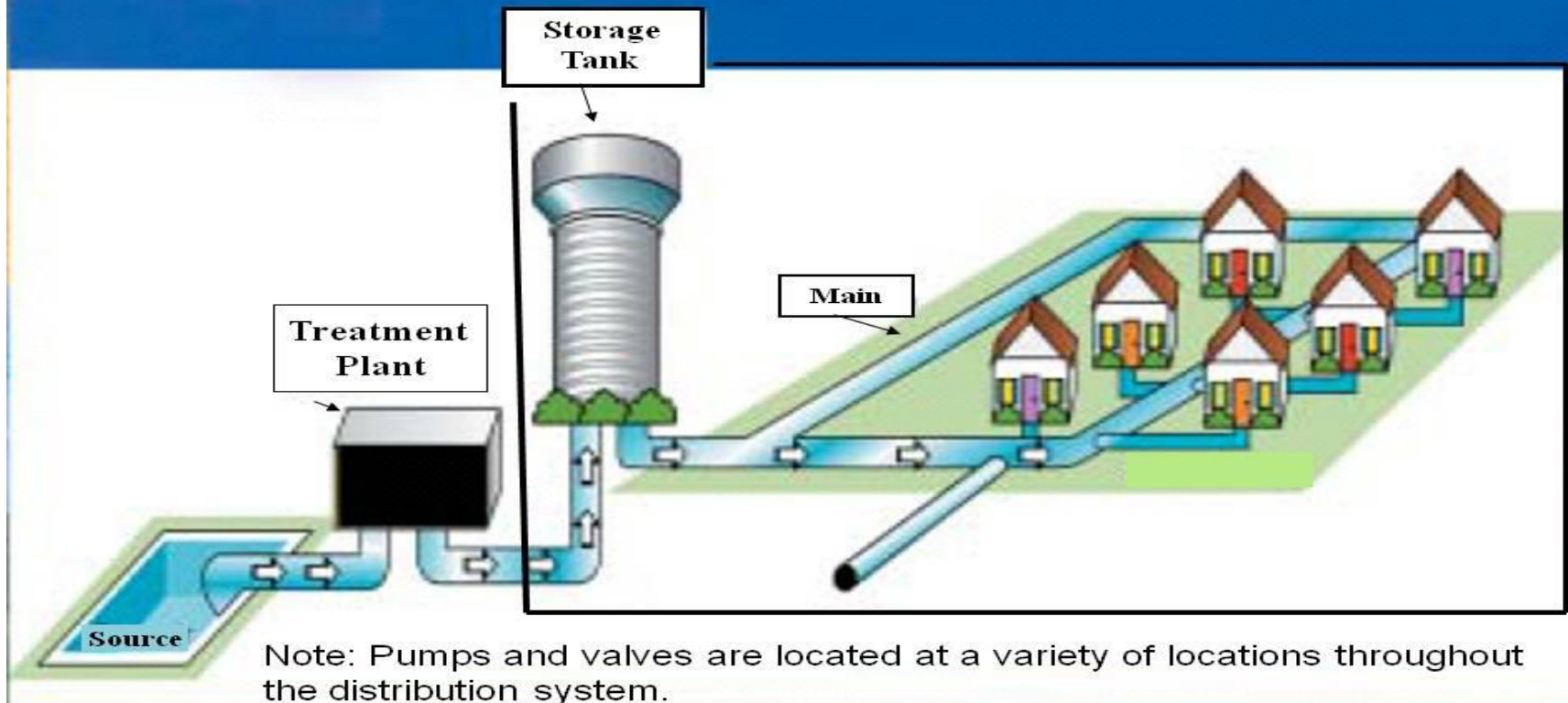
- In case of repairs
- Water remains in continuous circulation
- Less frictional loss

Methods Of Distribution

1. Gravitational system
2. Pumping system
3. **Combined gravity and pumping system**

Combined Gravity and Pumping System

Water Supply Distribution System



Advantages of Combined Gravity and Pumping Systems

This type of system is invariably and almost universally adopted because of its following **advantages** :

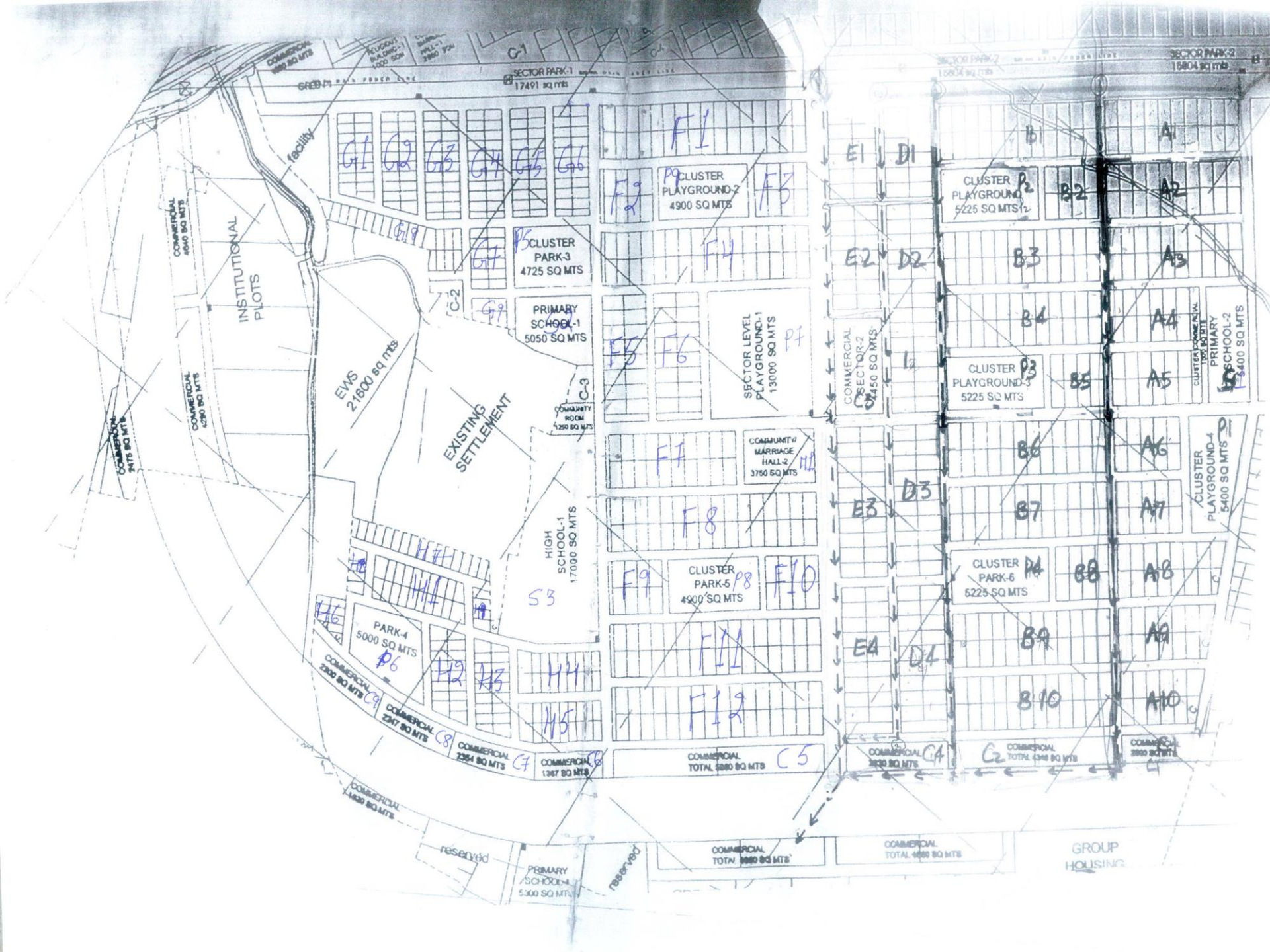
- Distribution reservoir can be supplied to the places of fire
- Reliable even during power failure or pumps failure
- Cheap, efficient and reliable

Minimum Domestic Water Consumption as per IS 1172-1993

Use	Consumption in litres per head per day(l/h/d)
Drinking	5
Cooking	5
Bathing	75
Washing of clothes	25
Washing of utensils	15
Washing and cleaning of houses and residences	15
Lawn watering and gardening	45
Flushing of water closets ,etc.	

Water requirements of Individual institutions and commercial Establishments

S.No.	Type of Institution or Commercial Establishment	Average Water Consumption in litres/head/day
1.	Offices	45-90
2.	Factories	
	(a) Where bath rooms are provided	45-90
	(b) Where no bath rooms are provided	30-60
3.	Schools	
	(a)Day scholars	45-90
	(b)residential	135-225



Calculation of demand of water

- Population of HIG flats
- Population of LIG flats
- Commercial Sector
- Per Capita Demand

1. No. of Flats(HIG)

Blocks	No. of plots
A1	20
A2	20
A3	20
A4	14
A5	14
A6	10
A7	10
A8	16
A9	14
A10	12
B1	24
B2	08
B3	24
B4	24
B5	08
B6	24
B7	24
B8	08
B9	24
B10	24

Blocks	No. of Flats
D1	12
D2	28
D3	20
D4	20
E1	12
E2	14
E3	20
E4	20
F1	32
F2	08
F3	08
F4	32
F5	16
F6	16
F7	20
F8	32
F9	08
F10	08
F11	32
F12	32

- Total No. of HIG flats = 732
- Total No. of person= $732 \times 08(4 \text{ G.F.} + 4 \text{ F.F.})$
=5856 Nos

1. No. of Flats(LIG)

Blocks	No. of plots
G1	18
G2	20
G3	22
G4	22
G5	22
G6	22
G7	12
G8	20
G9	04
H1	20
H2	16
H3	18
H4	18
H5	18
H6	08
H7	16
H8	04
H9	04

- Total number of LIG Flats=292 flats
- $292 \times 08 = 2336$ Nos
- Hence $HIG + LIG = (5856 + 2336) = 7892$

2. Commercial Sectors

Blocks	Area(in metre square)
C1	2800
C2	4500
C3	4450
C4	2800
C5	5800
C6	1367
C7	2354
C8	2247
C9	2300
TOTAL	28618

- Assuming commercial sectors 2 storeyed (Ground Floor and First Floor)
- Assuming population density at G.F. are 10 SQ MTS per person & 20 SQ MTS per person at first floor.
- $G.F. = 28618/10 = 2862$
- $F.F. = 28618/20 = 1430$
- **Total** 4292 No. of person

School Buildings

- 2 Primary school (Area 5050 SQ MTS)
- 1 High school (Area 17000 SQ MTS)
- Assuming **500** persons for primary school and **1000** person for High School
- TOTAL 2000 Nos

Per Capita Demand

Area	Demand (lpcd)	Person	Total Demand
Residential	200	7892	1578.4 kld
Commercial	50	4292	214.6 kld
School	50	2000	100 kld
Total			1893 kld



THANK YOU :)