

**3.3 Plumbing and Fire Fighting System**

S. No.	Description	EWS
1)	<b>Internal</b>	
a)	Water Supply	CPVC
b)	Soil, Waste, Rain Water	uPVC
2)	<b>Shafts</b>	
a)	Water Supply	CPVC
b)	Soil, Waste Water	uPVC
c)	Rain Water	uPVC
3)	Storm Water (External)	RCC
4)	Sewerage (External)	Stoneware
5)	Water Distribution (External)	GI
6)	Rain water harvesting	Considered
7)	Hot water pipe insulation	Not Provided
8)	Flushing Water (Recycled)	Not Considered
9)	Sanitary Fixtures & Fittings	As per architect
	<b>Fire Fighting Works</b>	
1)	Pipe	All MS 'C' Class
2)	Fire Extinguisher	Water/ Chemical type
3)	Pipe joint	Welding

## **SECTION-2: ELECTRICAL SYSTEM**

### **2.1 STATUTORY REQUIREMENTS:**

**2.1.1 Maximum voltage drop** Design of complete distribution system shall be such that maximum voltage drop at the farthest point from the Transformer shall be restricted to 5%, which is in compliance with the Indian Electricity Rules.

#### **2.1.2 Metering**

Single point bulk metering is allowed if group residents have no objection to same.

### **2.2 DESIGN BASIS:**

**2.2.1** Electrical load Calculations for the entire building is Given in Annexure

#### **2.2.1.1 HT Supply (11 KV supply)**

**2.2.1.2** It is proposed to have one combined connection of 11 KV HT supply for LIG and EWS from main campus

#### **2.2.1.3 Substation (11 KV Substation)**

- 1 Nos. Unitized Sub-stations of 1600KVA is proposed to be installed for both EWS and LIG using OilType 11 KV/0.433 KV Transformers with OFF Load Tap Changer.

#### **2.2.1.4 Emergency Power Supply**

No Emergency power is envisaged as guided by client.

### **2.3 M.V. SWITCHGEAR**

#### **2.3.1 Main LT Panel:**

The L.T. Panels shall be provided with adequate size of ACBs / MCCBs.

The bus bars of the panel shall be made of aluminum strips and the panel shall be in compartmentalized design.

The Main LT panel shall be located on the ground near USS for each area. Panel shall be suitable for 415V, 50Hz, 3 phase 4 wire system having fault level of 50 KA.

#### **2.3.2 Distribution:**

- The electric supply from the LT panel shall be distributed to actual load through suitable sized 415V, 50Hz, 3-phase, 4-wire, 1.1 kV grade XLPE power Cables
- Connection between LT Panel & meter boards shall be through suitable sized 415V, 50Hz, 3-phase, 4-wire, 1.1 kV grade XLPE power cables.

- Individual Factory made MCB Distribution Boards shall be provided at each unit
- The Distribution Boards shall be connected through Sub-mains of Copper wires in concealed/surface PVC conduits.
- Cable trays shall be MS painted (ladder/perforated type) to be used in LT panel Room and Meter Room.

### **2.3.3 METERING**

#### **2.3.3.1 HT Metering**

It is proposed to opt for single bulk connection of 11 KV each from main substation of wave city center.

#### **2.3.3.2 LT Metering**

It is proposed to opt for LT supply to each individual apartment owner will be metered and charged to consumer at unit rate by state electricity board. These meters shall be single source digital type, installed at Meter Room.

### **2.4 POWER FACTOR IMPROVEMENT:**

#### **2.4.1 Power Factors Correction System:**

The power factor shall be maintained around 0.9.

### **2.5 LIGHTING:**

Lighting shall be as per the drawings given by Architect. For common areas light density of 1.5W/sq.ft is proposed for design purpose and for parking area 0.5W/sq.ft.

Lighting for common areas like Staircases, Lobbies, Electromechanical spaces will be designed based on interiors requirement preference would be given to energy saving fixtures like CFLs/T5 /LED fixtures.

Lux Level requirement for various areas as per National Building Code Clause No. 4.1.3 and 4.1.3.2 (Table-3):

<b>Area</b>	<b>Lux Level as per NBC</b>	<b>Lux Level considered</b>
Corridor	50-100-150 Lux	100 Lux
Staircase	50-100-150 Lux	100 Lux
Bed rooms	30-50-100 Lux	150 Lux
Substation / Plant Room	100-150-200 Lux	150 Lux

### **2.6 LANDSCAPE LIGHTING:**

Landscape Lighting shall be as per Landscape consultant design.

## 2.7 EARTHING & LIGHTNING PROTECTION

### 2.7.1 Earthing:

Earthing system shall be provided in accordance with Indian Standards IS-3043-1987 and other statutory regulations.

The earthing system shall be so designed that the resistance of the earthing network shall be less than 1.0 ohm at any point of the system.

All the Cable Trays shall be provided with suitable size of 2 Nos.GI strip in full length.

Separate earthing grid shall be provided for the earthing of Panels, and earthing of Telephone System.

The proposed Earthing System can be divided into three sections:

1. Sub Station Equipments:
  - a) Transformer Neutral Earthing - Copper Earthing
  - b) USS body Earthing - G.I. Earthing
2. a) L.T. panels Earthing (Body) - G.I. Earthing
- b) Distribution boards Earthing - G.I. Earthing
- c) Equipment Earthing (UPS/EPABX) - G.I. / Copper Earthing
3. Lighting/Power Point circuits - Copper Wire Earthing

## 2.8 VOICE (TELE-COMMUNICATION SYSTEM)

2.8.1 One telephone point in, Living/Dining Room of LIG unit Wiring upto & within the LV shaft is included. No telephone is provided for EWS

2.8.2 EPABX with requisite lines shall be provided by P & T / Service provider. Incoming connectivity to EPABX & connectivity from EPABX to each floor to be done by service provider.

## 2.9 CABLE TV SYSTEM

2.9.1 No Central TV system is considered. Wiring and conduiting upto LV shaft will be made to provide Cable TV signal to each user. However high side equipment shall be provided by service provider.

2.9.2 One TV point each in Living room of LIG unit Wiring upto & within the LV shaft is included. No TV is provided for EWS is considered.

### **SECTION-3: PLUMBING SYSTEM**

#### **3.1 PLUMBING SYSTEM**

##### **3.1.1 Basis for Estimation of Daily water demand**

Daily water requirement for the proposed Group Housing Complex is based on National Building Code Part IX Plumbing Services Section I Water Supply. As mentioned under clause 5.1 page 6 water supply for residences as 135 liters per head per day for houses for Lower Income Group (LIG) and Economically Weaker Sections of Society (EWS) the minimum water supply of 135 liters per head per day is to be assured together with a full flushing system.

Flushing requirement as mentioned in clause 5.1.1 page 6 is that out of the 135 45 liters per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.

##### **NBC CODE 2005:**

For EWS water requirement = 135 liters per head per day.

Flushing requirement = 45 liters per head per day  
(For daily water demand calculations refer Annexure)

##### **3.1.2 Water Sources**

Present source of water is mainly assumed from main Wave City campus

##### **3.1.3 Water Storage Analysis**

The underground water storage capacity is designed on one day demand basis and half day storage in overhead tank. (Refer Annexure)

##### **3.1.4 Water Treatment & Distribution : IT is assumed to get treated water from wave city campus**

##### **3.1.5 Water supply ( external )is proposed to be of GI, however HDPE can also be used being corrosion free with an extra cost of 15 -20%.**

##### **3.1.5 Waste Water Management and Recycling**

. It has been assumed that about 80% of the domestic water supply shall find its way into the proposed sewer. Sewer lines shall be laid to a gradient maintaining self cleaning velocity. Necessary provision for laying S.W/RCC pipe sewer line, construction of required number of manholes etc., have been made.

The sewage & domestic waste is proposed to be connected to external sewage line which will be connected to STP of main Wave city Campus.

The recycled treated water from STP is proposed to be used for EWS and LIG irrigation

### **3.1.6 Drainage System**

#### **3.1.6.1 Rain Water Disposal (Internal)**

Rain Water from the various roofs will be drained through rains water vertical down take UPVC pipes. These vertical down take pipes will be located at suitable locations in side the shafts or embedded in side the wall. All the terraces will be sloped in a slope, slopping towards down vertical pipes. Rain Water khurras of suitable size with MS/CI grating shall be provided at roof with each rain water vertical down take.

Rain water disposal shall be designed as per NBC.

All rain water vertical pipes will be discharged to ground through piping network at Ground level. At the site plan level rain water will be discharged to recharge wells for harvesting. Oil & grease filter before the recharge well is proposed.

The material of the vertical water pipes and fittings shall be UPVC pipe conforming to IS: 4985 of class 3 (6 kg/cm<sub>2</sub>).

#### **3.1.6.2 RAIN WATER DISPOSAL (EXTERNAL):**

##### **a) Rain Water Catchments:**

It is proposed to provide underground piping network connected for the catch basins located in paved areas for catchments of rain water. The rain water in the landscaped areas will be absorbed by the soil & percolate to ground. For excess water in the landscape area a surface runoff system connected to the piping network shall be planned.

##### **b) Rain Water Disposal:**

Rain water channelised from all the sources shall be disposed of in either of the following ways:

##### **c) Soak Wells (Rain Water Harvesting):**

The rain water shall be discharged into the soak wells for absorption & recharging the ground water.

**FIRE FIGHTING SYSTEMS**

Fire fighting installations is proposed building as per NBC Part-IV.

The proposed building types of occupancy "Apartment Houses, A-4" less than 15

Meter for EWS and less than 35 meter for LIG

Type of building	Fire Extinguishers	Hose Reel	Down come r	Yard Hydrant	Automatic Sprinkler System	Manually Operating Electric Fire alarm System	Automatic detection and alarm system	Under-ground Static Water Storage Tank	Terrace Tank	Terrace Pump
EWS	R	R	NR	NR	NR	NR	NR	NR	R (5KL)	450 LPM
LIG	R	R	R	NR	NR	R	NR	NR	R (25KL)	900 LPM

Note:-1 'R' stands for Required  
2 'NR' stands for Not Required

**SECTION-: 4.0****4.1 Electrical Load****4.1.1 ANNEXURE-1: ELECTRICAL LOAD DETAIL For EWS**

S. No.	Description	Units	Load (KW)		D.F.	Max. Demand	
			Unit	Total		Unit	Total
1	EWS	576	1.3	576	0.7	.9	518.4
22	Plumbing	Lot	45	45	0.7	31.5	31.5
25	External Lighting & Landscaping	Lot	20	20	1	20	20
	<b>Total</b>						<b>570</b>

**4.1.2 ANNEXURE-2: ELECTRICAL LOAD DETAIL For LIG**

S. No.	Description	Units	Load (KW)		D.F.	Max. Demand	
			Unit	Total		Unit	Total
1	LIG	500	2.5	1250	0.7	1.75	875
22	Plumbing	Lot	45	45	0.7	31.5	31.5
25	External Lighting & Landscaping	Lot	20	20	1	20	20
	<b>Total</b>						<b>926.5</b>

**Total load=1496.5 KW**

**Taking overall div 0.9,pf 0.9 and loading 90% transformer rating=1663KVA**

**USS CAPACITY**

**1600KVA**



## 4.2 ANNEXURE-3: WATER DEMAND CALCULATIONS

### 4.2.1 Water Requirement

S. No	Type of Building	Number of bldgs	Number of Units	Occupancy persons @ 5 person /units	Water Demand 135 LPD @ person
a	EWS	8	576	2880	388800
b	LIG	2	500	2500	337500
	<b>TOTAL</b>		<b>1076</b>	<b>5380</b>	<b>726300</b>

S. No	Type of Building	Number of bldgs	Number of Units	Occupancy persons @ 5 person /units	Water Demand 135 LPD @ person	Irrigation Per day (Ltr.)
a)	For Irrigation 25000 Ltr. @ Acre		4.67		116750	116750
	<b>TOTAL</b>					<b>116750</b>

**4.2.2 Over Head Tank Details**

S. No	Type of Building	Each Domestic Tanks Capacity In KL
a)	EWS	24
b)	LIG	25+2x35

**Total water requirement**

S. No	Type of Building	Total Capacity In KL
a)	EWS	400
b)	LIG	350
c)	irrigation	100

**Capacity of fire tanks**

S. No	Type of Building	Total Capacity In KL
a)	EWS	5KL
b)	LIG	25KL