1

Brief Planning of Building Services

Proper planning of services has to be done carefully not only from safety point of view but in a manner that these confirm to local byelaws, etc. so that there is no difficulty later on in getting occupancy certificate etc. Water, electricity and telephones supply will also be not given if corresponding installations are not confirming to local byelaws. The codes, mannual, rules and regulation given in Appendix 'A' should be kept in view while planning services in high rise buildings.

The various codes and mannuals not only issue guidelines based on experience of various institutions but restricts on the temptations of builders for going into cheaper designs which may not be safe from consumers angles. Since most of the residents are not owners of the building they have no alternative but to use the service as may be provided by owner's /builders whether it is safe or unsafe, commensurate or obsolete. In this chapter a general outline of planning of various building services in a building/campus is given which should be known to all architects and electrical engineers and town planners for planning other services as services are inter dependents on each other. The planner of each service demands maximum possible space for services belonging to his category whereas it may not be possible to provide that much space or share in total costs for that particular service. Therefore a compromise is necessary which can be arrived at only when the design parameter is clearly understood by all planners.

1.1. Classification of Buildings based on Occupancy (As per N.B.C.)

General Classification. All buildings are classified according to the use or the character of occupancy in one of the following groups :

Group 'A' Residential.

Group 'B' Educational.

Group 'C' Institutional.

Group 'D' Assembly.

Group 'E' Business.

Group 'F' Mercantile.

Group 'G' Industrial.

Group 'H' Storage.

Group 'J' Hazardous.

1.1.1. Group 'A' Residential Building

These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dinning or both facilities, except any building classified under Group C.

Building structures under group A shall be further subdivided as follows :

A-1 Lodging or rooming houses.

A-2 One or two family private dwellings.

A-3 Dormitories.

A-4 Apartment houses (flats).

A-5 Hotels.

(*a*) *Sub-division A-1 : Lodging or Rooming Houses.* These shall include any building or group of buildings under the same management in which separate sleeping accommodation for a total of not more than 15 persons, on either transient or permanent basis, with or without dining facilities but without cooking facilities for individual is provided.

A lodging or rooming house shall be classified as a dwelling in sub-division A-2 if no room in any of its private dwelling units is rented to more then three persons.

(*b*) *Sub-division A-2 : One or two family private dwellings.* These shall include any private dwelling which is occupied by members of a single family and has a total sleeping accommodation for not more than 20 persons.

If rooms in a private dwelling are rented to outsiders these shall be for accommodating not more than 3 persons.

If sleeping accommodation for more than 20 persons is provided in any one residential building, it shall be classified as a building in sub-division A-3 or A-4 as the case may be.

(*c*) *Sub-division A-3 : Dormitories :* These shall include any building in which group sleeping accommodation is provided with or without dining facilities for persons who are not members of the same family, in one room or a series of closely associated rooms under joint occupancy and single management for example school and college dormitories students and other hostels and military barracks.

(*d*) *Sub-division A-4 : Apartment Houses (Flats)*. These shall include any building or structure in which living quarters are provided for three or more families living independently of each other and with independent cooking facilities for example apartment houses mansions and chawls.

(*e*) *Sub-division A-5 : Hotels.* These shall include any building or group of buildings under single management in which sleeping accommodation with or without dining facilities is provided for hire to more than 15 persons who are primarily transient for example hotels inns, clubes and motels.

1.1.2. Group 'B' Educational Buildings. This group includes all buildings or group of buildings which are used for schools colleges or day caring purposes for more than 8 hours per week including assemblies not covered by group 'D'.

1.1.3. Group 'C' Institutional. This includes :—

C 1. Hospital and sanitaria, infirmaries, clinics.

C 2. *Custodial institution.* Homes for aged and infirm, orphanages.

C 3. Penal institutions such as jails, prisons, mental hospital, mental sanitaria and reformatories.

1.1.4. Group 'D' Assembly. The buildings where group of people assemble for amusement, social religions, civil and travel purpose. This includes theatres, cinema, assembly halls, auditoria, exhibition halls, art galleries, restaurants, worship places, gymnasium, dance halls, clubs, passenger stations; air surface and marine terminals, stadia. These buildings are further classified as:–

D 1. having theatrical stage and fixed seats more than 1000 persons.

D 2. same but less than 1000 persons.

D 3. without stage and having temporary seating accommodation for 300 or more persons.

D 4. same but for less than 300 persons.

D 5. any other structure not covered by D 1 to D 4.

1.1.5. Group 'E' Business. Buildings for keeping accounts, records and similar purposes, doctors and dentists, news stands, lunch counters barber shops and beauty parlours used for transjaction of business other than group F.

1.1.6. Group 'F' Mercantile. Any building used for display and sale of merchandise such as shop, stores, market etc.

1.1.7. Group 'G' Industrial building. These are further classified as low, medium and high hazard industry buildings.

1.1.8. Group 'H' Storage Buildings. This group includes ware houses, cold storage, freight depot, transit sheds, garages, truck and marine terminals, hanger (not aircraft), silos, barns, stables etc.

1.1.9. Group 'J' Hazardous Buildings. Buildings used for storage of gas cylinders under pressure, highly flammable materials and explosives. Buildings for manufacture of flowers, synthetic leather, and fire work.

1.2. Chief Considerations in Building Designs

The following are the parameters in design of any multistoreyed building.

1.2.1. F.A.R. Considerations. Municipal Corporations of metropolitan cities like Bombay Municipal Corporation, New Delhi. Municipal Corporation and Municipal Corporation of Delhi had prescribed floor. Area Ratios (definition given below) for construction of building complexes which are different for different colonies or districts based on their existing density, availability of bulk services like water, electricity and drainage, roads, pollution etc. This must be adhered to National Building Code. National building code has also prescribed F.A.R. which are given in Table 1.1.

Floor Area Ratio (FAR) is defined as :

Floor Area. Floor area shall mean usable covered area of a building at any floor level.

Floor Area Ratio (FAR). The quotient obtained by dividing the multiplication of total covered area (Plinth area) on all floors and 100 by the area of the plot.

$$\text{FAR} = \frac{\text{Total covered area of all floors} \times 100}{\text{Plot area}}$$

The buildings are classified as class I, II, III and IV according to their resistance value of components. Type I building shall have 4 hours fire resistance, type II shall have 3 hours fire resistance and so on.

Table 1.1

Table 1.1 Various Types of Buildings (as per National Code)

Occupancy classification	*FAR as per clause 6.1.2 chapter IV N.B.C.*				*Occupant load in Gross area m^2 person*	*No. of occupants per units exist width*		*Trivel dist in metres*	
	Types					*Stair-range*	*Doors*	*Types*	
	I	*II*	*III*	*IV*				*I and II*	*III and IV*
Residential	U.L.	200	140	100	12.5	25	75	22.5	22.5
Educational	U.L.	200	140	100	4	25	75	22.5	22.5
Institutional	U.L.	150	100	80	15	25	75	22.5	22.5
Assembly	U.L.	100	70	50	(*a*) 0.6 (*b*) 1.5	60	90	30	30
Business	U.L.	290	230	160	10	50	75	45	30
Mercantile	800	180	140	100	(*a*) 3 (*b*) 6	50	75	30	30
Industrial	750	190	160	130	10	50	75	30	30
Storage	600	150	130	100	30	50	75	30	30
Hazardous	280	110	90	N.P.	10	25	40	22.5	22.5

Covered Area. Ground area covered immediately above the plinth level covered by the building but does not include the spaces covered by :—

(*a*) Garden, rockery, well and well structures, plant, nursery waterpool, swimming pool (if uncovered), platform round a tree tank fountain, bench CHABUTRA with open top and unclosed on sides by walls and the like.

(*b*) Drainage, culvert, conduit, catch-pit, gully pit chamber, and gutter.

(*c*) Compound wall, gate unstoreyed porch and portice, slide swing uncovered staircases area, covered by CHAJJA and the like.

Plinth. The portion of structure between the surface of the surrounding ground and surface of the floor immediately above the ground.

Plinth Area. The built up covered area measured at the floor level of the basement or of any storey.

Note. 1. Floor area ratio is for buildings facing atleast one public street of 9 m width.

2. In assembly (*a*) is for assemblies with fixed or loose sheets and dance floors and (*b*) is for assemblies without seating facility but including dining.

3. Group (*a*) of mercantile building includes street floor and sales basement and group (*b*) upper sales floor.

4. In case of dormitory portions of houses for aged orphanages, occupancy shall be not less than 7.5 m^2/person.

1.2.2. Other Limitations in Building Designs. Apart from F.A.R. described earlier some salient restrictions in building design are given herewith as per National Building Code.

1. **Frontage.** Each site will have frontage of 6 m on any street. For row housing this shall be 5.5 m.

2. **Front open space.** Every building fronting a street shall have a front yard forming an integral part of site of a minimum width of 3 m and in case of two or more sides fronting a street, an average width of 3 m but in no case less than 1.8 m.

3. **Rear open space.** Every building will have a rear yard forming an integral part of site on an average width 3 metres but not less than 1.5 m in any case. In case of back to back site the width of rear yard shall be 3 m throughout.

4. **Side open space.** Every semidetached or detached building shall have a permanently open air space forming integral part of site of not less than 3 m in width on sides.

5. The provisions of open spaces given above are not applicable to parking lockup garages upto 3 m in height located at a distance of 7.5 m from any street light or from boundary of plot. Above provisions from 1 to 4 are for building up to a height of 10 meters.

6. For building heights 10 to 25 m there shall be an increase of 1m per every 3 m or fraction thereof. For buildings of height between 25 m to 30 m there shall be minimum space of 10 m. Thereafter additional space of 1 m for every 5 m or fraction there of additional height over 30 m subjects to a maximum of 16 m should be provided.

7. A free access of width 3.6 m for campus having 3 storeyed buildings and 5 metre for those having buildings more than 3 storeyed, shall be provided from a street to enterance door.

8. No protion of building including verandah, balcony shall be constructed with distances from electric distribution line as per table 1.2.

Table 1.2. Distance of Electric Line from Buildings

Sl. No.	*Distribution lines of*	*Distance in metre*	
		Vertically	*Horizontally*
1.	Medium Voltage upto 650	2.4	1.22
2.	H.V. upto 33000 Volts	3.66	1.83
3.	Extra high voltage lines beyond 33000	3.66	1.83

9. **Minimum heights.** Following are the minimum heights.

Table 1.3. (Minimum heights)

	Areas	*Minimum heights (m)*
1.	Human habitation (Isolated) all rooms	2.75
2.	Human habitation (Row housing)	2.6
3.	A/C rooms with false ceiling	2.4
4.	Kitchen	2.75
5.	Bathroom and W.C.	2.2
6.	Passage under landing of staircase	2.2
7.	Tend or ledge	2.2
8.	Mezzanine floor	2.2

1.3. Minimum Areas

1. **Rooms for human habitation.** Minimum area of 9.5 sq. m is prescribed when only one room is provided. In case of houses having two rooms, one room with 7.5 sq m and another with minimum 8.5 sq. m must be provided. The smaller room shall have a width of 2.4 m.

2. **Kitchen.** Area shall be 5.5 sq. m with a minimum width of 1.8 m. When there is a separate store the floor area of kitchen may be reduced 4.5 sq. m. Combined kitchen and dining should have an area of 9.5 sq. m with minimum width 2.4 m.

3. **Bathrooms.** Size of bathrooms shall not be less than 1.8 sq. m (1.5 m $\times$ 1.2 m). In case of combined bath and W.C. 2.8. sq. m. with minimum width of 1.2 m. shall be there minimum area of 1.1 sq. m shall be provided for W.C.

4. **Mezzanine floor.** When mezzanine floor is to be used as living room it shall not be less than 9.5 sq. m. Aggregate area of such a floor in a building shall not exceed 1/3rd of total plinth area of building.

5. Prescribed occupancy, recommended width of exit and travel. distances are given in Table 1.1.

1.4. Floor Loadings

Table 1.4

Sl. No.	*Type of floor*	*Minimum live loading in kg/m^2*
1.	Floors in dwelling houses, tenements, hospital wards, bedrooms and private sitting rooms in hostel and dormitories	200
2.	Office floors other than entrance halls, floors of light work rooms	250–400
3.	Floors of banking halls, office enterance halls and reading rooms	300
4.	Shop floors, class rooms in school restaurants etc.	400
5.	Floors, of light class of warehouses and workshops	500
6.	Floors of medium class storage of warehouses and workshops	750
7.	Floors of heavy weight loading class of warehouses and workshops	1000
8.	Garage light weight exceeding 2.5 tonnes Slabs	400
	Beams	250
9.	Garages heavy weight exceeding 4 tonnes	750
10.	Transformer rooms upto 33 kV	3000
11.	Generating set plant rooms upto 248 kW	3000
12.	Lift machineroom floor	500
13.	Airconditioning plant room	3000
14.	Weather maker rooms of A/C plant	1300–1500
15.	Cooling towers	1300

1.5. Building Cost : Distribution of Expenditure

The table 1.5 gives rough cost distribution as a percentage of total building cost without electricity for various categories of civil items of building construction in government sector from which monetary importance of each can be evaluated.

Table 1.5. Percentage Costs

Sl. No.	*Description*	*Multistoreyed framed structure*		*Single storeyed residential*
		Residential	*Non-residential*	
1.	Foundation	—	—	3
2.	Plinth	2	2	5
3.	R.C.C.	49	55	18
4.	Brickwork	10	7	25
5.	Flooring	3	6	6
6.	Wood work	14	11	15
7.	Roofing	2	2	2
8.	Finishing	8	7	9
9.	Miscellaneous	2	3	5
10.	Sanitary	7	5	8
11.	Water supply	3	2	4
	Total	100%	100%	100%

In ordinary type of buildings cost of material is 60% and labour is 40%. The expenditure distribution material and labour wise is as follows :

(*A*)	Materials :	1. Cement	13%
		2. Steel	10%
		3. Timber	12%
		4. Other building materials	25%
(*B*)	Labour.	1. Excavation	1%
		2. Masons	25%
		3. Carpenter	12%
		4. Blacksmith	2%

1.6. Requirements of Materials

Various materials required based on per sq metre floor area are given in table 1.6.

Table 1.6. Material Requirement

Sl. No.	*Description*	*Multistoreyed*		*Single storeyed*
		Residentials	*Non–residential*	
1.	Brick	170 Nos	–	350 Nos
2.	Cement	3.5 Bags	2.7 Bags	1 Bag
3.	Steel	47 kg	43 kg	8 kg
4.	Timber	–	–	0.09 cu-m

Requirement of reinforcement steel for R.C.C. is given in table 1.7 in kg per cubic metre of concrete.

Table 1.7. Requirement of Steel per kg/m^3 of Concrete

Sl. No.	*R.C.C. item*	*When only mild steel is to be used*	*When tor-steel is also to be used*	
			M.S.	*Tor.*
1.	Slabs	95	85	–
2.	Lintels	110	75	25
3.	Beams	190	140	35
4.	Columns	230	175	40
5.	Column footing	85	80	–
6.	Stair case	115	105	–
7.	Chajjas	95	85	–
8.	Railings	90	80	–
9.	Fins	80	70	–
10.	Walls	130	120	–
11.	Raft	21	190	–
12.	Ribbed slab			
	(*a*) Rib	–	110	20
	(*b*) Slab	190	–	45

1.7. Standard of Accommodation (Applicable to Central Govt. Buildings)

1.7.1. Office buildings can be built to commercial pattern *i.e.* large halls with light weight partioned cabins for officers or the usual government pattern of having large halls on one side for ministerial establishment and rooms on the other side for offices which a central corridor in between. Following is the latest scale of accommodation for central Govt. Offices as prescribed by Ministry of Works and Housing.

1. Officers drawing Rs. 1300 or more : 23 sq. m. (260 s.ft.)

2. Gazetted Officers (Exc supt/s.o.) : 14.5 sq. m. (160 s.ft.)
3. Technical staff such as draftsman, tracers, estimaters : 5.5 sqm. (60 sft.)
4. Ministerial staff (S.O., supt. Headclerk, daftries) : 3.5 (40 sft.)

(10% extra admissible for ministerial staff for records).

5. Ministerial staff of audit deptt. (inclusive of records) : 4.5 sq. m.

Above scale is not applicable to offices of Income tax, Central Excise, and Customs. At present there is a cut of 10% for offices upto 2760 sq m.

1.7.2. Bureau of Public Enterprises had issued norms for office accommodation in Public Sector undertakings like BHEL, HAL, NTPC, as given below :

1. Officers above 2000/- 22 sq.m. (240 sft.)
2. Officers drawing 1100-2000/- 11 sq.m. (120 sft.)
3. Officers drawing below 1100/- 5.5 sq. (60 sft).
4. Ministerial Staff. 4.0 sq. m. (44 sft.)
5. Technical Staff 5.5 sq. m. (60 sft.)

(*i*) *Conference rooms.* These are located conveniently near accommodation for top bosses and if requires airconditioning then it should be near plantroom or at least in near proximity to the areas to be air-conditioned. Area recommended is 0.5% of total carpet area of building.

(*ii*) For other utility services standards had been laid down by CPWD which is the main construction agency for all central Govt. departments and are given in table 1.11.

1.7.3. Provisions for Garages and Parking Space

Parking requirement is one of the most important factors to be kept in view in designing of any building specially in big cities. These requirements have been roughly assessed for Government office in Delhi by the Town Planning Organisation by actual survey on the following basis :

(*i*) *Cars*. For 8% of the total employees (25% of this should be covered and 75% provided in open shape).

(*ii*) *Scooters and Motor Cycles*. 2% of the total number of employees.

(*iii*) *Cycles.* For 60% of the employees.

The remaining would be expected to travel by bus etc. Area of each covered garage for the motor car should be 20 to 25 sq m for the scooter and motor cycle 3 sq m and for the cycle stand space should be provided at 15 sq.m for each cycle. Total number of employees working in an office are determined roughly by taking

2,000 persons per 10000 sq.m. of accommodation, (*i.e.* carpet area) plus 20% for the class IV.

1.7.4 Carpet Area etc.

Carpet area is defined as the clear available space which can be used as office areas *i.e.* floor area minus areas occupied by corridors, passages, w.c's. air-conditioning plant rooms, garages, cycle-sheds, etc. Floor area is the total plinth area less the area of all external and internal columns, walls, etc. Floor area is usually 90% of the plinth area.

The ratio of carpet area to plinth area is generally taken as the design efficiency and varies from 55% to 60%.

Sometimes the term 'Office Area' is also used whereas carpet area includes all such areas which can, if need be, used as offices as areas such as conference and committee rooms, recreation room, record rooms, entrance hall, etc., The term 'Office area' would denote strictly the area available and earmarked for the office rooms exclusively excluding all these areas occupied by conference and committee rooms, recreation rooms, canteens, record room etc.

Norms have been fixed for a Government Office for economic space utilisation and these are as follows :

1.	Ratio of carpet area to plinth area	55% to 60%
2.	Ratio of floor area to plinth area	90%
3.	Area of horizontal circulation *i.e.* corridors etc.	12% to 16% plinth area
4.	Entrance halls and lobbies	20% to 4% of plinth area
5.	Area of vertical circulation *i.e.* lift wells and staircases	6% to 8% of plinth area
6.	Minimum window area	15% to 20% of carpet area

1.7.5 Other Utility Services

(*i*) *Requirements* of other utility services at per Central Design Organisation of CPWD are given in table 1.11.

(*ii*) *Canteens, Kitchens*. These should be from 1% to 4% of floor area. A canteen should be centrally situated and at the same time separate from main office rooms so that noise does not disturb the working staff. It should also be evenly distributed between all floors and not located only on the top most floor.

Table 1.8. Requirement of space for 11 kV Indoor Substation

Capacity KV A	Transfer room area (sq m)	*Total covered space required for substation*	
		Area	*Face width*
2 × 250	16	50	8.0
2 × 325	30	100	12.0
1 × 500	18	70	8.0
2 × 500	36	130	14.9
3 × 500	54	170	19.0
1 × 800	20	80	8.0
2 × 800	39	135	14.5
3 × 800	58	150	19.0
1 × 1000	22	–	8.0
2 × 1000	40	150	14.9
3 × 1000	60	200	19.0
2 × 2000	75	300	25.0

(*iii*) *Record rooms and stores.* This will vary according to requirements of particular departments. In certain departments such as Accountant General and Income Tax there is a large amount of records and much larger space is required for records. Usually the percentage varies from 2% to 11% of plinth area.

(*iv*) Area required for pumps (drinking and fire fighting) are given at the end of the chapters.

(*v*) Requirement of space for substations 11 kV/433 volts and 33/11 kV and diesel generating sets are shown in tables 1.8 to 1.10.

Table 1.9. Requirement of 22/33 to 11 kV Out Door Substations with Indoor L.T. Panel

Capacity MV A	*Voltage kV*	*Outdoor yard area having 33 or 22 kV O.C.B. and transformer*	*Built in area having 11 kV outgoing OCB/oil fuse switch units and L.T panels, metering etc.*
1 × 3	33 or 22	300	50
2 × 3	,,	600	100
1 × 5	,,	300	50
2 × 5	,,	600	100
1 × 10	,,	360	60
2 × 10	,,	720	120

Table 1.10. Space Required for Diesel Generating Sets

Capacity kW	*Area in sq m*	*Plant room height clear in m*
25	56	4.57
48	56	4.57
100	65	4.57
150	72	4.57
248	100	4.57
400	110	5.80
800	120	5.80

(*vi*) Recommended scale of electrical points in different classes of dwelling units are given in appendix.

Table 1.11. Space requirement abstract from manual on planning and design of R.C.M.S.O. buildings Central Design Organisation CPWD, Vol. I

Particulars	*Space required (as a rough guide)*	*Location*	*Remarks*
(*1*)	(*2*)	(*3*)	(*4*)
1. Record room and Stationary room.	2.5 percent of floor area for normal office buildings.	Basement (Water Proofed) Ground Floor is suitable for records occupying considerable area of the building; a separate block for the storage of records is recommanded.	A higher provision may be made for offices where the expected volume of records is likely to be higher.
2. Conference rooms	46.5 sq. m. (500 sft.) per 9300 sq. m. (1,10,000 sft.) of carpet area	At convenient place.	Conference rooms require accoustic treatment.

Continued

(1)	(2)	(3)	(4)
3. Library	As per Users At convenient place requirement.	Do	–
4. Canteen and Tiffin rooms	–	Do	Conditions vary from place to place depending upon social habits and the availability of suitable catering service facilities near by. Each case should be examined on its own merits
5. Recreation rooms	As per Users requirements.	–	–
6. Co-operative Stores	As per Users requirements.	At convenient place.	–
7. Garages and Cycle Stands	As required.	Ground Floor	Spacing of cols. and sizes of bays are planned for the upper floors & by using ground floor for parking purpose space is wasted. Plinth area rate of framed construction of a multi-storeyed building is normally higher than normal garage block. Hence separate two storey garage blocks are recommended where sufficient land is available.
8. Airconditioning plat form	5.5 sq. m. for every 100 sq. m of carpet area to be conditioned.	Ground Floor basements.	Requirement of area for A.C. plant etc. general depends upon the type of air conditioning adopted and also the floor area to be airconditioned.
9. Ducts and other requirements for air conditioning	As required.		

Continued

(*1*)	(*2*)	(*3*)	(*4*)
10. Lifts	(see chapter 7)		
11. Telephone exchange 12. Post office	0.7 percent floor area	Post office may be located near the main entrances. Telephone exchange may be located centrally with respect to the rooms where the telephone instruments are provided.	
13. Water tank and pumps House	–	A portion of the actual requirement may be kept in overhead storage tanks and the balance in the under ground reservoir	Pump house may be constructed very near to the underground sump
14. Electrical Sub-station	As required	Ground floor/perferably located away from the main building in separate building/room from the point of view of general safety.	The actual requirement should be determined in consultation with the Electric Engineer.
15. Quarters for Caretaking Staff	Caretaker Qr – 1 Electrician's Qr. – 1 Chowkidar Qrs – 3 Water fitter Qr. – 1	Per 9300 sq. m. (1 lakh of carpet area).	For every extra 9300 sq. m. (1 lakh sq. ft) of carpet area an extra chowkidar Qr. may be provided up to a maximum of 5 quarters.
16. Space for receptionist and Security Staff.	As per requirement	Near the entrances in Ground Floor.	Staff engaged for security purposes have to be provided with a rest room.
17. Banks	–	–	Requirements depends upon the population occupying the building.

1.7.6. Miscellaneous (thumb rule) Requirements

(*a*) Area occupied by external walls and columns — 4 to 6% of plinth area

(*b*) Area occupied by internal walls and partitions — 3 to 7% of plinth area

(*c*) Clear width of corridor — 2.00 m (6′ – 6″)

(*d*) Area of horizontal circulation — 12 to 14% of plinth area

(*e*) Entrance halls and lobbies — 1.5 % of plinth area

(*f*) Lifts — 1 per 2320 sq.m. (25,000 sq. ft.) to 2790 sq.m. (30,000 sq. ft.) of plinth area or as per traffic analysis.

(*g*) Disposition of staircases travel distances (100′) — 46 m (150 ft.) of this not more than 30.5 m alongwith the corridor.

(*h*) Area of vertical circulation, *i.e.* lifts and staircases. — 6 to 8% of plinth area.

(*i*) W.C. for personnel — 1 for 15 persons or part thereof

(*j*) W.C. for females — 1 for 25 persons or part thereof

(*k*) Urinals

(*i*) Nil, upto 6 persons

(*ii*) 1 for 7 — 20 persons

(*iii*) 2 for 21 — 45 for persons

(*iv*) 3 for 46 — 70 persons

(*v*) 3 for 71 — 100 persons

(*vi*) From 101 to 200 persons at the rate of 3%

(*vii*) For over 200 persons add at the rate of 2.5% (*l*) Wash basins 1 for every 25 persons or part thereof.

(*viii*) Area of W.C. Blocks. — 2 to 3% of plinth area

(*ix*) Floor to floor height. — 3.35 m (11′ – 0″).

(*x*) Orientation. — East West exposure to the avoided.

1.7.7. Prescribed. Scale of residential accommodation is given in Table 1.9, for general pool central government quarters.

Table 1.9. Scale of residential accommodation (CPWD)

Type of quarter	*Plinth area*	
	Sq. ft.	*Sq. m.*
I	365	33.91
II	535	49.70
III	710	65.96
IV	900	83.61
V	1500	139.36
VI	2100	195.10