Office of the Director General of Police
Commandant General, Home Guards & Director of Civil Defence and Director General Karnataka State Fire & Emergency Services
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KARNATAKA STATE FIRE & EMERGENCY SERVICES

NO OBJECTION CERTIFICATE

No. KSFES/GBC(1)/147

Docket No. KSFES/NOC/113/2021 Dated : 12/07/2021 17:19

To,

Commissioner,
Bengaluru Development Authority,
Kumara Park West,
T.Chowdaiah Road,
Bengaluru-560020.

Sir

Sub : Issue of No Objection Certificate for the construction of Mixed Occupany building at Sy. No. 2/6, Konadasapura Village, Bidarahalli hobli, , Bangalore East, BANGALORE - 560049

Ref:

1. Letter dated 11/05/2021 of the Authorized Signatory, M/s. Mista Infra Pvt Ltd., #B-1109, 11th Floor, Tower-B, Brigade Signature Towers, Old Madras Road, Bangalore East, BANGALORE - 562129

With reference to the letter of the M/s. Mista Infra Pvt Ltd., #B-1109, 11th Floor, Tower-B, Brigade Signature Towers, Old Madras Road, Bangalore East, BANGALORE - 562129 cited above, the Regional Fire Officer, CFO - Bangalore East Zone of this department has inspected the site of proposed Mixed Occupany buildings at Sy. No. 2/6, Konadasapura Village, Bidarahalli hobli, , Bangalore East, BANGALORE - 560049 on 17/05/2021 10:00 with reference to the drawings furnished by the builder and the details are as follows:

	Part-A: General Building requirements.	
1	Address of the applicant	The Authorised Signatory M/s. Mista Infra Pvt. Ltd., Regional Office.#B-1109, 11th Floor, Tower-B, Brigade Signature Tower, Old Madras Road, Bangalore 562 129.
		Sy No.2/6,

2	Address of the Premises	Konadasapura Village, Bidarahalli Hobli, Bengaluru East Taluk.
3	Number of Buildings	One Building with 3 Tower i.e. Tower-1 (Residential), Tower-2 (Office) & Tower-3 (Hostel) – joined together.
4	Number of floors	Tower-1 (Residential) : 5 basements, ground & 51 upper floors. Tower-2 (Office) : 5 common basements, ground, ground mezzanine & 42 upper floors. Tower-3 (Hostel) : 5 common basements, ground, ground mezzanine, 49 upper floors & mezzanine floor between 48 th & 49th floor.
	Type of Occupancy **Part 4, Fire and Life Safetyof Part-IV of NBC of 2016 clause 2.46** **Occupancy or Use Group**— The principal occupancy for which a building or a part of a building is used or intended to be used; for the purpose of classification of a building according to the occupancy, an occupancy shall be deemed to include subsidiary occupancies which are contingent upon it. **Part 4, Fire and Life Safetyof Part-IV of NBC of 2016 clause 3.1.2 classification of Assembly buildings.** **3.1.5 Group D6 – Buildings having mixed occupancies of assembly and mercantile (for example, shopping malls providing facilities such as shopping, cinema theatres, multiplexes and restaurants / food courts)** This subdivision shall include any building for assembly of people provided with multiple services / facilities like shopping, cinema theatres, multiplexes, restaurants / food court. **Part 4, Fire and Life Safetyof Part-IV of NBC of 2016 clause 3.1.2 classification of Business buildings.** **3.1.2 Group E-Business Buildings** These shall include any building or part thereof which is used for transaction of business for keeping of accounts and records and similar purposes, professional establishments, service	

5	facilities, etc, city halls, town halls, courthouses and libraries shall be classified in this group so far as the principal function of these is transaction of public business and keeping of books and records. Buildings under Group E shall be further sub divided as follows: **Sub division E-1**: Offices, banks, professional establishments, like offices of architects, engineers, doctors, lawyers, post offices and police stations. **Sub division E-2**: Laboratories, outpatient, clinics, research establishments, libraries and test houses. **Sub division E-3**: Electronic data processing centres, computer installations, information technology parks and call centres. **Sub division E-4**: Telephone exchanges. **Sub division E-5**: Broadcasting stations, T.V. stations and air traffic control towers. **Part 4, Fire and Life Safetyof Part-IV of NBC of 2016 clause 3.1.2 classification of High rise buildings.** **3.1.2 Group A Residential Buildings** These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities, except any building classified under Group C. **Subdivision A-5 Hotels**— These shall include any building or group of buildings under single management, in which sleeping accommodation is provided, with or without dining facilities for hotels classified up to four star category. **Part 4, Fire and Life Safetyof Part-IV of NBC of 2016 clause 3.1.2 classification of residential buildings.** **3.1.2 Group A Residential Buildings** These shall include any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities, except any building classified under Group C. **Subdivision A-4 Apartment houses** — 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.	Business Sub Division E-1 (Office) And Residential Building Sub Division-A4 (Residential) & Sub Division-A3 (Dormitories)
		Tower-1 (Residential).

Floor wise details of the occupancy :-	**Basement-5 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-4 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-3 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-2 :** For parking 92 Cars (46x2=92 cars stack parking) & Store room. **Basement-1 :** For parking 92 Cars (46x2=92 cars stack parking). UG tanks, STP, 2 Electrical rooms & 1 Communication room. **Ground floor:** For parking 8 cars & Fire control room. **1st floor to 19th floor :** 5 Flats on each floor. **20th floor:** 5 Flats & Refuge area of 31.88 Sq.mtrs . **21th floor to 29th floor:** 5 Flats on each floor. 30**th floor:** 5 Flats & Refuge area of 31.88 Sq.mtrs . 31 **th floor to 39th floor:** 5 Flats on each floor. **40th floor:** 5 Flats & Refuge area of 31.88 Sq.mtrs . **41th floor to 49nd floor:** 5 Flats on each floor. **50th floor:** 5 Flats & Refuge area of 31.88 Sq.mtrs . **51st floor (CLUB HOUSE) :** Multipurpose hall, Gym, Indoor games, Saloon & Massage room. **Terrace floor:** Staircase head room, Domestic & Fire Overhead tanks. **Tower-2 (Office) & Tower-3 (Hostel).** **Basement-5 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-4 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-3 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-2 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-1 :** For parking 58

6	Basements, Ground floor, Upper floor & Terrace floor.	**Basement 2 :** For parking 58 Cars (29x2=58 cars stack parking) & Electrical room. **Tower-2 (Office)** **Ground floor:** BMS room, Fire Command room & Reception area. **Ground mezzanine floor:** Reception and Multipurpose Lounge. **1st floor to 5th floor, 7th to 9th floor, 11th to 13th floor, 15th to 18th floor, 20th to 22nd floor, 24th to 26th floor, 28th to 30th floor, 32nd to 35th floor, 37th to 39th floor & 41 st floor:** 2 Conference rooms, Work cabins, Printer room & Pantry on each floor. **6th, 10th, 14th, 19th, 23rd, 27th, 31st, 36th & 40 th floor :** 2 Conference rooms, Work cabins, Printer room, Pantry & Refuge area of 32.80 Sq.mtrs. on each floor. **42nd floor (Club House) :** Gym, Multipurpose hall & Indoor games. **Terrace floor:** Staircase head room, MRL Head Room, Domestic & Fire Overhead tanks. **Tower-3 (Hostel)** **Ground floor:** Main Entry. **Ground mezzanine floor: Reception and Multipurpose Lounge** . **1st floor to 6th floor, 8th to 11th floor, 13th to 16st floor, 18th to 21st floor, 23rd to 26th floor, 28th floor to 31st floor, 33rd to 36th floor, 38th to 41st floor,& 43 rd to 46th floor :** 12 rooms on each floor. **7th, 12th, 17th, 22nd, 27th, 32nd, 37th, 42nd & 47 th floor** : 12 rooms & Refuge area of 22.18 Sq.mtrs on each floor. **48th floor** : 06 Duplex Living rooms. **48th Mezzanine floor** : Upper portion of duplex living rooms. **49th floor (** Club House) : Bar pool, Adults pool & Deck. **Terrace floor:** Staircase head

		room, MRL Head Room, Domestic & Fire Overhead tanks.
7	Height of the building. **As per Part 3 Development Control Rules and General Building Requirements clause 2.10 of NBC 2016** **Building, Height of –** 2.10 Building, Height of — The vertical distance measured in the case of flat roofs, from the average level of the ground around and contiguous to the building or as decided by the Authority to the terrace of last liveable floor of the building adjacent to the external walls; and in the case of pitched roofs, up to the point where the external surface of the outer wall intersects the finished surface of the sloping roof; and in the case of gables facing the road, the mid-point between the eaves level and the ridge. Architectural features serving no other function except that of decoration shall be excluded for the purpose of measuring heights.	Tower-1 (Residential), Tower-2 (Office) & Tower-3 (Hostel) : Each of 155.80 mtrs.
8	Site Area **As per Part 3 Development Control Rules and General Building Requirements clause 2.75 of NBC** **Site (Plot)** — A parcel (piece) of land enclosed by definite boundaries.	16,389.78 Sq.mtrs.
		Tower-1 (Residential) Basement-5 — 1,796.80 Sq.mtrs. Basement-4 — 1,796.80 Sq.mtrs. Baseemnt-3 — 1,796.80 Sq.mtrs. Basement-2 — 2,471.62 Sq.mtrs. Basement-1 — 2,471.62 Sq.mtrs. Ground floor — 1,168.50 Sq.mtrs. 1st floor — 555.20 Sq.mtrs. 2nd to 7th floor, 9 th floor to 12th floor, 14th floor to 17 th floor, 19th floor , 21st floor to 22nd floor, 24th floor to 27 th floor, 29th — 552.59 Sq.mtrs. on each floor x 36 floors = 19,893.24 Sq.mtrs.

		floor, 31st to 32nd floor, 34th floor to 37th floor, 39th floor, 41st to 42 nd floor, 44th floor to 47th floor, 49th floor	
		8th , 13th, 18th, 23rd , 28th, 33rd, 38th, 43rd & 48 th floors.	557.74 Sq.mtrs on each floor x 9 floors = 5,019.66 Sq.mtrs.
		20th , 30th, 40 th, & 50th floors.	584.47 Sq.mtrs on each floor x 4 floors = 2,337.88 Sq.mtrs
		51st floor (Club House)	552.59 Sq.mtrs.
		Terrace floor	70.18 Sq.mtrs.
		Tower-2 (Office) & Tower-3 (Hostel)	
		Basement-5	1,491.08 Sq.mtrs.
		Basement-4	1,491.08 Sq.mtrs.
		Baseemnt-3	1,491.08 Sq.mtrs.
		Basement-2	2,387.63 Sq.mtrs.
		Basement-1	2,387.63 Sq.mtrs.
9	Built up area of each floor(Block wise)	**Tower-2 (Office)**	
		Ground floor	624.69 Sq.mtrs.
		Ground Mezzanine floor	514.97 Sq.mtrs.
		1st to 5th Floor, 7th to 9th Floor,11th to 13th floor, 15th floor, 17th to 18th floor, 20th to 22nd floor. 25th to 26th floor, 28th to 30 th floor, 32nd floor, 34th to 35th floor,	514.97 Sq.mtrs.on each floor x 28 floors = 14,419.16 Sq.mtrs.

		37th to 39th floor.
		16th, 24th, 33rd & 41st floors. — 492.66 Sq.mtrs. on each floor x 4 floors = 1,970.64 Sq.mtrs.
		6th, 10th, 14th, 19th, 23rd, 27th, 31st, 36th & 40 th floor — 547.73 Sq.mtrs on each floor x 9 floors = 4,929.57 Sq.mtrs.
		42nd floor (Club house) — 514.97 Sq.mtrs.
		Terrace floor — 118.10 Sq.mtrs.
		Tower-3 (Hostel)
		Ground floor — 591.18 Sq.mtrs.
		Mezzanine floor — 359.92 Sq.mtrs.
		1st to 6th floor, 8th to 11th floor, 13th to 16th floor, 18th to 21st floor, 23rd to 26th floor, 28th to 31st floor, 33rd to 36th floor, 38th to 41st floor, 43 rd to 46th floor,& 48th Floor — 359.92 Sq.mtrs. on each floor x 39 floors = 14,036.88 Sq.mtrs.
		7th, 12th, 17th, 22nd , 27th, 32nd, 37th, 42nd & 47 th floor — 382.10 Sq.mtrs. on each floor x 9 floors = 3,438.90 Sq.mtrs.
		48th Mezzanine floor — 359.92 Sq.mtrs.
		49th floor (Club House) — 359.92 Sq.mtrs.
		Terrace floor — 63.94 Sq.mtrs.
10	Total Built-up area	91,482.15 Sq.mtrs.
11	Surrounding Properties.	
	Front (West)	Front (North) - 67.00mtrs wide NH – 4 Main road.
	Rear (East)	Rear (South) - Private property.
	Side (North)	Side (East) - Private property.
	Side (South)	Side (West) - Private property.

	B. Structural details indicating the fire prevention, fire fighting and evacuation measures to be indicated in the drawings	
1	Width of the road to which the building abuts and whether it is hard surfaced to carry the weight of 45000 kgs. **As per Part 3 Development Control Rules and General Building Requirements clause 2.83of NBC 2016** **Street :** Any means of access, namely, highway, street, lane, pathway, alley, stairway, passageway, carriageway, footway, square, place or bridge, whether a thoroughfare or not, over which the public have a right of passage or access or have passed and had access uninterruptedly for a specified period, whether existing or proposed in any scheme, and includes all bunds, channels, ditches, storm-water drains, culverts, footpaths, sidewalks, traffic islands, roadside trees and hedges, retaining walls, fences, barriers and railings within the street lines.	**Name of the Road:** 67.00mtrs wide NH – 4 Main road, located on the northern side. The road is hardened to carry the weight of 45,000 kgs capacity. **Width of the Road:-** Mentioned above. **Type of Road :-** Asphalted road. **Is road a Dead end:** No.
2	Number of entrances and width of each entrance to the premises & height clearance over the entrance. **As per Part 3 Development Control Rules and General Building Requirements clause 4.6 (d) of NBC 2016** 1) The main entrance to the plot shall be of adequate width to allow easy access to the fire engine and in no case shall it measure less than 6 m. 2) The entrance gate shall fold back against the compound wall of the premises, thus leaving the exterior access way within the plot free for movement of fire tender. 3) If the main entrance at the boundary wall is built over, the minimum clearance shall be 4.5 m. **As per Part 3 Development Control Rules and General Building Requirements clause 4.6of NBC 2016** a) The width of the main street on which the building abuts shall not be less than 12 m and one end of this street shall join another street not less than 12 m in width. b) The road shall not terminate in a dead end; except in the case of residential building, up to a height of 30 m.	**Main entrance width:** Proposed to provide 06 entrances, each of 6.00 mtrs width from 67.00mtrs wide NH – 4 Main road, located on the northern side. **Is Entrance gate provisioned:-** Yes Provisioned. **Is any Pergola planned :** No. If arch is proposed over the entrances, the height clearance shall be provided minimum 5.50 mtrs.
	Width of open space (Setbacks) **As per Part 3 Development Control Rules and General Building Requirements of NBC 2016**	

3	**Clause 2.57 Open Space:**— An area, forming an integral part of the plot, left open to the sky. NOTE — The open space shall be the minimum distance measured between the front, rear and side of the building and the respective plot boundaries. **2.58** Open Space, Front — An open space across the front of a plot between the building line and front boundary of the plot. **2.59** Open Space, Rear — An open space across the rear of a plot between the rear of the building and the rear boundary of the plot. **2.60** Open Space, Side — An open space across the side of the plot between the side of the building and the side boundary of the plot. **As per Part 3 Development Control Rules and General Building Requirements clause of NBC 2016 Table 4 Side and Rear Open spaces to be left around the Building (Clause 8.2.3.1)** **NOTES**: **1** For buildings above 24 m in height, there shall be a minimum front open space of 6 m. **2.** Where rooms do not derive light and ventilation from the exterior open space, the width of such exterior open space as given in col 3 may be reduced by 1 m subject to a minimum of 3 m and a maximum of 8 m. No further projections shall be permitted. **3.** If the length or depth of the building exceeds 40 m, add to col (3) ten percent of length or depth of building minus 4.0 m subject to maximum requirement of 20 m. **As per Part 3 Development Control Rules and General Building Requirements clause of NBC 2016** **Clause 4.6 (C):** 1) The approach to the building and open spaces on all its sides shall be not less than 6 m in width, and a turning radius of minimum 9 m shall be provided for fire tender movement of fire tenders weighing up to 45 t. 2) The same shall be hard surface capable of taking the mass of fire tender, weighing up to 45 t minimum. For heavier fire tenders, the minimum width, turning radius and the hard surface capable of taking the fire tender loads shall be as per the requirement laid down by the Fire Department. The layout for the open space for fire tender movement shall be done in consultation with the Chief Fire Officer of the city, which shall be kept free of	**Height of the building is –** Tower-1 (Residential), Tower-2 (Office) & Tower-3 (Hostel) – joined together – Each of 155.80mtrs. **Setbacks (Open space) required as per ZR:-** Minimum 16.00 mtrs. all around the building. **The allowed setback is :-** Front (North) : 16.00 mtrs. Rear (South) : 16.00 mtrs. Side (East) : 16.00 mtrs. Side (West) : 16.00 mtrs. **Driveway space left :** Proposed to provide **08**.00 mtrs. wide driveway all around the building from the building line with a turning radius of minimum 9.00 Mtrs. for the easy movement fire vehicles. **Further required setbacks of minimum 16.00 mtrs all around the building shall be at even level without any structure and projections up to a height of minimum 5.50 mtrs. These setbacks shall be always kept free from any construction or utilization like garden, landscaping, mechanical parking, etc.**

	obstructions and shall be motorable. The compulsory open spaces around the building shall not be used for parking. 3) If the main entrance at the boundary wall is built over, the minimum clearance shall be 4.5 m.	
4	Width of means of access **As per Part 3 Development Control Rules and General Building Requirements of NBC 2016** **Clause 4.3.1 Width of Means of Access** For all assembly buildings like, theatres, cinema houses assembly halls, stadia; educational buildings; markets, hospitals; industrial buildings and other buildings which attract large crowd, the means of access shall not be less than the following: **Sl no. / Width of means of access / Length of means of access** **(1) / (2) / (3)** i. / 12.0 / 200 ii. / 15.0 / 400 iii. / 18.00 / 600 iv. / 24.00 / Above 600 The residential plots shall abut on a public means of access like street/road which is 12mtrs wide. Plots which do not abut on a street/road shall abut/front on a means of access, the width and other requirements of which shall be as given in Table 1. The residential plots shall abut on a public means of access like street/road which is 12mtrs wide. Plots which do not abut on a street/road shall abut/front on a means of access, the width and other requirements of which shall be as given in Table 1. **Table 1 Width and Length of Means of Access (Clause 4.3)** **Sl no. / Width of means of access / Length of means of access** **(1) / (2) / (3)** i. / 6.0 / 75	Street/ Road width:- The building is directly abutting to 67.00mtrs wide NH – 4 Main road, located on the northern side.

ii.	7.5	150
iii.	9.0	250
iv.	12.0	400
v.	18.0	1000
vi.	24.0	Above 1000

Note: If the development is only on one side of the means of access, the prescribed widths may be reduced by 1 m in each case.

Arrangement for parking the cars and ramps.

As per Part 3 Development Control Rules and General Building Requirements of NBC 2016

Clause 2.63: Parking Space — An area enclosed or unenclosed, covered or open, sufficient in size to park vehicles, together with a drive-way connecting the parking space with a street or alley and permitting ingress and egress of the vehicles.

Arrangement for parking the cars and ramps and conditions for buildings on podium.

4.6.1 Buildings on Podium

4.6.1.1 Podium is a horizontal projection (platform) extending beyond the building footprint on one or more sides, and may consist of one or more levels (see Fig. 8A).

4.6.1.2 Uses permitted Podium may be used for the following purposes:

a) Parking of vehicles . When used for parking, one WC, two urinals and two wash basins for every 500 cars or part thereof, shall be provided on each podium floor. At least one accessible toilet complying with the requirements given in B-9 shall be provided preferably near the accessible parking.Provision for driver.s rest room for non-residential building shall be made.

b) Fire and building services/utilities in accordance with the provisions of other Parts/ Sections of the Code.

c) Topmost podium slab which is open to sky maybe landscaped and/or be used as recreational open space; subject to provision of 1.6 m high parapet wall.

d) Other habitable uses may be allowed by counting it in FAR subject to light, ventilation and fire safety requirements.

Uses proposed in (a) to (c), shall not be counted towards FAR.

4.6.1.3 Requirements

5	Following requirements shall be satisfied for buildings constructed on podium: a) A podium may be permitted in a plot of area 1 500 m2 or more. b) A podium, if provided with ramp, may be permitted in one or more levels, however the total height shall not exceed 30.0 m above ground level. c) In case a podium is not provided with ramp, but provided with car lift only, the same may also be permitted in one or more levels, however, the total height shall not exceed 9.0 m above ground level. d) Requirements for ramp for vehicles (see Fig. 8B): 1) One way ramp of clear width of minimum 3.0 m and two way ramp with clear width of minimum 6.0 m shall be provided for LMV. 2) One way ramp of clear width of minimum 4.5 m and two way ramp with clear width of minimum 9.0 m shall be provided for LCV. 3) One way ramp of clear width of minimum 6.0 m and two way ramp with clear width of minimum 12.0 m shall be provided for HMV. 4) Ramp slope shall be maximum 1 in 8. 5) After a 40 m length of continuous ramp, a flat surface of minimum 6.0 m length shall preferably be provided (see Fig. 8B). 6) If podium is accessible to fire tender, minimum 7.5 m wide ramp shall be required for fire engine access with maximum slope of 1 in 10. e) Podium shall not be permitted in required minimum front open space. f) Podium, if accessible to fire tender, shall be so designed so as to take the load of fire tender weighing up to 45 t minimum or as per the requirement laid down by the Fire Department. g) Requirement of accessibility for elders and persons with disabilities shall be ensured in compliance with the provisions of Annex B which may require providing ramps with specified gradient or accessible lifts for access to different levels. 4.6.1.4 Requirements for fire tender movement a) Buildings having height more than 15 m above ground level shall necessarily be accessible by fire tender, as follows (see Fig. 9A): 1) For buildings having floor area less than 10 000 m2, fire tenders shall have access to at least one-third of the perimeter of building	Provision has been made to park as mentioned below: **Tower-1 (Residential).** **Basement-5 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-4 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-3 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-2 :** For parking 92 Cars (46x2=92 cars stack parking). **Basement-1 :** For parking 92 Cars (46x2=92 cars stack parking). **Ground floor:** For parking 8 cars. **Tower-2 (Office) & Tower-3 (Hostel).** **Basement-5 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-4 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-3 :** For parking 58 Cars (29x2=58 cars stack parking. **Basement-2 :** For parking 58 Cars (29x2=58 cars stack parking). **Basement-1 :** For parking 58 Cars (29x2=58 cars stack parking). **Surface parking** – 50 Cars on the open space available all around the building after leaving 8.00 mtrs wide driveway from the building. **No. of Ramp:-** Tower – 01: 02 Ramps. Tower - 2 & 3: 02 Ramps. **Ramp width:** Each of 3.50 mtrs. **Type of Ramp:** One way. **Location of Ramp:** All the ramps are located at within the building line. **Gradation :** 1:8.

which shall be minimum 6.0 m wide and having 9.0 m turning radius.

2) For buildings having floor area more than 10 000 m2, fire engine shall have an access to at least to half of the perimeter of building which shall be minimum 6.0 m wide and having 9.0 m turning radius.

b) If podium is not accessible by fire tender, the podium may be such that it is not extended beyond the building footprint to an extent more than 11.0 m on the side where fire tender access is provided (see Fig. 9B and Fig. 9C). Such restriction shall not apply in case podium is accessible by fire engine (see Fig. 9D).

c) Minimum 6.0 m driveway width and 9.0 m width at turning shall be available for fire tender movement all around the podium. NOTE . The width and turning radius of ramp for fire tender access, and requirements of motorable open space for fire tender movement given above pertain to fire tender weighing up to 45 t and its operability. For heavier fire tenders, these shall be as per the requirement laid down by the Fire Department [see also 4.6 (c)].

4.7 Cul-de-sacs giving access to plots and extending from 150 m to 275 m in length with an additional turning space at 150 m will be allowed only in residential areas, provided cul-de-sacs would be permissible only on straight roads and further provided the end of cul-de-sacs shall be higher in level than the level of the starting point of such dead end road. The turning space, in this case shall be not less than 81 m2 in area, with no dimension less than 9 m.

Staircases.

As per NBC 2016, Part 4, Fire and Life Safety clause 4.4.2.4.3 Staircases,

As mentioned in **Part 4, Fire and Life Safety clause1.2 All buildings,shall have a minimum of two staircases.**

The provisions of this Part are applicable to,

a) all high rise buildings; where any of these buildings have floor area more than 500 m^2 on any one or more floors;

6) Buildings with two basements or more, or with one basement of area more than 500 m^2 unless otherwise mentioned specifically in the provisions.

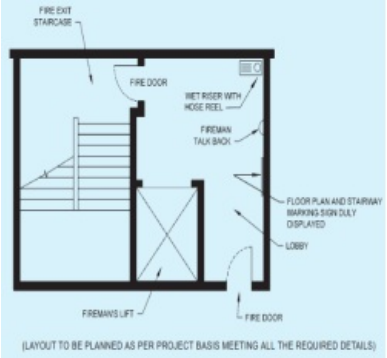
The minimum width of tread without nosing shall be 300 mm for staircase of Assembly buildings. The treads shall be constructed and maintained in a manner to prevent slipping. The maximum height of

6	riser shall be 150 mm. The number of risers shall be limited to 12 per flight. The staircases may be internal staircases or external staircases. **4.4.2.4.3.2 Internal staircases** The internal staircases may be constructed with an external wall, or otherwise, and shall comply with the following: a) Internal stairs shall be constructed of non-combustible materials throughout, and shall have fire resistant rating of minimum 120 min. b) A staircase shall not be arranged round a lift shaft. c) Exits shall not be used as a portion of a supply, return or exhaust air system serving adjoining areas. Any opening(s) shall not be permitted in walls or in doors, separating exits from adjoining areas. d) No flue chimney, electromechanical equipment, air conditioning units, gas piping or electrical panels shall be allowed in the stairway. e) Notwithstanding the detailed provision for exits in accordance with 4.2 and 4.3, **the following minimum width shall be provided for staircases for respective occupancies:** **1) Assembly: 2.00 m.** **2) Business & Hotel : 1.50 m** **3) Residential: 1.25 mtrs.** f) A handrail shall be provided on one side of the staircase of width less than 1 500 mm, and on both sides of the staircase of width 1 500mm and more. The projection of handrail(s) in the staircase width shall not be more than 115 mm. h) The design of staircase shall also take into account the following: 1) The minimum headroom in a passage under the landing of a staircase and under the staircase shall be 2.2 m 2) Access to exit staircase shall be through a fire door of a minimum 120 min fire resistance rating. 3) No living space, store or other fire risk shall open directly into staircases. 4) The exit (including staircases) shall be continuous from refuge floors or terrace level, as applicable, to the level of exit discharge. 5) No electrical shafts/air conditioning ducts or gas pipes, etc, shall pass through or open in the staircases. 6) Lifts shall not open in staircase.	

	7) No combustible material shall be used for decoration/wall panelling in the staircase. 8) Beams/columns and other building features shall not reduce the head room/ width of the staircase. 9) The floor indication board, indicating the location/designated number of staircase, respective floor number and direction to exit discharge shall be placed inside the staircase, on the wall nearest to the fire door. It shall be of size not less than 300 mm × 200 mm (see Fig. 9). 10) Individual floors shall be prominently indicated on the wall outside the staircase and facing it. **11) All staircases shall terminate at the level of exit discharge. The access to the basement shall be by a separate staircase.** **12) Scissors type staircases shall not be treated as part of exit.**	
	Staircases	Proposed to provide 06 staircases (2 in each tower). **Floor area** Tower–1 (Residential): The maximum floor area is 584.47 Sq. mtrs. Tower–2 (Office): The maximum floor area is 547.73 Sq. mtrs. Tower–3 (Hostel): The maximum floor area is 382.10 Sq. mtrs. **Area of Basement :** Tower–1 (Residential): Maximum area of Basement – 2,471.62 Sq. mtrs. Tower–2 (Office) & Tower–3 (Hostel): Maximum area of Basement - 2,387.63 Sq. mtrs. **No. of Basement :** Tower–1 (Residential): 5. Tower–2 (Office) & Tower–3 (Hostel): 5. Fire Rating : 120 min. Stairs around Lift : No. Stairs are clear from any other service routings: YES. No other services is taken inside the stairs : Yes. Fire door rating : 120 min. Fire Signage board : YES.

		Staircase terminated at Ground level: All the staircases are terminated at ground floor. Further 02 separate staircases have been proposed to reach each basement parking area from the ground floor of Tower -1 (Residential) & 04 separate staircases have been proposed to reach each common basement parking area from the ground floor of Tower -2 (Office) & Tower-3 (Hostel).
	Internal Staircase Size:	
	a. Width of the staircases. **As per Clause 4.4.2.4.3.2 of Part 4 Fire and Life Safety of NBC 2016** The following minimum width shall be provided for **Assembly Buildings : 2.00 m, Business & Hotel: 1.50 mtrs and Residential : 1.25 mtrs.**	Tower-1 (Residential) & Tower-3 (Hostel) - Each of 1.25 mtrs. Tower-2 (Office) – Each of 2.00 mtrs.
	b. Width of treads **As per clause 4.4.2.4.3.1 of Part 4 Fire and Life Safety of NBC 2016:** The minimum width of tread without nosing shall be 300 mm for staircase of **Assembly, Business, Hotel & Residential Buildings**.	300 mm.
	c. Height of riser. **As per clause 4.4.2.4.3.1 of Part 4 Fire and Life Safety of NBC 2016** : The maximum height of riser shall be 150 mm for staircase of **Assembly, Business, Hotel & Residential Buildings**	Tower-1 (Residential) & Tower-3 (Hostel) - 147.5 mm Tower-2 (Office) – 145.83 mm.
	d. Number of risers in a flight **As per clause 4.4.2.4.3.1 of Part 4 Fire and Life Safety of NBC 2016:** The number of risers shall be limited to 12 per flight.	12 risers per flight.
	e. Height of hand rails **As per clause 4.4.2.4.3.2 (f) of Part 4 Fire and Life Safety of NBC 2016:** Handrails shall be provided at a height of 1 000 mm to be measured from the base of the middle of the treads to the top of the handrails. Balusters/railing shall be provided such that the width of staircase does not reduce.	1.20 mtrs.
	f. Head room clearance **As per Part 3 Development Control Rules and General Building Requirements clause 2.70 of NBC 2016** **As per clause 4.4.2.4.3.2 (h) (1) of Part 4 Fire and Life Safety of NBC 2016:** The minimum headroom in a passage under the	2.40 mtrs.

	landing of a staircase and under the staircase shall be 2.2 m.	
7	External staircases **4.4.2.4.3.4 External staircases** The external staircases are the staircases provided on the external wall / facade, and shall comply with the following: a) External stairs shall always be kept in sound and usable condition. b) All external stairs shall be directly connected to the ground. c) Entrance to the external stairs shall be separate and remote from the internal staircase. d) Where an external staircase is provided, it shall be ensured that the use of it at the time of fire is not prejudiced by smoke and flame from openings (for example, windows, doors) in the external face of the building. Care shall be taken to ensure that no external wall or window opening opens on to or close to an external stair. If such openings exists within 3 m from an external staircase, they shall be protected with fire rated doors/window assemblies with rating of at least 60 min. e) The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have minimum 120 min fire resistance. f) No external staircase shall be inclined at an angle greater than 45° from the horizontal. g) External stairs shall have straight flight not less than 1 500 mm wide. h) Handrails, to be provided on both sides, shall be of a height not less than 1 000 mm and not exceeding 1 200 mm. There shall be provisions of balusters with maximum gap of 150 mm.	Not proposed.
8	Fire Tower **As per Part-4, NBC 2016, 2.24 Firefighting Shaft (Fire Tower)** -An enclosed shaft having protected area of 120 min fire resistance rating comprising protected lobby, staircase and fireman's lift, connected directly to exit discharge or through exit passageway with 120 min fire resistant wall at the level of exit discharge to exit discharge. These shall also serve the purpose of exit requirement/ strategy for the occupants. The respective floors shall be approachable from fire-fighting shaft enabling the fire fighters to access the floor and also enabling the fire fighters to assist in evacuation through fireman's lift. The firefighting shaft shall be equipped with 120 min fire doors. The firefighting shaft shall be equipped with firemen talk back, wet riser and landing valve in	Proposed to provide 03 Nos. Fire Towers (one in each tower) as per Part-4 of NBC-2016, 2.24 Fire

	with firemen talk back, wet riser and landing valve in its lobby, to fight fire by fire fighters (see Fig. 2 for a typical fire fighting shaft).  	fighting Shaft (Fire Tower).
9	Travel Distance **Travel Distance:** — The distance to be travelled from any point in a building to a protected exit or external escape route or final exit measured along the line of travel. **Table 5 Travel Distance (Based on Occupancy and Construction Type)** (Clauses 4.4.2.1 and 4.4.2.2) **of Part 4 0f NBC 2016.** Sl No / Occupancy Group / Maximum Travel distance: Type 1 & 2 / Type 3 and 4 i. **Assembly (Group D), Business (group-E)** — **30.00** / **30.00** ii. **Residential (Group A)** — **30.00** / **22.50** Notes: 1. For fully sprinklered building, the travel distance may be increased by 50 percent of the values specified. Ramp shall not be counted as an exit in case of basement below the first basement in car parking.	**Tower-1 (Residential):** Maximum 42.00 mtrs. from the farthest point to staircases in basements. Maximum 40.00 mtrs. from the farthest point and maximum 17.50 mtrs. from the dead end of the corridor to the staircases in upper floors. Increased travel distance from both farthest point & dead end corridor is acceptable, as the entire Tower is covered with automatic sprinkler system. **Tower-2 (Office) & Tower-3 (Hostel):** Maximum 45.00 mtrs. from the farthest point to staircases in basements. **Tower-2 (Office) :** Maximum 30.00 mtrs. from the farthest point and maximum 5.00 mtrs. from t he dead end of the corridor to the staircases in upper floors. Increased travel distance from the farthest point is acceptable, as the entire Tower is covered with automatic sprinkler system. **Tower-3 (Hostel):** Maximum 33.00 mtrs. from the farthest point and maximum 20.00 mtrs. from t he dead end of the corridor to the staircases in upper floors. Increased travel distance from both farthest point & dead end corridor is acceptable, as the entire Tower is covered with automatic sprinkler system.
	Number of lifts and capacity. **Lift:** An appliance designed to transport persons or	

materials between two or more levels in a vertical or substantially vertical direction by means of a guided car or a platform. The word elevator is also synonymously used for lift.

As per clause 4.15.1 of Part-4 Fire and Life Safety of NBC-2005

Where applicable, fire lifts shall be provided with a minimum capacity for 8 passengers and fully automated with emergency switch on ground level. In general, buildings 15 m in height or above shall be provided with fire lifts.

Fire Lifts— Following details shall apply for a fire lift:

1) To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1 200 m^2 of floor area shall be provided and shall be available for the exclusive use of the firemen in an emergency.

2) The lift shall have a floor area of not less than 1.4 m^2. It shall have loading capacity of not less than 545 kg (8 persons lift) with automatic closing doors of minimum 0.8 m width.

3) The electric supply shall be on a separate service from electric supply mains in a building and the cables run in a route safe from fire, that is, within the lift shaft. Lights and fans in the elevators having wooden panelling or sheet steel construction shall be operated on 24 V supply.

4) Fire fighting lift should be provided with a ceiling hatch for use in case of emergency, so that when the car gets stuck up, it shall be easily openable.

5) In case of failure of normal electric supply, it shall automatically trip over to alternate supply. Alternatively, the lift shall be so wired that in case of power failure, it comes down at the ground level and comes to stand-still with door open.

6) The operation of a fire lift is by a simple toggle or two-button switch situated in a glass-fronted box adjacent to the lift at the entrance level. When the switch is on, landing call-points will become inoperative and the lift will be on car control only or on a priority control device. When the switch is off, the lift will return to normal working. This lift can be used by the occupants in normal times.

7) The words 'Fire Lift' shall be conspicuously displayed in fluorescent paint on the lift landing doors at each floor level.

8) The speed of the fire lift shall be such that it can reach the top floor from ground level within 1 min.

Tower-1 (Residential): Proposed to provide 03 lifts (02 passenger lifts and 01 Fireman lift), each of 13 passenger's capacity.

Tower-2 (Office) : Proposed to provide 04 lifts (03 passenger lifts and 01 Fireman lift), each of 13

10	**Specification of lifts:** **C-1.5 Lifts** General requirements of lifts shall be as follows: a) Walls of lift enclosures shall have a fire rating of 2 h; lifts shafts shall have a vent at the top of area not less than 0.2 m^2. b) Lift motor room shall be located preferably on top of the shaft and separated from the shaft by the floor of the room. c) Landing doors in lift enclosures shall have a fire resistance of not less than 1 h. d) The number of lifts in one row for a lift bank shall not exceed 4 and the total number of lifts in the bank (of two rows) shall not exceed 8. A wall of 2 h fire rating shall separate individual shafts in a bank. e) Lift car door shall have a fire resistance rating of half an hour. f) Collapsible gates shall not be permitted for lifts and shall have solid doors with fire resistance of at least 1 h. g) If the lift shaft and lobby is in the core of the building, a positive pressure between 25 and 30 Pa shall be maintained in the lobby and a positive pressure of 50 Pa shall be maintained in the lift shaft. The mechanism for pressurization shall act automatically with the fire alarm; it shall be possible to operate this mechanically also. h) Exit from the lift lobby, if located in the core of the building, shall be through a self closing smoke stop door of half an hour fire resistance. j)Lifts shall not normally communicate with the basement; if, however, lifts are in communication, the lift lobby of the basements shall be pressurized as in (g), with self-closing door as in (h). k) Grounding switch(es), at ground floor level, shall be provided on all the lifts to enable the fire service to ground the lifts. m) Telephone or other communication facilities shall be provided in lift cars for building of 30 m in height and above. Communication system for lifts shall be connected to fire control room for the building. n) Suitable arrangements such as providing slope in the floor of lift lobby, shall be made to prevent water used during fire fighting, etc,at any landing from entering the lift shafts. p) A sign shall be posted and maintained on every floor at or near the lift indicating that in case of fire, occupants shall use the stairs	and 01 Fireman lift), each of 13 passenger's capacity. **Tower-3 (Hostel):** Proposed to provide 03 lifts (02 passenger lifts and 01 Fireman lift), each of 13 passenger's capacity. ***Further, as proposed lift lobbies should be enclosed at each floor level of Office Block by using self closing smoke stop swing door with minimum two hours fire resistance capacity.***

	unless instructed otherwise. The sign shall also contain a plan for each floor showing the locations of the stairways. Alternate source of power supply shall be provided for all the lifts through a manually operated changeover switch.	
11	Structural material RCC materials and brick walls of not less than two hours fire resistance should be used for the construction of structures. Only fire resistant materials or materials treated with fire retardant chemicals, should be used for interior decoration work. While attending the interior decoration the fixed fire fighting systems like sprinklers / risers etc., should not be covered or shifted from their original location.	RCC materials and brick walls of not less than two hours fire resistance should be used for the construction of structures. Only fire resistant materials or materials treated with fire retardant chemicals should be used for interior decoration work. While attending the interior decoration the fixed fire fighting systems like sprinklers / risers etc., should not be covered or shifted from their original location. Glass facade structure if proposed in the building should be provided **as per NBC 2016, para 3.4.10.2 .** The details as follows. a) For fully sprinklered buildings of 9m or more, tempered glass in a non-combustible assembly, with ability to hold the glass in place, shall be provided. It shall be ensured that sprinklers are located within 600mm of the glass façade providing full coverage to the glass. **b)** All gaps between floor-slabs and façade assembly shall be sealed at all levels by approved fire resistant sealant material of equal fire rating as that of floor slab to prevent fire and smoke propagation from one floor to another. c) Openable panels shall be provided on each floor and shall be spaced not more than 10m apart measured along the external wall from centre-to-centre of the access openings, such openings shall be openable at a height between 1.2m and 1.5m from the floor and shall be in the form of openable panels (fire access panels) of size not less than 1000mm X 1000mm openings outwards. The wordings, 'FIRE OPENABLE PANEL – OPEN IN CASE OF FIRE, DO NOT

		OBSTRUCT' of at least 25mm letter height shall be marked on the internal side. Such panels shall be suitably distributed on each floor based on occupant concentration. These shall not be limited to cubicle areas and shall be also located in common areas/corridors to facilitate access by the building occupants and fire personnel for smoke exhaust in times of distress.
12	Basements:- **12.9.3. The basement shall have the following requirements:** a) Every basement shall be in every part at least 2.4 m in height from the floor to the underside of the roof slab or ceiling; b) Adequate ventilation shall be provided for the basement. The ventilation requirements shall be the same as required by the particular occupancy according to byelaws. Any deficiency may be met by providing adequate mechanical ventilation in the form of blowers, exhaust fans, air conditioning systems, etc; c) The height of the ceiling of any basement shall be minimum 0.9 m and the maximum, 1.2 m above the average surrounding ground level. However, in case of parking, mercantile or business occupancy at ground floor, minimum height of the ceiling of the basement may be 0.3 m above the average surroundings ground level subject to mechanical ventilation being provided (see Fig. 11); d) Adequate arrangements shall be made such that surface drainage does not enter the basement; e) The walls and floors of the basement shall be watertight and be so designed that the effects of the surrounding soil and moisture, if any, are taken into account in design and adequate damp proofing treatment is given; f) The access to the basement shall be separate room the main and alternative staircase providing access and exit from higher floors. Where the staircase is continuous in the case of buildings served by more than one staircase, the same shall be of enclosed type serving as a fire separation from the basement floor and higher floors. Open ramps shall be permitted if they are constructed within the building line subject to the provision of (d); g) Access to basements through ramps shall be	Proposed to provide mechanical ventilation at each Basement parking area as per specification.

permitted subject to provision of (d). The requirements for the ramps shall be in accordance with 4.6.1.3 [see also Fig. 8 (b)];

h) For all public buildings and uses including group housing, having basement going up to more than one level, access to all levels shall also be provided through lift. The exit requirements in basements shall comply with the provisions of Part 4 .Fire and Life Safety. of the Code.

Pressurization of staircases & lift lobbies may be recommended as per requirement mentioned in Table-6.

Smoke control of exits

NBC 2016, Part 4, Fire and Life SafetyClause 4.4.2.5 Smoke control of exits a) In building design, compartmentation plays a vital part in limiting the spread of fire and smoke. The design should ensure avoidance of spread of smoke to adjacent spaces through the various leakage openings in the compartment enclosure, such as cracks, openings around pipes ducts, airflow grills and doors. In the absence of proper sealing of all these openings, smoke and toxic gases will obstruct the free movement of occupants of the building through the exits. Pressurization of staircases is of great importance for the exclusion of smoke and toxic gases from the protected exit.

b) Pressurization is a method adopted for protecting the exits from ingress of smoke, especially in high-rise buildings. In pressurization, air is injected into the staircases, lobbies, etc, as applicable, to raise their pressure slightly above the pressure in adjacent parts of the building. As a result, ingress of smoke or toxic gases into the exits will be prevented. The pressurization of staircases and lift lobbies shall be adopted as given in Table 6. The pressure difference for staircases shall be 50 Pa. Pressure differences for lobbies (or corridors) shall be between 25 Pa and 30 Pa. Further, the pressure differential for enclosed staircase adjacent to such lobby (or corridors) shall be 50 Pa. For enclosed staircases adjacent to non-pressurized lobby (or corridors), the pressure differential shall be 50 Pa.

c) Equipment and ductwork for staircase pressurization shall be in accordance with one of the following:

1) Directly connected to the stairway by ductwork enclosed in non-combustible construction.

2) If ducts used to pressurize the system are passed through shafts and grills are provided at each level, it shall be ensured that hot gases and

smoke from the building cannot ingress into the staircases under any circumstances.

d) The normal air conditioning system and the pressurization system shall be designed and interfaced to meet the requirements of emergency services. When the emergency pressurization is brought into action, the following changes in the normal air conditioning system shall be effected:

1) Any re-circulation of air shall be stopped and all exhaust air vented to atmosphere.

2) Any air supply to the spaces/areas other than exits shall be stopped.

3) The exhaust system may be continued provided,

i) the positions of the extraction grills permit a general air flow away from the means of egress;

ii) the construction of the ductwork and fans is such that, it will not be rendered inoperable by hot gases and smoke; and

iii) there is no danger of spread of smoke to other floors by the path of the extraction system which can be ensured by keeping the extraction fans running.

e) For pressurized stair enclosure systems, the activation of the systems shall be initiated by signalling from fire alarm panel.

f) Pressurization system shall be integrated and supervised with the automatic/manual fire alarm system for actuation.

g) Wherever pressurized staircase is to be connected to unpressurized area, the two areas shall be segregated by 120 min fire resistant wall.

h) Fresh air intake for pressurization shall be away (at least 4 m) from any of the exhaust outlets/grille.

As per clause 2.49 of Part 4 Fire and Life Safety of NBC 2016:

Pressurization — The establishment of a pressure difference across a barrier to protect a **stairway, lobby,escape route** or room of a building from smoke penetration.

Smoke exhaust and Pressurization of areas above ground as per clause 4.6.1 of Part 4 Fire and Life Safety of NBC 2016

Corridors in exit access (exit access corridor) are created for meeting the requirement of use, privacy and layout in various occupancies. These are most often noted in hospitality, health care occupancies and sleeping accommodations.

Smoke exhaust system having make-up air and

13	exhaust air system or alternatively pressurization system with supply air system for these exit access corridors shall be required. Smoke exhaust system having make-up air and exhaust air system shall also be required for theatres/auditoria. Such smoke exhaust system shall also be required for large lobbies and which have exit through staircase leading to exit discharge. This would enable eased exit of people through smoke controlled area to exit discharge. All exit passageway (from exit to exit discharge) shall be pressurized or naturally ventilated. The mechanical pressurization system shall be automatic in action with manual controls in addition. All such exit passageway shall be maintained with integrity for safe means of egress and evacuation. Doors provided in such exit passageway shall be fire rated doors of 120 min rating. Smoke exhaust system where provided, for above areas and occupancies shall have a minimum of 12 air changes per hour smoke exhaust mechanism. Pressurization system where provided shall have a minimum pressure differential of 25-30 Pa in relationship to other areas. The smoke exhaust fans in the mechanical ventilation system shall be fire rated, that is, 250°C for 120 min. For naturally cross-ventilated corridors or corridors with operable windows, such smoke exhaust system or pressurization system will not be required. **Smoke Exhaust and Pressurization of areas below Ground.** **As per clause 4.6.2 of Part 4 Fire and Life Safety of NBC 2016:** Each basement shall be separately ventilated. Vents with cross-sectional area (aggregate) not less than 2.5 percent of the floor area spread evenly round the perimeter of the basement shall be provided in the form of grills, or breakable stall board lights or pavement lights or by way of shafts. Alternatively, a system of mechanical ventilation system may be provided with following requirements: a) Mechanical ventilation system shall be designed to permit 12 air changes per hour in case of fire or distress call. However, for normal operation, air changes schedule shall be as given in Part 8 'Building Services, Section 3 Air conditioning, Heating and Mechanical Ventilation' of the Code.	Proposed to provide staircase pressurization (natural ventilation) as per clause 4.4.2.5 of NBC 2016, Part-4.

b) In multi-level basements, independent air intake and smoke exhaust shafts (masonry or reinforced concrete) for respective basement levels and compartments therein shall be planned with its make-up air and exhaust air fans located on the respective level and in the respective compartment. Alternatively, in multi-level basements, common intake masonry (or reinforced cement concrete) shaft may serve respective compartments aligned at all basement levels. Similarly, common smoke exhaust/outlet masonry (or reinforced cement concrete) shafts may also be planned to serve such compartments at all basement levels. All supply air and exhaust air fans on respective levels shall be installed in fire resisting room of 120 min. Exhaust fans at the respective levels shall be provided with back draft damper connection to the common smoke exhaust shaft ensuring complete isolation and compartmentation of floor isolation to eliminate spread of fire and smoke to the other compartments/floors.

c) Due consideration shall be taken for ensuring proper drainage of such shafts to avoid insanitation condition. Inlets and extracts may be terminated at ground level with stall board or pavement lights as before. Stall board and pavement lights should be in positions easily accessible to the fire brigade and clearly marked ‘AIR INLET’ or ‘SMOKE OUTLET’ with an indication of area served at or near the opening.

d) Smoke from any fire in the basement shall not obstruct any exit serving the ground and upper floors of the building.

e) The smoke exhaust fans in the mechanical ventilation system shall be fire rated, that is, 250°C for 120 min.

f) The smoke ventilation of the basement car parking areas shall be through provision of supply and exhaust air ducts duly installed with its supports and connected to supply air and exhaust fans. Alternatively, a system of impulse fans (jet fans) may be used for meeting the requirement of smoke ventilation complying with the following:

1) Structural aspects of beams and other down stands/services shall be taken care of in the planning and provision of the jet fans.

2) Fans shall be fire rated, that is, 250°C for 120 min.

3) Fans shall be adequately supported to enable operations for the duration as above.

4) Power supply panels for the fans shall be located

	in fire safe zone to ensure continuity of power supply. 5) Power supply cabling shall meet circuit integrity requirement in accordance with accepted standard [4(13)]. The smoke extraction system shall operate on actuation of flow switch actuation of sprinkler system. In addition, a local and/or remote 'manual start-stop control/switch' shall be provided for operations by the fire fighters. Visual indication of the operation status of the fans shall also be provided with the remote control. No system relating to smoke ventilation shall be allowed to interface or cross the transformer area, electrical switchboard, electrical rooms or exits. Smoke exhaust system having make-up air and exhaust air system for areas other than car parking shall be required for common areas and exit access corridor in basements/ underground structures and shall be completely separate and independent of car parking areas and other mechanical areas. Supply air shall not be less than 5 m from any exhaust discharge openings.	
14	Compartmentation **As per clause 4.5 of Part 4 Fire and Life Safety of NBC 2016:** **4.5.1 General** a) It is important to limit the spread of a fire in any building. The usual method is to use fire barriers. In some instances these barriers need to be penetrated for ductwork, plumbing and electrical systems, and in such cases, use of passive fire protection measures shall be done so that the integrity of these barriers is not compromised. b) Floor(s) shall be compartmented with area as given below. **4.5.2** All floors shall be compartmented / zoned with area of each compartment being not more than 750 m^2. The maximum size of the compartment shall be as follows, in case of sprinklered Basement / Building: In addition, there shall be requirement of a minimum of two compartments if the floor plate size is equal or less than the areas mentioned above. However, such requirement of minimum two compartments shall not be required, if the floor plate is less than 750 m^2. Compartmentation shall be achieved by means of fire barrier having fire resistance rating of 120 min.	Proposed to provide Water curtain nozzles system in each common basement parking area and fire barrier in upper floors of each Tower as per NBC-2016.
	Gas Supply	

15	**As per clause 4.7.1 of Part 4 Fire and Life Safety of NBC 2016:** **Town Gas/ LPG supply pipes** Where gas pipes are run in buildings, the same shall be run in separate shafts exclusively for this purpose and these shall be on external walls, away from the staircases. Gas distribution pipes shall always be below the false ceiling. The length of these pipes shall be as short as possible. In the case of kitchen cooking range area, hood should have grease filters using metallic grill to trap oil vapours escaping into the fume hood. NOTE — For detailed information on gas pipe installations, reference may be made to Part 9 'Plumbing Services, Section 4 Gas Supply' of the Code. 4.7.2 Thermal detectors These shall be installed into fume hoods of large kitchens for hotels, hospitals, and similar areas located in high rise buildings. Arrangements shall be made for automatic tripping of the exhaust fan in case of fire. If gas is used, the same shall be shut off. The voltage shall be 24 V or 100 V d.c. operated with external rectifier. The valve shall be of the hand re-set type and shall be located in an area segregated from cooking ranges. Valves shall be easily accessible. The hood shall have manual facility for steam or suitable hood extinguishing gas released depending on duty condition. **4.7.3** Gas cylinders and manifold shall need to be housed in a detached location with no other occupancy within distances prescribed in good practice [4(14)] thereof. There shall be an enclosure suitably ventilated. It is desirable to provide medium velocity spray nozzles which can be operated by quick opening valve situated away from the enclosure. **4.7.4** In the case of gas cylinders, if manifold has to be installed on podium/close to podium, the same shall be away from any air intakes/smoke exhaust openings/ any windows. **4.7.6** Gas meters shall be housed in a suitably constructed metal cupboard located in a well-ventilated space, keeping in view the fact that LPG is heavier than air and town gas is lighter than air. **4.7.7** Wherever LPG reticulation/ cylinders are used in buildings above 100 m, gas leak detectors shall be provided at the usage points and monitored from fire command centre. The cables used for signalling shall be circuit integrity cables. **4.7.8** The gas lines shall not be installed through any electrical shafts,	Not proposed in the drawings. If Town Gas / LPG supply system is proposed in the building, it shall be provided as per clause 4.7.1 of Part-4 Fire and Life Safety of NBC 2016 & separate NOC has to be obtained from this department.

	escape routes, refuge areas / refuge floors. **4.7.9** Kitchens working on LPG fuel shall not be permitted in basements.	
16	Service ducts and shafts **3.4.5.4 Service ducts and shafts** Openings in walls or floors which are necessary to be provided to allow passages of all building services like cables, electrical wirings, telephone cables, plumbing pipes, etc, shall be protected by enclosure in the form of ducts/shafts having a fire resistance not less than 120 min. The inspection door for electrical shafts/ducts low voltage wiring running in shafts/ducts, shall either be armoured type or run through metal conduits. The space between the electrical cables/conduits and the walls/slabs shall be filled in by a fire stop material having fire resistance rating of not less than 120 min. This shall exclude requirement of fire stop sealing for low voltage services shaft. For plumbing shafts in the core of the building, with shaft door opening inside the building, the shafts shall have inspection doors having fire resistance rating not less than 30 min. For plumbing shafts doors which open in wet areas or in naturally ventilated areas or on external wall of the building, the shafts may not require doors having any specified fire rating. **3.4.6 Electrical Installation** 3.4.6.1 The electric distribution cables/wiring shall be laid in a separate shaft. The shaft shall be sealed at every floor with fire stop materials having the same fire resistance as that of the floor. High, medium and low voltage wiring running in shaft and in false ceiling shall run in separate shaft/conduits. Water mains, gas pipes, telephone lines, intercom lines or any other service line shall not be laid in the duct for electrical cables; use of bus ducts/solid rising mains instead of cables is preferred.	Service ducts and shafts should be sealed at every floor level as per specification.
	Escape Lighting and Exit Signage's. **3.4.7 Escape Lighting and Exit Signage**Exit access, exits and exit discharge shall be properly identified, with adequate lighting maintained in the elements of the egress systems so that all occupants shall be able to leave the facility safely. **3.4.7.1 Lighting** a) The exit, exit access and exit discharge systems shall be illuminated continuously. The floors of the means of egress shall be illuminated at all points, including angles and intersections, in corridors and passageways, stairwells, landings of stairwells and	

	exit. b) Emergency lighting shall be powered from a source independent of that supplying the normal lighting. c) Escape lighting shall be capable of, 1) indicating clearly and unambiguously the escape routes; 2) providing adequate illumination along such routes to allow safe movement of persons towards and through the exits; and 3) Ensuring that fire alarm call points and Fire fighting equipment provided along the escape routes can be readily located. d) The horizontal luminance at floor level on the centreline of an escape route shall not be less than 10 lumen / m^2. In addition, for escape routes up to 2 m wide, 50 percent of the route width shall be lit to a minimum of 5 lumen / m^2. e) Required illumination shall be arranged such that the failure of any single lighting unit, such as the burning out of one luminaire, will not leave any area in darkness and does not impede the functioning of the system further. f) The emergency lighting shall be provided to be put on within 5 s of the failure of the normal lighting supply. Also, emergency lighting shall be able to maintain the required illumination level for a period of not less than 90 min in the event of failure of the normal lighting even for smaller premises. g) Battery pack emergency lighting, because of its limited duration and reliability, shall not be allowed to be used in lieu of a diesel engine driven emergency power supply. h) Escape lighting luminaries should be sited to cover the following locations: 1) Near each intersection of corridors, 2) At exits and at each exit door, 3) Near each change of direction in the escape route, 4) Near each staircase so that each flight of stairs receives direct light, 5) Near any other change of floor level, 6) Outside each final exit and close to it, 7) Near each fire alarm call point, 8) Near fire fighting equipment, and 9) To illuminate exit and safety signs as required by	
17		Escape lighting and Exit signage's should be provided as per clause 3.4.7, Lighting 3.4.7.1.

the enforcing authority.

NOTE. For the purpose of this clause 'near' is normally considered to be within 2 m measured horizontally.

j) The luminaries shall be mounted as low as Possible, but at least 2 m above the floor level.

k) Signs are required at all exits, emergency exits and escape routes, which should comply with the graphic requirements of the relevant Indian Standards.

3.4.7.2 Exit passageway (at ground) and staircase lighting shall also be connected to alternative supply. The alternative source of supply may be provided by battery continuously trickle charged from the electric mains.

3.4.7.3 Suitable arrangements shall be made by installing double throw switches to ensure that the lighting installed in the staircase and the corridor does not get connected to two sources of supply simultaneously. Double throw switch shall be installed in the service room for terminating the stand-by supply.

The emergency lighting system shall be well maintained by periodical inspections and tests so as to ensure their perfect serviceability at all times.

3.4.7.4 Exit signage Where exit access is provided through corridors / paths, the occupants shall be able to easily identify the way to exits. Exit signs shall be provided such that no point in an exit access is more than 30 m from a visible exit directional sign. An exit sign indicating the direction to an exit shall be provided at all changes in direction.

Exits shall be clearly visible and the route to reach the exits shall be clearly marked and signs posted to guide the occupants of the floor concerned. Signs shall be illuminated and wired to an independent electrical circuit on an alternative source of supply. The sizes

and colours of the exit signs shall be in accordance with good practice [4(7)]. The colour of the exit signs shall be green.

NOTE. This provision shall not apply to A-2 and A-4 occupancies less than 15 m in height. The exit sign with arrow indicating the way to the escape route shall be provided at a suitable height from the floor level on the wall and shall be illuminated by electric light connected to corridor circuits. All exit way marking signs should be so installed that no mechanical damage shall occur to them due to

	moving of furniture or other heavy equipment. Further, all landings of floor shall have floor indicating boards prominently indicating the number of the floor. Photo luminescent markings shall be pasted at internal hydrant boxes.	
18	Additional fire prevention requirements for D-6 occupancy to be referred & followed as per Clause: 6.4.1.2 of NBC 2016, PartIV of Fire & Life Safety. 6.4.1 Fire Prevention 6.4.1.1 The following shall be applicable: a) Decorations of places of assembly shall be of non-flammable materials. Fabrics and papers used for such purpose shall be treated with an effective flame-retardant material. Stage settings made of combustible materials shall likewise be treated with fire retardant materials of Class 1 flame spread. b) Gymnasiums, indoor stadiums and similar occupancies are permitted to have floors/ running tracks of wood, cinder, synthetic or the like. D-6 occupancy Building having D-6 mixed use assembly/mercantile occupancy will limit the height of the assembly/ mercantile occupancy portion of the buildings to 30 m. Above this height the buildings may be used for business or residential occupancies with 240 min separation. Independent exits shall be provided for such occupancy above 30 m and shall not interface with exits of assembly/mercantile occupancy.	Not required.
	Additional Life safety requirements for Group D occupancy to be referred & followed as per Clause: 6.4.2, and following sub clause: 6.4.2.1. & 6.4.2.2 & 6.4.3 of NBC 2016, PartIV of Fire & Life Safety. 6.4.2 Life Safety 6.4.2.1 The following shall be applicable: a) Exit door width for assembly buildings shall not be less than 2.0 m. b) Every place of assembly of subdivision D1 shall have at least four separate exits as remote from each other as practicable. c) Every place of assembly of subdivision D-2 shall have at least two separate exits as remote from each other as practicable and if of capacity over 600, at least three exits shall be provided with each exit not less than of 2.0 m width.	

d) Clear aisles not less than 1.2 m in width shall be formed at right angles to the line of seating in such number and manner that no seat shall be more than seven seats away from an aisle.

Rows of seats opening on to an aisle at one end only shall have not more than seven seats. Under the conditions, where all these aisles do not directly meet the exit doors, crossaisles shall

be provided parallel to the line of seating so as to provide direct access to the exit, provided that not less than one cross aisle for every 10 rows shall be required. The width of cross-aisles

shall be minimum of 1 m. Steps shall not be placed in aisles to overcome differences in levels, unless the gradient exceeds 1 in 10.

e) The fascia of boxes, balconies and galleries shall have substantial railings not less than 1 000 mm high above the floor. The railings at the end of aisles extending to the fascia shall

be not less than 1 100 mm high for the width of the aisle or 1.2 m high at the foot of steps.

f) Cross-aisles, except where the backs of seats on the front of the aisle project 600 mm or more above the floor of the aisle, shall be provided with railings not less than 900 mm high.

g) No turnstiles or other devices to restrict the movement of persons shall be installed in any place of assembly in such a manner as to interfere in any way with the required exit facilities.

h) In theatres and similar places of public assembly where persons are admitted to the building at a time when seats are not available for them and are allowed to wait in a lobby or

similar space until seats are available, such use of lobby or similar space shall not encroach upon the required clear width of exits. Such waiting shall be restricted to areas separated from the required exit ways by substantial permanent partitions or fixed rigid railing not less than 1 050 mm high. Exits shall be provided for such waiting spaces on the basis of one person for each 0.3 m2 of waiting space area. Such exits shall be in addition to the exits specified for the main auditorium area and shall conform in construction and arrangement to the general rules of exits given above.

j) No display or exhibit shall be so installed or operated as to interfere in any way with access to any required exit, or with any required exit sign.

k) All displays or exhibits of combustible material or construction and all booths and temporary

	construction in connection therewith shall be so limited in combustibility or protected as to avoid any undue hazard of fire which might endanger occupants before they have opportunity to use the available exits, as determined by the authority. m) Places of assembly in buildings of other occupancy may use exits common to the place of assembly and the other occupancy, provided the assembly area and the other occupancy are considered separately, and each has exits sufficient to meet the requirements of the Code. n) Exits shall be sufficient for simultaneous occupancy of both the places of assembly and other parts of the building. p) For detailed information regarding cinema buildings, reference may be made to good practice [4(27)]. q) Seats in places of public assembly, accommodating more than 300 persons, shall be securely fastened to the floor, except as permitted in (r) below. All seats in balconies and galleries shall be securely fastened to the floor, except that in nailed-in enclosures, boxes with level floors and having not more than 14 seats, the seats need not be fastened. r) Chairs not secured to the floor may be permitted in restaurants, night clubs and other occupancies where the fastening of seats to the floor may not be practicable, provided that in the area used for seating, excluding dance floor, stage, etc, there shall be not more than one seat for each 1.4 m2 of floor area and adequate aisles to reach exits shall be maintained at all times. The arrangements shall be as follows in general: 1) Rows of seats between aisles shall have not more than 14 seats. 2) Rows of seats opening on to an aisle at one end only shall have not more than 7 seats. 3) Seats without dividing arms shall have their capacity determined by allowing 450 mm per person. s) The spacing of rows of seats from back to back shall be neither less than 850 mm nor less than 700 mm plus the sum of the thickness of the back and inclination of the back. There shall be a space of not less than 350 mm between the back of one seat and the front of the seat immediately behind it as	
19		Not required.

measured between plumb lines.

t) Lighting . No open flame lighting devices shall be used in any place of assembly, except in the following cases:

1) Where necessary for ceremonialpurposes, the enforcing Authority maypermit open flame lighting under suchrestrictions as are necessary to avoiddanger of ignition of combustiblematerials or injury to occupants.

2) Candles may be used on restaurant tables if securely supported on non-combustible bases and so located as to avoid danger of ignition of combustible materials.

3) Open flame devices may be used on stages where they are a necessary part of theatrical performance, provided adequate precautions, satisfactory to the Authority are taken to prevent ignition of combustible materials.

6.4.2.2 Life safety provisions for D-6 occupancy

The following additional requirements shall be applicable:

a) Assembly occupancies of theatres, cinema halls and multiplexes shall be so located in the mall building that their exits will be separate and lead the occupant directly to exit discharge.

b) The common path of travel shall be 30 m. The maximum dead end of corridor distance shall not exceed 6 m.

c) The minimum width of an exit passageway shall be 2.0 m.

d) Where wheeled carts or buggies are used by customers, adequate provision shall be made for the transit and parking of such carts to minimise the possibility that they might obstruct means of egress. Any other storage

or hindrances causing obstruction in exits shall be avoided.

e) Car parking facilities shall comply with Annex H. Car parking areas at upper levels adjacent to shops, food courts or multiplex shall be separated by 120 min fire rated

construction and building elements.

f) 50 percent lifts in common areas in D-6 shall be with features and requirement of fireman.s lift.

g) The manual call points shall be break glass and not pull stations.

h) Photoluminescent markings shall be done along the width and length of treads in all enclosed exits

	staircases. Exit directional arrow on the wall (in the direction of egress) shall be 175 mm × 50 mm. j) Refuge area to be provided on the floor at or immediately above 18 m shall be not less than 10 percent of gross area of floor. Next refuge area to be at/on the floor immediately above 24 m. The refuge area shall be 10 percent of the respective floor, which may be divided into two or more separate refuge areas at each ofthe respective floors, with each being not less than 100 m2. Refuge area shall also meet all the requirements of life safety as per 4. 6.4.3 Fire Protection a) Every stage equipped with fly galleries, grid irons and rigging for movable theatre type scenery, shall have a system of automatic spaces and auxiliary spaces, such as dressingrooms, store rooms and workshops, and the proscenium opening shall be provided with a fire resisting curtain, capable of withstanding a lateral pressure of 4 kN/m2 over the entirearea. The curtain shall have an emergency closing device capable of causing the curtain to close without the use of power and when so closed, it shall be reasonably tight againstthe passage of smoke. b) The stage roof of every theatre using movable scenery or having a motion picture screen of highly combustible construction shall have a ventilator or ventilators in or above it, openable from the stage floor by hand and also opening by fusible links or some other approved automaticheat/smoke actuated device, to give a free opening equal to at least one-eighth the area of the floor of the stage. c) The proscenium wall of every theatre using movable scenery of decorations shall have, exclusive of the proscenium opening, not more than two openings entering the stage, each not to exceed 2 m2 and fitted with self-closing fire resistant doors. d) Every place of assembly in which projection of motion pictures by light is made shall have the projection apparatus enclosed in a fire resisting fixed booth in accordance with good practice [4(27)], except that such booth shall not be required where no nitrocellulose motion picture film is used.	
	D. The builder should arrange for the following fire fighting and evacuation measures:-	
	Electric Power Supply **NBC 2016, Part-4 Fire and Life Safety**	

1	**3.4.6.2** Emergency power for fire and life safety systems Emergency power supplying distribution system for critical requirement for functioning of fire and life safety system and equipment shall be planned for efficient and reliable power and control supply to the following systems and equipment where provided: a) Fire pumps. b) Pressurization and smoke venting; including its ancillary systems such as dampers and actuators. c) Fireman's lifts (including all lifts). d) Exit signage lighting. e) Emergency lighting. f) Fire alarm system. g) Public address (PA) system (relating to Emergency voice evacuation and annunciation). h) Magnetic door hold open devices. j) Lighting in fire command centre and security room. Power supply to these systems and equipment shall be from normal and emergency (standby generator) power sources with changeover facility. If power supply, is from HV source and HV generation, the transformer should be planned in standby capacity to ensure continuity of power to such systems. Wherever and backup DG sets are of higher voltage rating, then dual redundant cables shall be taken to all transformers. The generator shall be capable of taking starting current of all the fire and life safety systems and equipment as above. Where parallel HV/LV supply from a separate substation fed from different grid is provided with appropriate transformer for emergency, the provision of generator may be waived in consultation with the Authority. **3.4.6.4 Standby supply** **Diesel generator set(s) shall not be installed at any floor other than ground/first basement.** If the same are installed indoors, proper ventilation and exhaust shall be planned. The DG set room shall be separated by 120 min fire resistance rated walls and doors. The oil tank for the DG sets (if not in the base of the DG) shall be provided with a dyked enclosure having a volumetric capacity of at least 10 percent more than the volume of the oil tank. The enclosure shall be filled with sand for a height of 300 mm. For detailed information regarding fire safety requirements for hazardous petroleum products, reference may be made to The Petroleum Act, 1934 and the Rules framed there under.	Proposed to provide 04 standby generators, 02 each of 750 KVA capacity and another 02 each of 320 KVA capacity at open space available on the northern side after leaving 08.00mtrs wide driveway from the building line to provide alternative power supply to all the emergency provisions in the building.

2	Down comer system **NBC-2016, Part-4, Fire & Life Safety, Down-comer —** An arrangement of fire fighting within the building by means of down-comer pipe connected to terrace tank through terrace pump, gate valve and non-return valve and having mains not less than 100 mm internal diameter with landing valves on each floor/landing. It is also fitted with inlet connections at ground level for charging with water by pumping from fire service appliances and air release valve at roof level to release trapped air inside. **NBC 2016, Part-4, Fire & Life Safety Table 7 (6) down comer shall be provided for every 1000 sq.mtrs. built up area,** **Business Buildings (E)** 1. Less than 10 m in height. 1. Size of mains shall be 100 mm with single outlet landing valves. **Apartment Houses (A-4)** 1. For 15 m and above but not exceeding 35 m in height. The down comer should be of 100 mm internal diameter and G.I. 'C' class pipe. From each down comer single hydrant outlet should be provided	Not required.
3	Wet riser system. **NBC 2016 Part-4, Fire & Life Safety, Clause 2.65 Wet Riser —** An arrangement for fire fighting within the building by means of vertical rising mains not less than 100 mm nominal diameter with landing valves on each floor/landing for fire fighting purposes and permanently charged with water from a pressurized supply. **NBC -2016, Part-4 Fire & Life Safety, Table 7 (5) wet riser shall be provided for every 1000 sq.mtrs. built up area**, **Assembly Buildings (D-6)** 1. Should be provided in all buildings up to 30 m in height and irrespective of occupancy. 1. Size of mains shall be 100 mm with single outlet landing valves – upto 45 m height. The riser should be of 100 mm internal diameter and G.I. 'C' class pipe. From each riser single hydrant outlet should be provided at each landing. **Business Buildings (E)** 1. 1. Above 10 m in height. 1. Size of mains shall be 100 mm with single outlet landing valves – upto 45 m	Proposed to provide 03 Wet Riser-cum- down comer systems (1 in each tower), near the staircases. Each system will be of 150 mm internal diameter and will be of

3	height. Size of mains shall be 150 mm with single outlet landing valves – above 45 m height. **Hotels (A-5)** 1. Less than 15 m in height. i. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor (**Note 7**: Required to be provided for buildings with more than two storeys (Ground + One). ii. Floor area exceeding 1000 m^2 on any of the floor (**Note 15**: Required to be provided for buildings with more than one storey) 3. 15 m and above in height. i. Size of mains 100 mm with single outlet landing valves upto 45 m height. ii. Size of mains 150 mm with single outlet landing valves above 45 m height. **Apartment Houses (A-4)** 1. 35 m and above in height. The riser should be of 100 mm internal diameter and G.I. 'C' class pipe. From each riser single hydrant outlet should be provided at each landing.	internal diameter and will be of G.I. 'C' Class pipe. From each system double headed hydrant outlets at each floor landing will be provided.
4	First aid hose reel hose system. **NBC-2016, Part-4, Fire and Life Safety, Table 7 (4) First Aid Hose reel shall be provided for,** **Assembly Buildings (D-6) &**Should be provided in all the buildings irrespective of height and irrespective of occupancy. **Business Buildings (E)** 2. Should be provided in all buildings irrespective of height and irrespective of occupancy. **Hotels (A-5)** 1. Should be provided in all the buildings irrespective of height and irrespective of occupancy. **Apartment Houses (A-4)** 3. Should be provided in all the buildings irrespective of height and irrespective of occupancy. Rubber lined Hose reel hose of size minimum 19 mm of 40 mtrlength as per IS 884, with Gate valve (upstream) and shut off nozzle of 5 mm size. The hose reel hose should be connected at each landing by means of an adaptor. Adequate BIS marked re-in forced rubber lined delivery hoses of 63 mm size to reach the farthest point of the floor / setbacks from the system should be provided with a branch pipe near each hydrant outlet in a proper box to protect it	Hose reel hose of 40.00 mtrs. length with drum and 2 Nos. delivery hose pipes, each of 15 mtrs. length with gunmetal branch pipe will be provided inside the hose cabinet near each outlet.

	from withering.	
5	Hydrant system **NBC-2016, Part-4, Clause 2.64.1 : Hydrant system** – A distribution system having a network of piping installed underground / above ground around and / or through inside of a building with internal and / or external hydrants fitted with landing walls at regular interval according to the occupancy. The distribution system is connected to water supply system from fire fighting. **NBC-2016, Part-4, Table 7 (7)Yard hydrant shall be provided for,** **Assembly Buildings (D-6)** 1. Should be provided in all the buildings irrespective of height and irrespective of occupancy. **NBC-2016, Part-4, Table 7 (7)Yard hydrant shall be provided for,** **Business Building (E)** 1. Above 15 m in height. **Hotels (A-5)** 1. Less than 15 m in height, but floor area exceeding 1000 m^2 on any of the floor. 2. 15 m and above in height. **Apartment Houses (A-4)** 1. 45 m and above in height. At least two fire service inlets to boost the water in the riser directly from the mobile pump should also be provided. These inlets should be located at an easily accessible position, preferable near the entry point to the premises.	07 Nos. yard hydrants all around the building and 1 No. 4 way & 1 No. 4 way Fire Service inlets, near the entrances will also be provided.
	Underground Static Water Storage Tank Combined Capacity for Wet Riser, Yard hydrant and Sprinklers per set of Pumps **NBC-2016, Part-4, Table 7 (11) Underground Static Water Storage Tank Combined Capacity for Wet Riser, Yard hydrant and Sprinklers per set of Pumps shall be provided for,** **Assembly Buildings (D-6)** 1. Building height not exceeding 30 m in height & irrespective of occupancies – 2,00,000lts. **Business Buildings (E)** 1. Above 10 m but not exceeding 15 in height – 50,000 lts. 2. Above 15 m and upto 24 m in height – 1,00,000lts.	

	3. Above 24 m and upto 30 m in height – 1,50,00lts. 4. Above 30 m in height – 2,00,000lts. **Hotels (A-5)** 1. Less than 15 m in height. i. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor – 10,000 ltrs. for every 500 m^2 floor area subject to minimum of 50,000 ltrs. **(See Note 7**: Required to be provided for buildings with more than two storeys (Ground + One). ii. Floor area exceeding 1000 m^2 on any of the floor – 1,00,000 Ltrs. (**Note 15**: Required to be provided for buildings with more than one storey)	
6	2. 15 m and above but not exceeding 30 m in height – 1,50,000Ltrs. 3. Above 30 m in height- 2,00,000Ltrs. **Apartment Houses (A-4)** 1. Above 35 m but not exceeding 45 m. In height – 75,000 lts. 2. Above 45 m but not exceeding 60 m. In height – 1,50,000 lts. 3. Above 60 m in height. – 2,00,000 lts. **Note: Fire tank to be always filled with water. Over flow of fire tank to be taken to domestic tank. Arrangement should be such that any incoming water should first fill-up fire tank, then overflow to other utilizations.** **H-4 ENCLOSED PARKING STRUCTURES** c)For basement car parking, compartmentation can be achieved, with fire barrier or with water curtain nozzle (K-23) or with combination there of. Automatic deluge system comprising deluge valve, piping, nozzles, etc shall be used to zone the compartment in case of water curtain system. In case of water curtain, existing water storage shall be supplemented by water demand for water curtain nozzles for 60 min considering the largest compartment. perimeter out of all compartments of car parking in any of the basements. d) The water supply for the water curtain nozzles shall be through independent electric pump of adequate capacity (flow and head) with piping/riser for the water supply to the nozzles. e) The water curtain shall be operated by the actuation of flow switch actuating sprinkler system.	The wet riser cum down comer system and water curtain nozzles system of tower-1 (Residential) will be connected to an underground tank of 3,70,000 litres capacity. Similarly, The wet riser cum down comer system and water curtain nozzles system of tower-2 (office) & tower-3 (hostel) will be connected to an underground tank of 6,00,000 litres capacity.
	Terrace Tank Over Respective Tower Terrace	

7	**NBC-2016, Part-4 Table 7(12) Terrace Tank Over Respective Tower Terrace shall be provided for** **Assembly Buildings (D-6)** 1. Building height not exceeding 30 m in height & irrespective of occupancies – 20,000 ltrs. **Business Building (E)** 1. Less than 10 m in height – 10,000 lts.(5000 lts.) **(Note 6 :** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2) 2. Above 10 m but not exceeding 15 m in height – 5,000lts. (5000 lts.) **(Note 6 :** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2) 3. Above 15 m and up to 24 m in height – 10,000 lts. 4. Above 24 m upto 30 m in height – 20,000 lts. Above 30 m in height – 20,000 lts. **Hotels (A-5)** 1. Less than 15 m in height. i. Floor area not exceeding 300 m^2 on any of the floor – 5000 Ltrs. (5000 lts) (**Note 6**: Additional value given in parenthesis shall be added if basement area exceeds 200 m^2). ii. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor – 10,000 ltrs. (5000 lts.) (**Note 6**: Additional value given in parenthesis shall be added if basement area exceeds 200 m^2). iii. Floor area exceeding 1000 m^2 on any of the floor – 10,000 Ltrs. (**Note 4**: Required to be installed in basement, if area of basement exceeds 200 m^2) 2. 15 m and above - 20,000 Ltrs. **Apartment Houses (A-4)** 5. Less than 15 m in height 5000 lts. (5000 lts.) **(Note 6 :** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2) 6. 15 m and above but not exceeding 35 m in height 25,000 lts. 7. Above 35 m but not exceeding 45 m in height 5000 lts. 8. 45 m and above in height 10,000 lts. Note: Over head tank to overflow to domestic tank.	Each wet riser cum down comer system will also be connected to RCC overhead tank of 20,000 litres capacity (total 3 overhead tanks, 01 in each tower).

Arrangement should be such that any incoming water should first fill-up fire tank, then overflow to other utilizations.

Pump near underground static water storage tank (Fire pump) with minimum pressure of 3.5 kg/cm2

NBC-2016, Part-4, Table 7 (13) Pump near underground static water storage tank (Fire pump) with minimum pressure of 3.5 kg/cm2 at remotest location.

Assembly Buildings (D-6)

1. Building height not exceeding 30 m in height & irrespective of occupancies. (**N o t e 12**: Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity y 2 850 litre/min and two electric pump of capacity 180 litre/min **(see also Notes 22 and 23)**.

(**Note 22:** One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers.

Note 23: Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.)

Business Building (E)

1. Above 10 m but not exceeding 15 m in height (**Note 14 :** Provide required number of sets of pumps each consisting of one electric and one diesel pump (stand by) of capacity 1620 Litre/min and one electric pump of capacity 180 litre/min (see also note 22 and 23)
2. Above 10 m but not exceeding 15 m in height (**Note 10** Provide required number of sets of pumps each consisting of one electric and one diesel pump (standby) of capacity 2280 litre/min and one electric pump of capacity 180 litre/min **(see also note 22 and 23)**
3. Above 24 m and upto 30 m in height (**Note 11**Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity 2 280 litre/min and two electric pump of capacity 180 litre/min (see also Notes 22 and 23).
4. Above 30 m in height (**N o t e 12** Provide required number of sets of pumps each consisting of two electric and one diesel pump

	(stand by) of capacity 2 850 litre/min and two electric pump of capacity 180 litre/min (see also Notes 22 and 23) (**Note 22**: One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. (**Note 23**: Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.) **Hotels (A-5)** 1. Less than 15 m in height. i. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor. (**Note 14:** Provide required number of sets of pumps each consisting of one electric and one diesel pump (stand by) of capacity 1620 litre/min and one electric pump of capacity 180 litre/min **(see also Notes 22 and 23)** (**Note 22:** One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. (**Note 23**: Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.) ii. Floor area exceeding 1000 m^2 on any of the floor (**Note 15:** Required to be provided for buildings with more than one storey (**Note 14:** Provide required number of sets of pumps each consisting of one electric and one diesel pump (stand by) of capacity 1620 litre/min and one electric pump of capacity 180 litre/min **(see also Notes 22 and 23).** (**Note 22**: One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. (**Note 23**: Alternative to provisions of additional set of pumps, the objective can be met by	
8		The wet riser cum down comer system of tower-1 (residential) will be connected to 02 Nos. electrically driven pump & 1 No. diesel driven pump, each capable of delivering 2850 litres of water per minute and 02 Nos. jockey pump, capable of delivering 180 litres of water per minute. Proposed to provide one separate electrically driven pump, capable delivering 2850 litres of water per minute for Water Curtain nozzle system. Similarly, the wet riser cum down comer system of tower-2 (office) & tower-3(hostel) will be connected to 04 Nos. electrically driven pumps & 02 Nos. diesel driven pumps, each capable of delivering 2850 litres of water per minute and 04 Nos. jockey pump, capable of delivering 180 litres of water per minute. Proposed to provide one separate electrically driven pump, capable delivering 2850 litres of water per minute for Water Curtain nozzle system. ***Further, installation of Fire pumps arrangement should be provided as positive suction (Installation of negative suction arrangement and submersible pumps shall not be permitted) and Fire pump***

providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.)

2. 15 m and above in height **(Note 11**: Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity 2 280 litre/min and two electric pump of capacity 180 litre/min **(see ealsoNotes 22 and 23).**

(Note 22: One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers.

(Note 23: Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.)

Apartment Houses (A-4)

5. Above 35 m but not exceeding 45 m in height

(**Note 10 :** One electric and one diesel pump of capacity 2220 l/min and one electric pump of capacity 180 l/min. See also Note 22 and 23)

(Note 22: One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers.

(**Note 23**: Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.)

6. Above 45 m in height but not exceeding 60 m in height

(**Note 11** Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity 2 280 litre/min and two electric pump of capacity 180 litre/min (see Fig. 12) (see also Notes 22 and 23).

(**Note 22** One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers.

Note 23 Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and

room (Pump House) shall be sufficiently large to accommodate all pumps and their accessories like PRVs, Installation control valve, valves, diesel tank, electrical panel, etc.

Note: As per NBC-2016 Clauses 5.1.4 & 6 (Annex E) – where the height of the building exceeds 150 mtrs to 175 mtrs, fire static storage and pumps shall be required to be provided at 160 mtrs to 180 mtrs and thereafter at intermediate floors at higher levels enabling efficient and functional fire fighting installations. But in this case, the building height is below 160 mtrs, hence fire pumps are not required.

	doubling the water tank capacity as required for one set of pumps.) 1. Above 60 m in height (**Note 12** Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity 2 850 litre/min and two electric pump of capacity 180 litre/min (see Fig. 12) (see also Notes 22 and 23) (**Note 13** Lower levels in high rise buildings 60 m or above in height are likely to experience high pressure and therefore, it is recommended to consider multi-stage, multi-outlet pumps (creating pressure zones) or variable frequency drive pumps or any other equivalent arrangement) (**Note 22** One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. (**Note 23** Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.) If Basement is compartmented using water curtains additional pump as per clause H-4 d) The water supply for the water curtain nozzles shall be through independent electric pump of adequate capacity (flow and head) with piping/riser for the water supply to the nozzles to be provided.	
9	Pumps at the Terrace tank level with Minimum Pressure of 3.5 kg/cm2 **NBC-2016, Part-4, Table 7 (14) pumps at the Terrace tank level with Minimum Pressure of 3.5 kg/cm2 shall be provided for,** **Business Building (E)** 1. Less than 10 m in height – 450LPM (450 LPM) **(seeNote 6)** 2. Above 10 m but not exceeding 15 m in height – 450 LPM (450 LPM) **(see Note 6)** (**Note 6:** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2.) **Hotels (A-5)** 1. Less than 15 m in height i. Floor area not exceeding 300 m^2 on any of the floor & Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor - 450	Terrace pump not required.

	LPM (450 LPM) **Note 6:** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2.) ii. Floor area exceeding 300 m2 but not more 1000 m2 on any of the floor – 450 LPM (450 L P M)**(Note 6:**Additional value given in parenthesis shall be added if basement area exceeds 200 m^2.) **Apartment Houses (A-4)** 3. Less than 15 m in height 450 LPM (450 LPM) (**Note 6:** Additional value given in parenthesis shall be added if basement area exceeds 200 m^2.) 2. 15 m and above but not exceeding 35 m in height – 900 LPM.	
10	Manually operated fire alarm system. **NBC-2016, Part-4, Clause 2.1 Alarm System –** Fire alarm system comprising components for automatically detecting a fire, initiating an alarm of fire and initiating other actions as appropriate. NOTE – The system may also include manual fire alarm call points. **NBC-2016, Part-4, Table 7 (9) Manually operated Electric Fire alarm system is required** **Assembly Buildings (D-6)** Should be provided in all the buildings irrespective of height and irrespective of occupancy. **NBC-2016, Part-4, Table 7 (9) Manually operated Electric Fire alarm system is required** **Business Buildings (E)** 1. 15 m and above in height. **Hotels (A-5)** 2. Should be provided in all the buildings irrespective of height and irrespective of occupancy. **Apartment Houses (A-4)** 1. 15 m and above in height. Manually operated electrical fire alarm system should be installed with call boxes located near each staircase landing of each building. The call boxes should be of 'break glass' type, where the call is transmitted automatically to the control room when the glass of the system is broken. This system should also be connected to an alternative source of power supply (diesel generator). The call boxes should be so installed that their	Proposed to provide manually operated Electrical Fire Alarm System with call point near each staircase landing at each floor and its control panel at ground floor.

<table>
<tr><td></td><td>location can be easily noticed from either direction and should be at a height of one meter from the floor level.</td><td></td></tr>
<tr><td>11</td><td>Automatic Fire Detection and alarm systems
NBC -2016, Part-4, Clause 2.1 as per Table 7(10) Automatic Fire Detection and alarm systems required (see Note 2: automatic detection and alarm system is not required to be provided in car parking area. Such detection system shall however be required in other areas of car parking such as electrical rooms, cabins and other areas) – Fire alarm system comprising components for automatically detecting a fire, initiating an alarm of fire and initiating other actions as appropriate.
Assembly Buildings (D-6)
1. Building height not exceeding 30 m in height & irrespective of occupancies.
Business Building (E)
Above 10 m in height.
Hotels (A-5)
1. Less than 15 m in height.
i. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor
ii. Floor area exceeding 1000 m^2 on any of the floor .
2. 15 m and above in height.
Apartment Houses (A-4).
Above 60 m in height (Automatic detection and alarm system is not required to be provided in car parking area. Such detection system shall however be required in other areas of car parking such as electrical rooms, cabins and other areas)</td><td>Proposed to provide automatic fire detection system with smoke detector heads, as indicated below:-
Tower-1 (Residential)
<table><tr><th>Floor</th><th>Smoke detector heads</th></tr><tr><td>Ground floor</td><td>04</td></tr><tr><td>1st floor to 50th floor</td><td>20
On each floor</td></tr><tr><td>51st floor (Club House)</td><td>13</td></tr></table>Tower-2 (office)
<table><tr><th>Floor</th><th>Smoke detector heads</th><th>Beam detector heads</th></tr><tr><td>Ground Mezzanine</td><td>06</td><td>03</td></tr><tr><td>1st floor to 41st floor</td><td>33 on each floor.</td><td>--</td></tr><tr><td>42nd floor</td><td>11</td><td></td></tr></table>Tower-3 (hostel)
<table><tr><th>Floor</th><th>Smoke detector heads</th><th>Beam detector heads</th></tr><tr><td>Ground Mezzanine</td><td>10</td><td>02</td></tr><tr><td>1st floor to 47th floor</td><td>32
on each floor.</td><td>--</td></tr><tr><td>48th floor</td><td>19</td><td>--</td></tr><tr><td>48th Mezzanine</td><td>19</td><td>--</td></tr><tr><td>49th floor</td><td>05</td><td>--</td></tr></table></td></tr>
<tr><td>12</td><td>Public Address System:
A system of two way talk back speaker with push to talk speakers to be provided at every staircase or</td><td>Proposed to provide Public Address System with two way communication facility (talk back</td></tr>
</table>

12	firemen telephone to be provided at every staircase. Necessary console & amplifier with micro phone to be provided at ground floor in fire command center.	system) near each staircase landing at each floor and its console at ground floor.
	Automatic sprinkler system A system of water pipes fitted with sprinkler heads at suitable intervals and heights and designed to actuate automatically, control and extinguish a fire by the discharge of water. **NBC-2016, Part-4, Table 7 (8) Automatic Sprinkler system.** **Assembly Buildings (D-6)** 1. Building height not exceeding 30 m in height & irrespective of occupancies. **Business Building (E)** 2. Less than 15 m in height (**Note4:** Required to be installed in basement if area of basement exceeds 200 m^2) 15 m and above in height. **Hotels (A-5).** 1. Less than 15 m in height.	Proposed to provide automatic sprinkler system with sprinkler heads & water curtain nozzles, as indicated below:- ***Tower-1 (Residential)*** ***Floors*** / ***Sprinkler heads*** / ***Water curtain nozzle*** Basement-5: 200 / 15 Basement-4: 205 / 15 Basement-3: 205 / 15 Basement-2: 204 / 15 Basement-1: 245 / 38 Ground floor: 46 / -- 1st to 19th floor, 21st to 29th floor, 31 st to 39th floor & 41st to 49th floor: 35 On each floor / -- 20th, 30th, 40 th & 50th floor: 39 On each floor / -- 51st floor: 61 / -- ***Tower-2 (office) & Tower-3 (hostel)*** ***Floors*** / ***Sprinkler heads*** / ***Water curtain nozzle*** Basement-5: 149 / 15 Basement-4: 148 / 15 Basement-3: 152 / 15 Basement-2: 149 / 15 Basement-1: 139 / 15 ***Tower-2 (office)*** Ground floor: 29 / -- Mezzanine: 15 / -- 1st floor to 5th floor, 7th to 9th: 59 on each floor. / --

13	i. Floor area not exceeding 300 m^2 on any of the floor **(See Note 4** : Required to be installed in basement if area of basement exceeds 200 m^2) ii. Floor area exceeding 300 m^2 but not more 1000 m^2 on any of the floor (**Note4:** Required to be installed in basement if area of basement exceeds 200 m^2). iii. Floor area exceeding 1000 m^2 on any of the floor. 2. 15 m and above. **Apartment Houses (A-4).** 3. Upto 35 m in height. (**Note4:** Required to be installed in basement if area of basement exceeds 200 m^2) 4. Above 35 m but not exceeding 45 m in height. (**Note 4:** Required to be installed in basement if area of basement exceeds 200 m^2 and **Note 9:** **S**prinklers shall be fed water from both underground static water storage tank and terrace tank) 5. 45 m and above in height to installed in entire building. (Basements, ground and all upper floors)	floor, 11th to 13th floor, 15th to 18th floor, 20th to 22nd floor, 24th to 26th floor, 28th to 30th floor, 32nd to 35th floor, 37th to 39th floor, 39th to 41st floor		
		6th, 10th, 14th, 19th, 23rd, 27th, 31st, 36th & 40 th floor	64 On each floor	--
		42nd floor	43	--
		Tower-3 (hostel)		
		Ground floor	44	--
		Mezzanine	25	--
		1st to 6th floor, 8th to 11th floor, 13th to 16th floor, 18th to 21st floor, 23rd to 26th floor, 28th to 31st floor, 33rd to 36th floor, 38th to 41st floor, 43 rd to 46th floor.	34 on each floor	--
		7th, 12th, 17th, 22nd , 27th, 32nd, 37th, 42nd & 47 th floor	39 on each floor	--
		48th floor	21	--
		48th Mezzanine floor	33	--

		49th floor	16	--

Tower-1 (Residential)

Proposed to provide Refuge area of 31.88 Sq.mtrs at each floor i.e. 20th floor, 30th floor, 40 th floor and 50th floor on each floor.

20th floor built up area is 584.47 Sq.mtrs / 12.50 = 46.75 Persons.

21th floor built up area is 552.59 Sq.mtrs / 12.50 = 44.20 Persons.

Required Refuge area at 20th floor = total 90.95 persons x 0.3 Sq.mtr. = 27.28 Sq.mtrs + 0.9 Sq.mtr = 28.18 Sq.mtrs.

Proposed refuge area is more than the requirement.

30th floor built up area is 584.47 Sq.mtrs/ 12.50 = 46.75 Persons.

31th floor built up area is 552.59 Sq.mtrs / 12.50 = 44.20 Persons.

Required Refuge area at 20th floor = total 90.95 persons x 0.3 Sq.mtr. = 27.28 Sq.mtrs + 0.9 Sq.mtr = 28.18 Sq.mtrs.

Proposed refuge area is more than the requirement.

40th floor built up area is 584.47 Sq.mtrs / 12.50 = 46.75 Persons.

41st floor built up area is 552.59 Sq.mtrs / 12.50 = 44.20 Persons.

Required Refuge area at 20th floor = total 90.95 persons x 0.3 Sq.mtr. = 27.28 Sq.mtrs + 0.9 Sq.mtr = 28.18 Sq.mtrs.

Proposed refuge area is more than the requirement.

50th floor built up area is 584.47 Sq.mtrs / 12.50 = 46.75 Persons.

51th floor built up area is 552.59 Sq.mtrs / 12.50 = 44.20 Persons.

Required Refuge area at 20th floor = total 90.95 persons x 0.3 Sq.mtr. = 27.28 Sq.mtrs + 0.9 Sq.mtr = 28.18 Sq.mtrs.

Proposed refuge area is more than the requirement.

	Tower-2 (Office) Proposed to provide Refuge area of 32.80 Sq.mtrs at each floor i.e. 6th, 10th, 14th , 19th, 23rd, 27th, 31 st, 36th & 40th floor on each floor. 6th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 7th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 6th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 10th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 11th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 10th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 14th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 15th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 14th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 19th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 20th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 19th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 23rd floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons.
Horizontal Exits/Refuge Area **NBC-2016, Part-4, Annex-E-4** a) A horizontal exit shall be through a fire door of 120 min rating in a fire resistant wall. Horizontal exit require separation with the refuge area or adjoining compartment through 120 min fire barrier. The adjoining compartment of the horizontal exit should allow unlocked and ease of	

14	egress and exits for the occupants using defend in place strategy. Requirements of horizontal exits are as under: a) Width of horizontal exit doorway shall be suitable to meet the occupant load factor for egress. b) Doors in horizontal exits shall be openable at all times from both sides. c) All doors shall swing in the direction of exit travel. For horizontal exits, if a double leaf door is used, the right hand door leaf shall swing in the direction of exit travel. d) **Refuge area** for **Group D** occupancy to be provided on the floor at or immediately above 18m, shall be not less than 10percent of gross area of floor. Next refuge area to be at/on the floor immediately above 24m. The refuge area shall be 10percent of the respective floor, which may be divided into two or more separate refuge area at each of the respective floors, with each being not less than 100sq.m. Refuge area shall also meet all the requirements of life safety as per 4. 1. The refuge area shall be provided on the periphery of the floor and open to air at least on one side protected with suitable railings. 2. Refuge area (s) shall be provided at / or immediately above 24 m and thereafter at every 15 m or so. e)A prominent sign bearing the words 'REFUGE AREA' shall be installed at the entry of the refuge area, having height of letters of minimum 75 mm and also containing information about the location of refuge areas on the floors above and below this floor. The same signage shall also be conspicuously located within the refuge area. f) Each refuge area shall be ventilated and provided with first aid box, fire extinguishers, public address speaker, fire man talk back, and adequate emergency lighting as well as drinking water facility. g) Refuge areas shall be approachable from the space they serve by an accessible means of egress. h) Refuge areas shall connect to fire fighting shaft (comprising fireman's lift, lobby and staircase) without having the occupants requiring to return to the building spaces through which travel to the area of refuge occurred. j) The refuge area shall always be kept clear. No storage of combustible products and materials, electrical and mechanical equipment, etc shall be	24th floor built up area is 492.66 Sq.mtrs / 10 = 49.26 Persons. Required Refuge area at 23rd floor = Total 104.03 Persons x 0.3 Sq.mtr = 31.20 Sq.mtrs + 0.9 Sq.mtr = 32.10 Sq.mtrs. Proposed refuge area is more than the requirement. 27th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 28th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 27th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.88 Sq.mtrs + 0.9 Sq.mtr = 32.78 Sq.mtrs. Proposed refuge area is more than the requirement. 31st floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 32nd floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 31st floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 36th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 37th floor built up area is 514.97 Sq.mtrs / 10 = 51.49 Persons. Required Refuge area at 36th floor = Total 106.26 Persons x 0.3 Sq.mtr = 31.87 Sq.mtrs + 0.9 Sq.mtr = 32.77 Sq.mtrs. Proposed refuge area is more than the requirement. 40th floor built up area is 547.73 Sq.mtrs / 10 = 54.77 Persons. 41st floor built up area is 492.66 Sq.mtrs / 10 = 49.26 Persons. Required Refuge area at 40th floor = Total 104.03 Persons x 0.3 Sq.mtr = 31.20 Sq.mtrs + 0.9 Sq.mtr = 32.10 Sq.mtrs. Proposed refuge area is more than the requirement.

allowed in such areas. k) Refuge area shall be provided with adequate drainage facility to maintain efficient storm water disposal. m) Entire refuge area shall be provided with sprinklers. n) Where there is a difference in level between connected areas for horizontal exits, ramps of slope not steeper than 1 in 12 shall be provided (and steps should be avoided). **NOTE** – Refuge area provided in excess of the requirements shall be counted towards FAR.	**Tower-3 (Hostel)** Proposed to provide Refuge area of 22.18 Sq.mtrs at each floor i.e. 7th, 12th, 17th , 22nd, 27th, 32nd, 37 th, 42nd & 47th floor. 7th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons. 8th floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 7th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs. Proposed refuge area is more than the requirement. 12th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 13th floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 12th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement. 17th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 18th floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 17th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement. 22nd floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 23rd floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 22nd floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement. 27th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 28th floor built up area is 359.92

		Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 27th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement.	
		32nd floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 33rd floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 32nd floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement.	
		37th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 38th floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 37th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement.	
		42nd floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 43rd floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 42nd floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs Proposed refuge area is more than the requirement.	
		47th floor built up area is 382.10 Sq.mtrs / 12.50 = 30.56 Persons 48th floor built up area is 359.92 Sq.mts / 12.50 = 28.79 Persons. Required Refuge area at 47th floor = Total 59.35 Persons x 0.3 Sq.mtr = 17.80 Sq.mtrs + 0.9 Sq.mtr = 18.70 Sq.mtrs	

		Proposed refuge area is more than the requirement.
15	Fire Command Centre **NBC-2016, Part-4 Clause 3.4.12 Fire Command Centre (FCC)** a) Fire command centre shall be on the entrance floor of the building having direct access. The control room shall have the main fire alarm panel with communication system (suitable public address system) to aid floors and facilities for receiving the message from different floors. b) Fire command centre shall be constructed with 120 min rating walls with a fire door and shall be provided with emergency lighting. Interior finishes shall not use any flammable materials. All controls and monitoring of fire alarm systems, pressurization systems, smoke management systems shall happen from this room. Monitoring of integrated building management systems, CCTVs or any other critical parameters in building may also be from the same room. c) Details of all floor plans along with the details of fire fighting equipment and installations (2 sets laminated and bound) shall be maintained in fire command centre. d) The fire staff in charge of the fire command centre shall be responsible for the maintenance of the various services and fire fighting equipment and installations in coordination with security, electrical and civil staff of the building.	Proposed to provide Fire command centre at ground floor as per NBC 2016.
16	Fire Safety Plan **NBC-2016, Part-4, Annex-D, Clause 4.11 D-5 FIRE SAFETY PLAN** **D-5.1 A format for the Fire Safety Plan shall be as given in D-9.10.** **D-5.2** The applicable parts of the approved Fire Safety Plan shall be distributed to all tenants of the building by the building management when the Fire Safety Plan has been approved by the Fire Authority. D-5.3 The applicable parts of the approved Fire Safety Plan shall then be distributed by the tenants to all their employees and by the building management to all their building employees. D-5.4 In the event there are changes from conditions existing at the time the Fire Safety Plan for the building was approved, and the changes are such so as to require amending the Fire Safety Plan, within 30 days after such changes, an amended Fire Safety Plan shall be submitted to the	FIRE SAFETY PLAN should be provide as per NBC 2016.

	fire brigade for approval.	
17	Fire and Life Safety **As per clause 4.10 of Part 4 Fire and Life Safety of NBC 2016:** **4.10 Fire Officer** **4.10.1** A qualified Fire Officer with experience of not less than 3 years shall be appointed for D-6 occupancy. **4.10 Fire Officer** **4.10.1** A qualified Fire Officer with experience of not less than 3 years shall be appointed who will be available on the premises, for business buildings with height 30 m and above. **4.10 Fire Officer** **4.10.1** A qualified Fire Officer with experience of not less than 3 years shall be appointed who will be available on the premises, for starred hotels. **4.10 Fire Officer** **4.10.1** A qualified Fire Officer with experience of not less than 3 years shall be appointed who will be available on residential building with height 60 m and above. **4.10.2** The Fire Officer shall, a)maintain the fire fighting equipment in good working condition at all times. b)prepare fire orders and fire operational plans and get them promulgated. c)impart regular training to the occupants of the buildings in the use of fire fighting equipment provided on the premises and keep them informed about the fire emergency evacuation plan. d)keep proper liaison with the city fire brigade. e)ensure that all fire precautionary measures are observed at the times. NOTE - Competent authority having jurisdiction may insist on compliance of the above rules in case of buildings having very large areas even if the height is less than 30 m.	Fire officer should be appointed as per clause 4.10 of Part 4 Fire and Life Safety of NBC 2016. 40% of the occupants/employees of each block should be got trained in fire prevention & fire fighting at the R.A. Mundkur Fire and Emergency Services Academy, Bannerghatta Road, Bangalore-560 029, within 6 months from the date of occupation. For this purpose before approaching this department for final clearance certificate, the applicant should give an undertaking in the form of an affidavit regarding the maintenance of the fire prevention and fire fighting measures suggested above and arranging training of 40% of the occupants in fire prevention and fire fighting within 6 months from the date of issue of the Clearance Certificate.
		As proposed Fire extinguishers at following suitable places should be provided. 1) One ABC powder extinguishers of 6 kgs. and 9 Litres capacity Portable Hand held "Water Mist & CAFs" fire extinguishers – Jet & spray (combination) Capacity for every 8 cars at parking areas

18	Fire extinguishers **NBC-2016, Part-4, Table 7 (3) Fire extinguishers shall be provided for,** **Assembly Buildings (D-6), Business Buildings (E1), Hotel (A5) Building & Residential (A4)** 1. One ABC powder extinguishers of 6 kgs. Capacity for every 8 cars at parking areas should be provided. 2. One CO_2 extinguishers of 4.5 kgs. Capacity should be provided near the entrance to the electrical room. 3. One Mechanical Foam extinguishers of 9 litres capacity & one ABC powder extinguishers of 6 kgs. Capacity should be provided near the transformer. 4. One Mechanical foam extinguishers of 9 litres capacity and one ABC powder extinguishers of 6 kgs. Capacity should be provided near the diesel generator. 5. One CO_2 extinguishers of 2 kgs. Capacity should be provided inside each lift machine	should be provided. - As per IS-15683 / EN3-7 / NFPA-10 (Design & Construction) - Suppression Technology: NFPA 750 & NFPA 11 - Minimum Lancing Distance : Jet – 30Feet or more. - Minimum Lancing Distance : Spray– 10Feet or more - Spraying Angle 60° - Class – A, B, LPG Fires and Live Electrical Fire below 1000Volts (Test certificate to be submitted) - Fire Rating A: 21A or more - Fire Rating B: 144B or more - Foam Mist / Pressurised bubbles (Adhere to vertical and Horizontal surfaces, bubbles should retain for a minimum period of 20Minutes) - Foam Expansion minimum 1:10 or more **2)** One CO_2 extinguishers of 4.5 kgs. Capacity should be provided near the entrance to the electrical room. **3)** One 9 Litres capacity Portable Hand held "Water Mist & CAFs" fire extinguishers – Jet / spray type (Combination) and One ABC powder extinguishers of 6kgs. Capacity should be provided near transformer & diesel generator. - As per IS-15683 / EN3-7 / NFPA-10 (Design & Construction) - Suppression Technology: NFPA 750 & NFPA 11 - Minimum Lancing Distance : Jet – 30Feet or more - Minimum Lancing Distance : Spray– 10Feet or more - Spraying Angle 60° - Class – A, B, LPG Fires and Live Electrical Fire below 1000Volts (Test certificate to be submitted) - Fire Rating A: 21A or more - Fire Rating B: 144B or more - Foam Mist / Pressurised bubbles	

	room. 6. One Water Mist type extinguishers of 4 litres & 9 litres capacity should be kept near each staircase landing at each floor. All the extinguishers suggested above should be with B.I.S. markings and should be located at an easily accessible position without obstructing the normal passage and maintained periodically.	(Adhere to vertical and Horizontal surfaces, bubbles should retain for a minimum period of 20Minutes) - Foam Expansion minimum 1:10 or more and one ABC powder extinguishers of 6 kgs. Capacity should be provided near the diesel generator. **4)** One CO_2 extinguishers of 2 Kgs. Capacity should be provided inside each lift machine room. **5)** 9 Litres capacity Portable Hand held "Water Mist & CAFs" fire extinguishers – Jet / spray type (combination) should be kept in alternative staircase landing at each floor. - As per IS-15683 / EN3-7 / NFPA-10 (Design & Construction) - Suppression Technology: NFPA 750 & NFPA 11 - Minimum Lancing Distance : Jet – 30Feet or more - Minimum Lancing Distance : Spray– 10Feet or more - Spraying Angle 60° - Class – A, B, LPG Fires and Live Electrical Fire below 1000Volts (Test certificate to be submitted) - Fire Rating A: 21A or more - Fire Rating B: 144B or more - Foam Mist / Pressurised bubbles (Adhere to vertical and Horizontal surfaces, bubbles should retain for a minimum period of 20Minutes) - Foam Expansion minimum 1:10 or more All the extinguishers suggested above should be with B.I.S. markings and should be located at an easily accessible position without obstructing the normal passage and maintained periodically.

CONDITIONS:-

1. All the fire prevention, fire fighting and evacuation measures suggested/ recommended in B, C and D shall be strictly adhered to adopted.

2. Hazardous materials such as petroleum products, explosives, chemicals etc. should not be stored on any floor.
3. Refuse dumps or storage should not be permitted in any of the floors.
4. Liquefied petroleum gas should not be stored in the building except the limited quantity required for each kitchen.
5. Plan and occupancy should not be changed without informing the Fire & Emergency Services and without taking clearance.
6. The occupancy certificates should not be issued without obtaining the clearance certificate from the Fire and Emergency Services department.
7. Such reasonable changes/modifications as may be found necessary, after the building is fully constructed, will have to be agreed to be done by the builder/occupants of the building.
8. All the metal fittings of down comer system and all the extinguishers suggested above should have B.I.S markings.
9. Apart from the above the Building shall be constructed by following all the rules & conditions stipulated in Part-III & IV of NBC & local zoning regulations strictly, failing which the NOC issued will not be valid.
10. The above mentioned requirements are indicative and not exhaustive. All other requirements of National Building Code not specifically mentioned above shall also be complied with mandatorily.
11. This NOC is issued from the Fire Prevention and Fire Fighting point of view Karnataka State Fire & Emergency Services Department is not responsible for the ownership of the land, its location and other disputes, which may arise in due course.

Subject to the strict adherence to the conditions laid down as above, issue of License for the construction Mixed Occupany that is Sy. No. 2/6, Konadasapura Village, Bidarahalli hobli, , Bangalore East, BANGALORE - 560049 may please be considered.

- **All other relevant and applicable requirements as per NBC-2016 will have to be compiled with mandatorily.**

Yours faithfully,
Director General of Police and Director,
Karnataka Fire & Emergency Services.

Digitally signed by SHIVA KUMAR K
Date: 2021.07.12 17:44:16 +05:30
Reason: Approved