GUIDELINES BY CFO
MUNICIPAL CORPORATION OF GREATER MUMBAI
MUMBAI FIRE BRIGADE

1. **ACCESS:**
   a) All access & fire tender access should be free of encumbrances
   b) There shall be no compound wall on the Road side Entrance gate if provided shall be of not less than 6.00 meters width each shall be provided, at locations marked on the plan Archways if any over the entrance gates shall have height clearance of not less than 4.5mtrs.

2. **ACCESS RAMP:**
   a) Basements are provided with 02 nos. of two way ramps each of width 6.00 mtrs which will have entry at the ground level.
   b) The gradient of the ramp leading to the basement shall not be steeper than 1:10.
   c) The access provided to the basement shall be kept unobstructed
   d) **If podium proposed with access for fire appliances:**
      i. **The width of the ramp**- The normal width of the fire vehicle is 2.5 mtr and hence the minimum width of the ramp shall not be less than 6 mtr., if it is straight ramp.
      ii. **Turning circle radius**- When the vehicle taking the turn on the corner, the turning circle radius is very important factor. When vehicle is negotiating the turn, the front and the rear corner of the vehicle moves in the arc and it needs more width of the road / ramp compare to straight line driving. As per the present dimensions of vehicle, the minimum turning circle radius required is 14 mtr. Hence the width of the ramp at the corner shall not be less than 15 mtr.
      iii. **Gradient of the ramp**- Every vehicle is designed to climb on certain gradient. As per rules the vehicle shall climb on a gradient having a slope of 1 in 10 preferably 1 in 12, hence the gradient of the ramp shall be required to be maintain 1 in 12.
      iv. **Load bearing capacity of ramp surface** - The special appliances such as TTL, ALP, HP, JT etc. are heavy duty in nature and the access ramp / slab shall be designed to take this load. The heaviest vehicle available presently with the fire brigade is 52 ton GVW of 90 mtr. HP. Apart from
this there could be number of vehicles climbing on the ramp simultaneously at the time of the fire and hence the combined load of all these vehicles needs to be considered while designing the ramp. The easiest way to calculate the load bearing capacity of ramp shall be similar to bridges constructed in the city.

v. **Two way ramp**- There shall be two separate ramps, one for access to podium and another for exit from the podium with minimum 6 mtr. width with adequate width at corners according to turning circle radius and gradient of 1 in 12. This is very important to avoid locking of the vehicles which are climbing the ramp and the vehicles descending the ramp at the same time.

vi. **Anti – crash barriers to the ramp** - There is a possibility of rolling back of vehicle while climbing the ramp due to loss of traction. In this situation, the vehicle will hit to the side parapet of the ramp. If this side parapet is not strong enough to bear the load of the vehicle, and it will break due to impact of vehicle and the vehicle will fall down. Hence all the ramp should have anti – crash barriers as provided on highways to avoid the vehicle pass through these barriers.

vii. **Surface of the ramp** - The surface of the ramp is very important for the traction of the vehicle to climb on to the podium with fully loaded condition. If the surface of the ramp does not have anti – skit pattern, it will contribute for the slippage of tyres under load condition and vehicle will not climb to the podium level. The situation would be more dangerous during the monsoon season when the ramps are wet due to rain water. Hence the ramp surfaces should be made from anti skid design.

viii. **Load bearing capacity of the podium** - If the fire fighting vehicle are required to be operated on the podium for firefighting and rescue operation, the load bearing capacity of the podium slab is very important. The podium slab need to be designed as per the operating loads of the TTL, ALP, HP with factor of safety and the allowance for aging of the slab over a period of time considering life of the building.

ix. **Availability of space on the podium** - There shall be sufficient space available on the podium for the movement of fire fighting vehicles. The longest vehicle available with the fire brigade is having a length of 12.5 mtr. with 2.5 mtr. width. However there would be number of vehicles on the podium at the time of emergency call and there shall be sufficient space for movement of all these vehicles.

x. **Entry and Exit to the podium** - Considering the size of the vehicle, turning circle radius, proper entry and exit to the podium is very
important for the maneuverability of vehicles on the podium during the emergency.

xi. **Surface of the podium** - The podium surface is required to be made from anti-slip material to avoid the skidding of the vehicles at the time of emergency.

xii. **Lightning on the podium** - During the night time, a proper lighting is required to be provided for visibility and maneuvering of the vehicles during the emergency to avoid accidents.

3. **COURTYARDS:**

   a) The available courtyards, R.G and all the sides from building line shall be paved suitably to bear the load of fire engines weighing up to 48 metric tons each.

   b) All the courtyards shall be in one plane.

   c) The courtyards shall be kept free from obstruction at all times.

   d) No structure of any type shall be permitted in courtyards of the building.

   e) There shall not be any trees obstructing fire appliances reach in compulsory openspaces required as per DCR.

4. **STAIRCASE:**

   a) The staircase shall be of enclosed type as shown in the plans and throughout its height it shall be naturally ventilated & pressurized.

   b) Permanent vent for emergency at the top equal to 5% of the cross sectional area of the staircase shall be provided.

   c) Openable sashes or RCC grills with clear opening of not less than 0.5 sq. meter per landing on the external wall of the staircase shall be provided.

   d) Structural steel members connected to staircase shall be protected with fire retardant coatings.

   e) No combustibles shall be kept or stored in staircase / passages.

   f) Staircase lobbies shall be provided with smoke check lobby and shall be pressurized.
g) No glass façade shall be permitted at the external face of the staircase.

THE TERRACE DOOR MANNER AS FOLLOWS

1. The latch-lock shall be installed from the terrace side at the height of not more than 1mtrs.

2. The glass front of 6 inch diameter with the breakable glass shall be provided just above the latch-lock so as to open the latch in case of an emergency by breaking glass.

3. The door shall either be fitted with magnetic lock connected to console and detected system or shall be synchronized with fire detection and alarm system.

5. CORRIDOR / LIFT LOBBY:

a) Corridor / lift lobby at each floor level shall be mechanically ventilated with emergency ventilation facility at each floor level & pressurised.

b) The common corridor / lift lobby at each floor level shall be kept free from obstructions at all times.

c) Proper signages for way to staircase, escape routes, staircase, floor nos. etc. shall be provided at each floor of building.

d) Portable lights / insta lights shall be provided at strategic locations in the staircase and lift lobby

6. STAIRCASE AND CORRIDOR LIGHTINGS:

a) The staircase and corridor lighting shall be on separate circuits and shall be independently connected so that they could be operated by one switch installation on the ground floor easily accessible to firefighting staff at any time irrespective of the position of the individual control of the light points, if any.

b) Staircase and corridor lighting shall also be connected to alternate supply

c) Double throw switches should be installed to ensure that lighting in the staircase and the corridor does not get connected to two sources of supply simultaneously. A double throw switch shall be installed in the service room to terminate the stand-by-supply.
d) Emergency lights shall be provided in the staircases/corridors.

7. **FLAT ENTRANCE, KITCHEN DOORS & EXIT / ENTRANCE STAIRCASE:**

   a) Flat entrance and kitchen doors if any shall be of solid core having fire resistance of not less than one hour (solid wood of 45 mm thickness)

   b) The fire resistance rating for staircase FRD, Lift lobby / protected lobby & the lift doors as per N B.C. provisions.

8. **ELECTRIC CABLE SHAFTS, SERVICES & METER ROOM:**

   a) Electric cable shafts shall be exclusively used for electric cables and should not open in staircase enclosure.

   b) Inspection doors for shafts shall have two hours fire resistance.

   c) Electric shafts shall be sealed at each floor level with non-combustible materials such as vermiculite concrete No storage of any kind shall be done in electric shaft.

   d) Electric wiring /cable shall be non-toxic non-flammable low smoke hazard having copper core / fire resistance for the entire building with provision of ELCB/MCB.

   e) Electric meter room shall be provided at location marked on the plan. It shall be adequately ventilated & easily accessible.

   f) Electric wiring shall be having copper core having the fire resistance and low smoke hazard cables for the entire bldg., with the provision of ELCB/MCB Low and medium voltage wiring running in shaft and in false ceiling should run in separate conduits;

   g) Water main, telephone lines, intercom lines, gas pipes or any other service line should not be laid in the duct for electrical cables, use of bus bar/solid rising mains instead of cables is preferred.

   i) Separate circuits for firefighting pumps, fire lifts, staircases and corridor lighting and blowers for pressuring system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fuse in on circuit will not affect the others. Such circuits shall be protected at origin by an automatic circuit breaker with its no-volt coil removed.
j) a. The Master switches controlling essential service circuits shall be provided in the Fire Control room and shall be clearly labeled and operations of the same shall be carried out only by trained personnel or Fire Brigade personnel.

b. The manual control for the change-over switch from main to DG Set/ other sub-station alternate supplies shall be provided in the Fire Control room.

c. Emergency electrical services / switches shall be provided in the Fire Control room.

9. FALSE CEILING (if provided):

False ceiling if provided in the bidding shall be of non-combustible material similarly the suspenders of the false ceiling shall be of no combustible materials.

10. MATERIALS FOR INTERIOR DECORATION/FURNISHING

The use of materials which are combustible in nature and may spread toxic fume/gases should not be used for interior decoration/furnishing, etc.

11. ESCAPE ROUTE FROM FLAT TO STAIRCASE (Corridor / Lift Lobby):

a) Corridor / Lift lobby at each floor level shall be ventilated to outside air as shown on the plan. This natural ventilation shall not be blocked / obstructed by partition etc.

b) All lifts, lift lobbies & common corridors shall be pressurized in the event of fire at each floor. The positive pressure in these lift shafts should be maintained 50 Pascal and enclosed lift lobbies should be maintained 25 Pascal.

c) Proper signage for way to staircase, escape routes, staircase, floor nos. etc. shall be provided at each floor of building.

d) Location / layout plan of each floor shall be on walls of each floor at lift lobby etc.

12. LIFT

a. Walls enclosing lift shaft shall have a fire resistance of not less than two hours.
b. Shafts shall have permanent vent of not less than 0.2 Sqmts in clear area immediately under the machine room.

b) Landing doors and lift car doors of the lift shall be of steel shuttered with fire resistance of one hour No collapsible shutter shall be permitted.

c) One of the lift from each lift bank shall be converted into fire lift and shall be as per Specifications laid down under the regulations a toggle switch shall be provided to this lift for the use of Firemen.

d) Threshold of non-combustible material shall be provided at the entrance of each landing door

A. FIRE LIFT:

a) To enable fire services personnel to reach the upper floors with the minimum delay one fire lift shall be provided and shall be available for the exclusive use of the firemen in an emergency.

b) The lift shall have a floor area of not less than 1.4 sqmtrs It shall have loading capacity of not less than 545 kg (08 persons lift) with automatic closing doors of minimum 0.8 m. width.

c) 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 Light & fans in the elevators having wooden paneling or sheet steel construction shall be operated on 24 volt supply

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

e) In case of failure normal electric supply, it shall automatically changeover to alternate supply For apartment houses this changeover of supply could be done through manually operated changeover switch 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.

f) The operation of fire lift should be by a simple toggle or two-button switch situated in 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. Then this lift can be used by the
occupants in normal times.

g) The words Fire lift shall be conspicuously displayed in fluorescent paint on the lift ending doors at each floor level.

h) The speed of the fire lift shall be such that it can reach the top floor from ground level within one minute.

i) The fire rating of lift corridor having half an hour fire resistance & shall increase beyond NBC provisions by half an hour after every 70 mtrs height of the building.

j) Fire lift shall be constructed as per prevailing Indian & International standard.

13. CAR PARKING:

a) Car parking shall be permitted in the designated area.

b) Drainage of the car parking area of all the levels shall be laid independent from that of the buildings & it shall be provided with catch pit & fire trapped before connecting the building drainage or Municipal drainage.

c) Drainage of the car parking areas at all the levels shall be so laid as to prevent any overflow in the staircase, lift shaft etc.

d) The parking area shall not be used for dwelling purpose & repairing / maintenance purpose, at any time. Dwelling use of naked light flame repairing / maintenance of vehicles shall be strictly prohibited in the parking area.

e) Repairing / servicing of cars / use of naked light shall not be permitted in the car parking areas.

f) The drive way shall be properly marked & maintained unobstructed

g) The Automatic Sprinkler System provided to the entire car parking area

PODIUM / CAR PARKING FLOORS

a) All the sides of the stilted / covered car parking shall be kept open except parapet walls of not more than 0.75 meters height.

b) Automatic sprinkler and drencher system at the top of the podium
shall be provided to the entire parking floor.

c) The driveways shall be properly marked and maintained unobstructed, proper illuminated signage shall be provided for escape route, ramps etc. at prominent location

14. BASEMENT:

a) Each basement shall be separately ventilated. Vents with crosssectional area(Aggregate) not less than 2.5 percent of the floor area spread evenly around 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 air inlets shell be provided at basement floor level and smoke outlets at basement ceiling level inlets and outlets may be terminated at ground level with stall boards or pavement lights as before but ducts to convey fresh air to the basement floor level shall have to be laid stall boards and pavement lights should be in position easily accessible to the fire brigade personal and rescue teams and clearly marked 'SMOKE OUTLET or AIRINLET with an indication of area served at or near the opening.

b) The basements shall be used for designated purpose only as shown in the plan.

c) The basement shall be provided with natural ventilations through the ventilators open cut outs as shown in the plan.

d) The staircases of the basement shall be of enclosed type and entry to basement area shall be through two hours fire resistance self-closing door provided in the enclosed wall of the staircase and through smoke check / cut off lobby. The smoke check / cut off lobby shall be mechanically pressurized.

e) Mechanical ventilation shall be provided to the basement with 15 air changes per hour with an arrangement to accelerate the rate of air changes to 30 per hour in the event of a fire emergency.

f) The ducts of the mechanical ventilations system shall be of substantial metal gauge as per the relevant I.S. standard.

g) The operating switches of the mechanical ventilation shall be located in the fire control room with appropriate zonal indications.

h) Exhaust duct shall be provided to draw out exhaust at ground level of the basement.
i) Suitable signage shall be provided in the basement showing exit direction way to exits etc.

j) Automatic sprinkler system shall be provided in basement area/including ramp. These systems shall be installed as per the standard laid down by T.A.C. and relevant I.S. specifications

k) Smoke check lobby, Staircases, common passages & escape routes of the entire building shall be painted with fire retardant paint.

l) One Dry Chemical Powder fire extinguisher ABC type of 09 kgs Capacity each shall be kept for every 100 sqmtrs area in each basement

exits signs with IP 54 enclosure Luminance of the signages shall be such that they are visible from a distance of 12 to 16 meters

n) The staircase of the basement & the associated lift lobbies shall be pressurized in the event of fire The pressure in this enclosed staircase and enclosed lift lobbies shall be maintained not less than 5m m. W G & 2 5 mm W G for lift lobbies

o) CO Detector with audible alarm system shall be provided to all the basement areas and the circuit of the same shall be given / connected to mechanical ventilation system to start automatically on actuation of CO detector and the other detectors provided in the basement.

p) Ventilation system shall start automatically on actuation of detector provided in the basement area.

q) Exhaust duct, mechanical ventilation duct should not pass through exit or entry.

r) The basement beyond building line shall be paved, suitably to bear the load of fire engines weighing upto 48 m. tones each with point load of 09 kgs./sq. cms.

s) Basement area shall be divided in compartments as per NBC/DCR Regulations.

t) The ventilation and area of ventilation and compartmentation if required shall be checked by EEBP.

u) The interconnectivity between (exit / entrance) between two compartments shall be protected by fire curtain having four hours fire
15. FIRE FIGHTING REQUIREMENTS:

(i) a. UNDER GROUND WATER STORAGE TANK: (WING )

An underground water storage tank of .............liters capacity shall be provided for Wet riser & sprinkler system at the location marked in the plan, as per the design specified in the rules with baffle wall and fire brigade collecting breaching.

b. UNDER GROUND WATER STORAGE TANK: (EWS Wing)

An underground water storage tank of .............liters capacity shall be provided for wet riser at the location marked in the plan, as per the design specified in the rules with baffle wall and fire brigade collecting breaching. Both the tanks shall be connected to each other by butterfly valve.

(ii) a. OVERHEAD TERRACE WATER STORAGE TANK (WING _)

An another tank of .............liters capacity shall be provided on each staircase shaft at the terrace level, the layout of which shall be got approved from H E’s departments prior to erection. The tank shall be connected to wet risers through a booster pump through anon-return valve gate valve.

b. OVERHEAD TERRACE WATER STORAGE TANK (EWS WING):

An another tank of .............liters capacity shall be provided on each staircase shaft at the terrace level, the layout of which shall be got approved from H.E's departments prior to erection. The tank shall be connected to wet risers through a booster pump through anon-return valve gate valve.

(iii) WET RISER:

Wet riser of internal dia.Of15 cms.of G.I. „C“ Class pipe shall be provided in the duct adjoining the staircase with double hydrant outlet & hose reel at each floor in such away as not to reduce the width of the common corridor. Pressure reducing discs or orifices shall be provided at lower level, so as not to exceed the pressure of 5.5 kgs. Per sqcms. The wet risers shall be extended from lower basement up to top most floor/terrace level. Wet riser outlet and hose reel at a distance of 100 ft. shall be provided on periphery of all podium / parking floors.
(iv) **FIRE SERVICE INLET:**

a) A fire service inlet on the external face of the building near the tank directly fronting the courtyards shall be provide to connect the mobile pump of the fire service independently to a) the wet riser b) sprinkler system & c) drencher system

b) Breeching connection inlet shall be provided to refill UG tank.

c) Operating switches of fire pumps shall be also provided in glass fronted boxes at ground floor or Fire control room at 2nd podium level.

(v) **AUTOMATIC SPRINKLER SYSTEM : (WING A, B&C)**

The Automatic sprinkler system shall be provided in entire building including each flat, lift lobby & common corridor at each floor level, basements and car parking area as per the standards laid down by T.A.C. or relevant IS specifications.

(vi) **AUTOMATIC SMOKE DETECTION SYSTEM:**

Lift machine room, electric meter room, lift lobby & common corridor at each floor level, control room etc. shall be protected with Automatic smoke detection system with main console panel at ground floor level.

(vii) **DRENCHER SYSTEM: (FOR ALL FIRE CHECK FLOORS AND PODIUM OF WING A, B & C)**

Drencher system should be provided on the periphery of Fire check floor of the building, top of the podium floor and should be connected to the main sprinkler pump as per the standard laid down in relevant IS Specifications.

(viii) **a FIRE PUMP,BOOSTER PUMP, SPRINKLER PUMP AND JOCKEY PUMP:(WING _)**

a) Wet-riser shall be connected to a fire pump of capacity of not less than 2800 liters/min. capable of giving a pressure of not less than 3.2 kgs/ sq. cms. at the top most hydrant.

b) Booster pump of 900 liters/min. capacity giving a pressure of not less than 3.2 kgs/sqcms at the top most hydrant outlet of the wet-riser shall be provided at the terrace Level
c) Sprinkler pump of suitable capacity along with jockey pump shall be provided for automatic sprinkler system

d) Electric supply (normal) to these pumps shall be Independent circuit.

e) Separate jockey pump shall be provided to Wet riser system to keep system pressurized.

f) Operating switches for booster pumps shall be also provided in glass fronted boxes at ground floor and on terrace level.

g) Operating switches of fire pumps shall be also provided in glass fronted boxes ground floor.

h) The fire pumps provided shall be surface mounted type or vertical turbine mounted type and not submersible type

b. FIRE PUMP, BOOSTER PUMP, SPRINKLER PUMP AND JOCKEY PUMP: (EWS Wing)

i) Wet-riser shall be connected to a fire pump of capacity of not less than 1800 liters/mm. capable of giving a pressure of not less than 3.2 kgs/sq. ems at the top most hydrant.

j) Booster pump of 450 liters/min capacity giving a pressure of not less than 3.2 kgs/sqcms at the top most hydrant outlet of the wet-riser shall be provided at the terrace level.

k) Electric supply (normal) to these pumps shall be Independent circuit.

l) Separate jockey pump shall be provided to Wet riser system to keep system pressurized.

m) Operating switches for booster pumps shall be also provided in glass fronted box at ground floor and on terrace level.

n) Operating switches of fire pumps shall be also provided in glass fronted boxes at ground floor.

o) The fire pumps provided shall be surface mounted type or vertical turbine mounted type and not submersible type
(ix) **RATE OF RISE DETECTORS: (WING _)**

Rate of rise detectors shall be installed in the hot areas i.e kitchen, pantry, etc. and same shall be connected to mam console at ground floor level.

(x) **STAND BY PUMP : (WING _)**

Diesel operated stand pumps shall be provided as per N.B.C.

(xi) **EXTERNAL HYDRANTS:**

Courtyard hydrants shall be provided at distance of 30.00 mtrs each at top of podium floor as well as ground floor within the confines of the site of the wet riser-cum-down comer at the location marked on the plan.

(xii) a. **ALTERNATE SOURCE OF POWER SUPPLY AND D.G. SET : (WING A, B & C)**

Alternate source of L V./ H C. supply from a separate substation as well as DG Set with appropriate change over switch shall be provided for fire pumps, sprinkler pump booster pump, staircase and corridor lighting circuits, manual fire alarm system & P A system. It shall be housed in a separate cabin.

b. **ALTERNATE SOURCE OF POWER SUPPLY AND D.G. SET : (EWS WING)**

An alternate source of LV./ H C supply from a separate substation or DG Set with appropriate change over switch shall be provided for fire pumps, booster pump staircase and corridor lighting circuits, manual fire alarm system & P.A system. It shall be housed in a separate cabin.

(xiii) **PORTABLE FIRE EXTINGUISHERS:**

a) Two Dry Chemical Power (ABC) type fire extinguisher of 9 Kgs. Capacity having ISI certification mark and two buckets filled with dry, clean sand shall be kept in Electric Meter Room as well as Lift Machine Room.

b) Twenty dry chemical powder (class ABC) type fire extinguishers each of 9KgsCapacity each & with ISI mark and four buckets of dry, clean sand shall be kept on podium floor at prominent places.

c) One Dry Chemical Powder fire extinguisherABCtypeof6 Kgs. Capacity each shall be kept for every 100 Sq.Mt. area in each level of basement.
(xiv) **FIRE ALARAM SYSTEM I FIRE DETECTION SYSTEM: (WING _)**

   a) The building shall be provided with intelligent analog addressable fire alarm system with microprocessor based main control panel at ground floor level and addressable call points and hooters at each floor level. The design of fire alarm system shall be in accordance with I.S specification and based on NFPA 72 guidelines (as per 2010 edition).

   b) The addressable fire alarm system shall be equipped with the latest evacuation features such as digital voice evacuation capabilities; fire fighters telephone system, directional sounders etc. The main entry / exit points shall be provided with firefighters interactive interface to enable viewing of critical information in event of fire.

   c) All basements, podiums shall be provided with intelligent multi sensor detectors connected to the main fire alarm panel. This is to avoid nuisance alarm caused due to smoke emission from the vehicles of the car parking

   d) Appropriate fire detection system shall be installed in kitchen area.

   e) Access control system, close circuit cameras shall be installed in the entire building & connected to B.M.S. control at reception.

(xv) **PUBLIC ADDRESS SYSTEM:**

   The entire building shall be provided with the public address system in common areas as per the with main control operator at console panel at ground floor reception area

(xvi) **SIGNAGES:**

   Self-glowing/fluorescent exit signs in green color shall be provided showing the means of escape for entire building.

(xvii) **BREATHING APPARATUS SETS: (WING A&C)**

   Two Self-contained Compressed Air Breathing Apparatus sets of 45 minutes duration each shall be kept in the fire control room & two Self-contained Compressed Air Breathing Apparatus sets of same capacity shall be kept in refuge area in consultation with C.F.O

(xviii) **VOICE EVACUATION SYSTEM: (WING _)**
The voice evacuation system shall be integrated to Fire Alarm system so as to facilitate the co-ordination activities in case of fire emergencies. The actuation of the fire alarm control panel shall automatically activate the Voice Evacuation system. A pre-recorded message shall be broadcast on the affected floor, one floor below & two floors above the affected floor.

(xix) INTEGRATED SYSTEM: (WING A&C)

The entire firefighting system shall be of the type "Integrated Building Automation System" combining all the systems. Flasher light shall be installed at the top of the building which will be switched on in case of incident of fire in that building to indicate involvement of building in fire. It will also help the incoming fire brigade appliances to reach the spot in time without delay.

(xx) DETECTORSYSTEM:

LPG / CNG detector system shall be installed in basement area.

(xxi) EMERGENCY ESCAPE ROUTE PLAN:

Emergency exit route plan framed in glass shall be displayed in the common corridor, cross passages, staircase/lift lobbies of each floor level.

(xxii) FIRE DRILLS & EVACUATION DRILLS:

Fire Drills and evacuation drills shall be conducted regularly in consultation with Mumbai Fire Brigade and log of the same shall be maintained.

(xxiii) MECHANICAL ASCENDING/DESCENDING DEVICE: (WING A&C)

Controlled Lowering device or external evacuation system, as approved by CFO, shall be provided.

a) External electro hydraulically operated ascending and descending evacuation system having minimum 8 persons capacity with entry and exit at each floor level which is connected to the common lobby (staircase / lift).

b) The lowering device shall be installed on the external face of the building from terrace with guide line, along with cabin and should be used for ascending & descending
c) The electric supply for the same shall be from emergency as well as alternate source of electric supply for separate back up emergency power supply

d) The said device shall be operational from the cabin as well as from ground level (preferably by remote control) by the operator

e) Controlled lowering device/ external evacuation system shall confirm to the relevant NFPA Codes and shall be certified by U L

(xxiv) **FIRE CURTAIN:**

a) The fire curtain provided for entry/exit at basements from one compartment to other shall be of four hours fire resistance

b) Fire curtain shall operate on activation of Detector/ suppression system or automatically of that particular zone

(xxv) **WATER CURTAIN:**

Water curtain system should be provided at the entrance to the basement from rampat each exit and should be connected to the main sprinkler pump as per the standard laid down in relevant I.S Specifications

16. **SERVICE DUCT:**

a) All service ducts shall be of 2 hr fire resistance.

b) Inspection door of the service ducts shall have 2 hr. fire resistance

c) Duct for water service, drainage line, shall be separate from that of electrical cable duct.

d) All service duct shafts shall be sealed at each floor level with non-combustible materials such as vermiculite concrete No storage of any kind shall be done in the shaft.

17. **FIRE CHECK FLOOR : (WING A & C)**

a. Fire check floor shall be provided at every 70.00 mtrs. height of the building.

b. Fire check floor shall be open on all sides which serve as fire separation floor
c. Fire check floor shall be properly accessible from common areas.

d. Fire check floor shall not be allowed to be used for any other purpose and it shall be the responsibility of the owner / occupier to maintain the same clean and free of encumbrances and encroachments at all times.

e. Height of the fire check floor shall not be more than 1.8 mtrs

f. Periphery of the Fire Check floor shall not be enclosed.

g. Fire Drenchers shall be provided at the periphery of the each fire check floor externally.

18. TRAINED OFFICER I SECURITY GUARDS:

a) A qualified full time fire officer with experience of not less than 3 years shall be appointed who will be available on the premises at all times. Alternative full time qualified fire officers working in shift duty system shall be placed round the clock on the premises.

b) The trained security / fire supervisor along with trained staff having basic knowledge of fire fighting & fix firefighting installation shall be provided / posted in the building.

c) Maintenance of all the first aid firefighting equipments, fixed Installations &

d) Other firefighting equipments/ appliance in good working condition at all times.

e) Imparting training to the occupants of the building in the use of firefighting equipment provided on the premises & kept them informed about the fire & other emergency evacuation procedures.

f) To liaise with the City Fire Brigade on regular & continual basis.

19. FIRE CONTROL ROOM:

a) Separate Fire Control room with well qualified man power shall be established on ground floor.

b) Plan of each floor indicating means of egress as well escape shall be maintained.

c) i. The Master switches controlling essential service circuits
shall be provided in the Fire Control room and shall be clearly labeled and operations of the same shall be earned out only by trained personnel or Fire Brigade personnel

   ii.  The manual control for the change-over switch from main to D. G. Set/ other substation alternate supplies shall be provided in the Fire Control room.

d)  “Integrated Building Automation System” shall be provided in the Fire control room.

20.  REFUGE AREA :

1)  Refuge area provided as shown on the plans shall be conforming to the following requirements

Manner of refuge area

   a.  The refuge area shall be so located that it shall preferably face the access road of the building.

   b)  The refuge area shall be provided railing / parapet of 1.20mt.

   c)  The refuge area shall have a door which shall be painted or fixed with a sign in luminous paint mentioning “REFUGE AREA”.

   d)  The lift/s shall not be permitted to open into the refuge areas

   e)  The refuge area provided within building line shall be accessible from common passage/staircase.

ii)  Use of refuge area :

   a.  The refuge area shall be earmarked exclusively for the use of occupants as temporary shelter and for the use of Fire Brigade Department or any other organization dealing with fire or other emergencies when occur in the building and also for exercises/drills if conducted by the Fire Brigade Department

   b.  The refuge areas shall not be allowed to be used for any other purpose and it shall be the responsibility of the owner/occupier to maintain the same clean and free of encumbrances and encroachments at all times.
iii) Facilities to be provided at refuge area

Adequate emergency lighting facility shall be provided

iv) Terrace floor as a refuge floor:

a. The necessary facilities such as emergency lighting, drinking water etc. shall be provided

b. The access door/s from the enclosed staircase/s to the terrace floor shall have louvers at top half portion of the door. The entrance doors to the terrace shall be painted or fixed with sign painted in luminous paint mentioning "REFUGE AREA"