

Disaster Management Plan & Risk Assessment

for

“KAATYAAYANI HEIGHTS”- RESIDENTIAL CUM COMMERCIAL DEVELOPMENT

at

**PLOT BEARING C.T.S.NO. 198,199,213,214 &
215(PART) AT VILLAGE MOGRA, PARSII PANCHAYAT
ROAD, ANDHERI (EAST) , DISTRICT MUMBAI,
MAHARASHTRA**



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1. Introduction

The proposed project is for the amendment in environmental clearance of SRA project for "Kaatyayani Heights"- residential cum commercial development. It is proposed by Starwing Developers Pvt. Ltd. who will be constructing 3 buildings on Plot bearing C.T.S.No. 198,199,213,214 & 215(Part) at village Mogra, Andheri (East) , District Mumbai ,Maharashtra.

The proposed development will consist of construction of one Rehab Building with G+22 floors inclusive of 24 shops at G+1; and 2 Sale Towers, wherein Tower 1 is G+23 Floors and Tower 2 is G+6Podium+17 Floors, in configuration.

Total Plot Area : 7208.80 sq.m

FSI Area : 24058 sq.m. Non FSI Area : 23466.03 sq.m.

Max. Height : 69.9 m

The proposed number of tenements is 545 and shops are 24. Occupancy is about 2835 of which residential users are 2725, commercial users are 110. At present, the land is not vacant. The existing structures will be demolished before new construction.

An emergency situation in a residential cum commercial complex may be due to manmade hazards like fire, power outage etc. or due to natural disasters viz. earthquake, flooding etc. For the preparedness of on-site emergency, the following objectives are taken into Consideration. The objective of a Disaster Management Plan is to ensure effective mitigation plan and best possible protection of the members of the society during a disaster occurrence.

A hazard is defined as a dangerous condition or events that threaten or have the potential for causing injury to life or damage to property or the environment is called hazard. Hazards can be categorized in various ways, but based on the origin they, worldwide, are basically grouped in two broad headings:-

1. Natural Hazards
2. Unnatural Hazards/ Man Made

2. Risk Assessment And Vulnerability Analysis

The proposed project encompasses the lives of a large number of people. It also involves installation of various structures that meet the comfort and needs of its population but may also pose serious threat to the occupants & workers in case of an accident. It is thus considered necessary to carry out a risk assessment and disaster management plan for the project.

Disasters can occur at any point of time. It is essential to predict possible scenarios and consider the mitigation plan and also plan for protection for all the involved individuals during occurrence of a disaster. If the inhabitants of a structure are aware of the protocols to be followed during a disaster, loss of life can be averted.

Assessing the risk and vulnerability of disasters is extremely important. The main objectives of a risk assessment plan are mentioned below:

Simplicity: The plan will be concise; roles and responsibilities have been clearly stated.

Flexibility: Emergency procedures have been prepared; we have planned alternative routes to an evacuation assembly area in the event that the main route is cut off by the hazard.

Decision making process: We will adopt and implement a decision making process in the event of an emergency.

Consultation: We will derive a workable plan after consultation with agencies working in emergency services.

Review: This plan we will be reviewed on a regular basis, preferably annually and following any significant emergency, to ensure that it remains workable.

2.1 Steps of Risk Assessment

a) Identify Hazards: We have identified the hazards which will occur due to activity during construction & operational phase, such as risks arising due to excavation, gas cutting & welding, manual handling, lifting, noise, electric work, work in confined space, etc. Also risk occurring from falling material, slip; defective equipment, storage of material etc. have been identified.

Vulnerability Analysis

Vulnerability analysis is identifying areas which are unable to withstand the effects of the hazard.

Table 1: Vulnerability Analysis

Accidents/ Hazards	Mitigation measure
Gas leakage	Turning 'off' gas knobs whenever not in use. Opening up windows and other all source of ventilation so that the gas can escape.
Collapsing of lift	Regular maintenance and checking of the lift. Putting up lift capacity details and sensor inside the lift.
Boiler Blast	Regular maintenance of the boiler. Installing automatic boiler shut down.
Electric short circuit	Proper insulation of wires. Regular checking of electric boards for any exposed wires and installing automatic trips.

b. Identify people at risk: Inhabitants of the building and support staff like watchmen, sweepers and cleaners, gardeners, etc are at direct immediate risk during a disaster. Surrounding buildings/ residents/workers could be at risk in the event the disaster cannot be contained.

3. Evaluate the risk and decide on precaution: The management of the premises and the people, who will use it, will have an effect on our evaluation of risk. Management alone shall have responsibility along with, building owners or managing agents.

4. Record, plan, inform, instruct & train: We will be recording all the significant findings of risk assessment and the actions will be taken. Also we will be recording the discussions with staff or staff representatives. We have prepared the Emergency plan based on all situations. This Emergency plan will be readily available to the employees, their representatives (where appointed), residents and the enforcing authority.

We will provide adequate fire safety training for the staff & workers. Training will be based on the particular features of our premises.

5. Review: We will be constantly monitoring and implementing the fire risk assessment, to assess how effectively the risk is being controlled. If

necessary we will revise the assessment. We will keep records of the testing, maintenance and training etc.

Table 2: Steps of Risk Assessment

1	Identify fire hazards	Sources of ignition Sources of fuel Sources of oxygen
2	Identify people at risk	People in and around the premises People especially at risk
3	Evaluate, remove, reduce and protect from risk	Evaluate the risk of a fire occurring Evaluate the risk to people from fire Remove or reduce fire hazards Remove or reduce the risks to people <ul style="list-style-type: none"> • Detection and warning • Fire-fighting • Escape routes • Lighting • Signs and notices • Maintenance
4	Record, plan, inform, instruct and train	Record significant finding and action taken Prepare an emergency plan Inform and instruct relevant people; co-operate and co-ordinate with others Provide training
5	Review	Keep assessment under review Revise where necessary

2.2 Risk Hazard & its control measures

We will be following all the safety norms during construction & operation phase. However, it is not always possible to totally eliminate such eventualities and random failures of equipment or human errors. A detailed table showing activities during construction and operation phase along with mitigation measures are given below in Table 2.

Table 3: Activities during construction and operation along with mitigation measures

Sr.	Hazards associated with activities (during construction & operation)	Control/Mitigation measures
1	Manual Handling Strains and sprains due to incorrect lifting too heavy loads - Twisting - Bending - Repetitive movement - Body vibration	1. Exercise/warm up 2. Get help when needed control loads rest breaks/no exhaustion no rapid movement /twisting/ bending / repetitive movement 3. Good housekeeping
2	Falls - Slips - Trips Falls on same level, falls to surfaces below, poor housekeeping slippery surfaces, uneven surfaces, poor access to work areas climbing on and off plant unloading materials into excavations wind. Falling objects	1. Good Housekeeping 2. Guardrails, handholds, harnesses, hole cover, hoarding, no slippery floors/trip hazards clear/ safe access to work areas egress from work areas dust/water controlled 3. Personal Protective Equipment
3	Fire Flammable liquids/Gases like LPG, Diesel storage area and combustible building materials poor housekeeping grinding sparks open flames, absence of Fire hydrant net work.	1. Combustible/flammable materials properly stored. 2. Good housekeeping 3. Fire extinguishers made available & Fire hydrant Emergency Plan in case of Fire or collapse of structure.
4	Absence of Personal Protective Equipment Lack of adequate footwear head protection hearing/eye protection respiratory protection gloves Goggles	1. Head/face footwear hearing/eye skin respiratory protection 2. Provided training 3. Maintenance of equipment
5	Defective or wrong Hand Tools Wrong tool defective tool struck by flying debris caught in or on missing guards	1. Right tool for the job. 2. Proper use of tools, good condition/ maintenance guards isolation/ 3. Proper demarcation of work.
6	Electricity Electrocution overhead/underground services any leads damaged or poorly insulated temporary repairs - no testing and tagging circuits	1. Leads good condition and earthed no temporary repairs 2. No exposed wires 3. Good insulation no overloading 4. Use of protective devices testing and tagging no

Sr.	Hazards associated with activities (during construction & operation)	Control/Mitigation measures
	overloaded non use of protective devices.	overhead/underground services
7	Scaffolding Poor foundation. Lack of ladder access insufficient planking lack of guardrails and toe boards insufficient ties. All scaffolds incorrectly braced or stabilized to prevent overturning.	<ol style="list-style-type: none"> 1. All scaffolds correctly braced and stabilized 3:1 height to base ratio firm foundation, plumb and level ladder access provided and used proper platform planks 2. Secured guardrails and toe boards 900 mm to 1,100 mm high, within 200 mm of working face, mid-rail
8	Ladders Carrying loads not secured against dislodgement, defective ladders not sufficient, length wrong positions .incorrectly placed (angles, in access ways, vehicle movements)	<ol style="list-style-type: none"> 1. Secured against movement or footed ladders in good condition. 2. Regularly inspected extend 1 m above platform 4:1 angle out of access ways. 3. Not working platforms
9	Excavations Trench collapse material falling in undetected underground services Hazardous atmosphere struck by traffic and mobile plant.	<ol style="list-style-type: none"> 1. Soil stability known no water accumulation existing services known material 600 mm from edge clear of suspended loads hardhats. 2. Personal Protective Equipment, traffic controls 3. Emergency Plan
10	Gas Cutting and Welding Fire welding flash, burns, fumes, electrocution in wet conditions flashback in oxygen set, leaking cylinders, acetylene cylinders lying down Poorly maintained leads.	<ol style="list-style-type: none"> 1. Welding flash and burns controlled with and shields; fumes controlled with ventilation. 2. Personal Protective Equipment (in good condition and properly positioned) 3. Gas cylinders will be on secured position (properly tied) 4. Combustible materials kept at secured place to avoid fire & Fire Extinguishers kept in fire prone area. 5. Training to people for its use.
11	Noise Equipment, Machines, Room, Vehicle	<ol style="list-style-type: none"> 1. Use of Personal Protective Equipment 2. Tree plantation act as noise barrier
12	Falling Material	<ol style="list-style-type: none"> 1. Materials placed in secured area

Sr.	Hazards associated with activities (during construction & operation)	Control/Mitigation measures
	Fall during carrying/Lifting materials dislodged tools and materials from overhead work areas.	<ul style="list-style-type: none"> 1. kept away from edge toe boards 2. Use of Personal Protective Equipment
13	<p>Crane lifting Display of carrying capacity i.e. load (No. of person), incorrectly slung, defective lifting equipment, unsecured loads, craning in close proximity to building people and plant falls - Falling materials.</p>	<ul style="list-style-type: none"> 1. Periodic testing of crane by competent authority. 2. Correctly slung/secured loads, lifting equipment good condition 3. Use of proper hand signals 4. Falls while unloading controlled.
14	<p>Visitors Presence at site Falls Struck by dropped materials road accidents Insufficient hoarding or fencing pedestrian access past site</p>	<ul style="list-style-type: none"> 1. Sufficient hoarding 2. Fencing and barricades 3. Safe pedestrian access past site traffic management for loading and delivery 4. Construction separated from occupied areas of projects
15	<p>Kitchen Fall Burn injury Fire</p>	<ul style="list-style-type: none"> 1. Open cooking, such as Blue FROG frying, not be left unattended. 2. Isolation switches for gas and electricity supplies, 3. Isolation switches for any extractor fans will be located near to an exit. 4. Good housekeeping
16	<p>Storage of material Fire</p>	<ul style="list-style-type: none"> 1. Store combustible 2. materials and stock such as baggage, linen and 3. Furniture in a dedicated storage area. 4. Storeroom or cupboard that is fire resisting. 5. Fire extinguishers available near the storage area.
17	<p>Smoking Fire</p>	<ul style="list-style-type: none"> 1. Prohibited smoking in crowded area. 2. Display suitable signs throughout the premises. 3. Design separate area for smoking. 4. Regular inspection in smoking

Sr.	Hazards associated with activities (during construction & operation)	Control/Mitigation measures
		permitted area.

2.3 Instructions for occupants

- Get out of buildings as quickly and as safely as possible.
- Follow the fire evacuation plan posted in the passageway.
- Go to the nearest refuge floor/evacuation assembly point
- Use the stairs to escape. When evacuating, stay low to the ground.
- If possible, cover mouth with a cloth a avoid inhaling smoke and gases.
- Close doors in each room after escaping to delay the spread of the fire.
- If smoke is pouring in around the bottom of the door or if it feels hot, keep the door closed.
- Open a window to escape or for fresh air while awaiting rescue.
- If there is no smoke at the bottom or top and the door is not hot, then open the door slowly.
- If there is too much smoke or fire in the hall, slam the door shut.
- Stay out of damaged buildings.
- Check that all wiring and utilities are safe.
- Fire fighting system is proposed for the project to prevent and control fire outbreaks. The fire fighting system will consist of portable fire extinguishers, hose reel, wet riser, yard hydrant, automatic sprinkler system, and manual fire alarm system. The buildings will also be provided with automatic fire detection and alarm system.

3. Disaster Management Plan

Disaster

A disaster is the product of a hazard such as earthquake, flood or storm coinciding with a vulnerable situation, which might include communities, cities or villages. There are two main components in this definition: hazard and vulnerability. A disaster occurs when hazards and vulnerability meet.

Disaster Management Plan (DMP) deals with the preparations to reduce the impacts of Natural and Man-made disasters. Recent rise in the occurrence of disasters has alerted us regarding the need of pre-planned DMP which will aim at providing effective and timely relief during disaster through organized manner.

Importance of a Disaster Management Plan

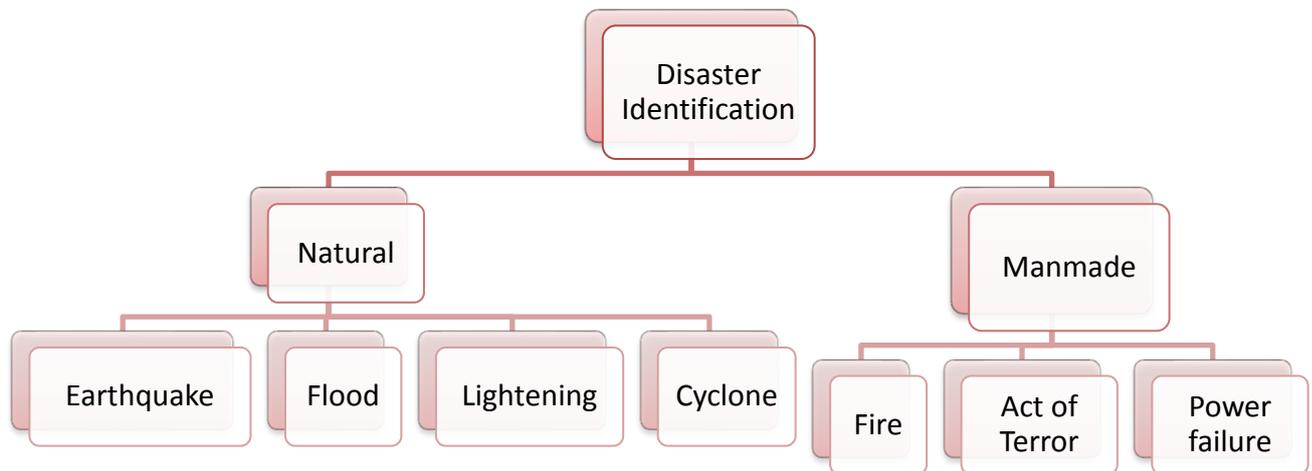
Hazard identification and Risk assessment is done to handle natural disasters such as floods, cyclones, landslides etc., as well as Man Made Disasters. This Disaster Management Plan is designed as per the present need and the major strategies to respond to any unexpected situation have also been considered. In the multi-hazard mitigation plan, all the disasters will be handled properly following the given procedure. The main features of the Disaster Management Plan are:

- It gives importance to all the disasters equally and helps to mitigate the situation beforehand.
- All the line authorities are assigned with their proper role and responsibilities, which are clearly indicated in this plan.

The overall objective of a disaster management plan is to make use of the combined resources created or available at the site and/or off-site services to achieve the following:

- To prevent disasters
 - Minimize the impact of the accident on people and property;
 - Initiate the rescue and medical treatment of casualties;
 - Safeguard other people
 - Carefully evacuate people to safe areas.
 - Inform and collaborate with statutory local and state authorities;
 - Provide credible information to news media;
 - Bring the incident under control;
 - Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency;
- Investigate and take steps to prevent recurrence of similar incidents.

Figure 1: Disaster Identification



A comprehensive Disaster Management Plan includes:

- **Prevention:** Prevention activities aim to reduce the probability of disaster occurrence through measures meant to avoid its adverse effects.
- **Preparedness:** We have prepared the emergency plan. Emergency exercises we will be carried out during construction & operation phase; like warning systems mock drills, and training.
- **Mitigation:** Minimizing or reducing the impacts of disaster mitigation measures include building codes, vulnerability analyses updates, zoning and land use management, building use regulations and safety codes, preventive health care, public awareness and education.
- **Response:** Efforts to minimize the hazards created by a disaster i.e. rescue, emergency relief, medication.

Figure 2: Disaster Management Steps



Following types of natural disaster can occur with a prior indication or without any prior indication.

3.1 NATURAL DISASTERS: Natural Disasters occur naturally with or without any prior indication. Natural disasters which often are sudden and intense, result in considerable destruction, injuries, deaths, disrupting normal life as well as the process of development. Increasing population and various other socio-economic factors have forced people to live in vulnerable areas. Natural disasters are perceived on increase in their magnitude, frequency and economic impact.

3.1.1 Earthquake

Earthquakes are usually caused when rock underground suddenly breaks along a fault. This sudden release of energy causes the seismic waves that make the ground shake. Building develops cracks, collapses when the intensity of earthquake is more and prolonged. Probability of Occurrence: As per the earthquake zonation of India, the proposed site falls under seismic zone III which is referred as moderate risk zone. Thus the possibility and severity of the experiencing the earthquake apparently decreases. Although there are no past records of this disaster in this region, earthquake of intensity between 5.0 and 6.9 on the Richter scale can occur in Zone III. Accordingly the measures proposed are enumerated in the section of mitigation and preparedness.

✓ **Mitigation Measures:**

- Before an Earthquake?

- Learn about causes and effects. Speak about them in a calm and composed manner.

- Keep a torch light and a working transistor radio with spare batteries.
- Keep an updated list of telephone numbers like Doctor, Fire, Police and District Administration, Ambulance, water, electricity, etc. and all your family members will know them.
- Arrange your home in such a manner that it is easy to move around
- Attach shelves, gas cylinders, flower pots etc., to the walls of the room.
- Place heavy objects on the floor or in lower shelves
- Teach all members of your family how to turn off electricity and gas supply.

- What to do during an Earthquake?

- Keep calm and keep others calm
- Do not panic

If you are at home or inside a building or auditorium, Practice Drop, Cover and Hold. Protect yourself by standing in the corner of the room. Do not rush to the doors or the exits and keep well away from windows, mirrors and furniture. Let younger children, elderly and disabled people leave first.

If you are on the road in a built up area, walk towards an open place, in a calm and composed manner. Do not run and do not wander in the street or on the roads for sight-seeing. You must keep the roads free for movement of rescue and relief teams. Also, keep away from buildings, especially old, tall buildings or detached buildings, electricity wires and poles, slopes and walls. They are liable to collapse.

If you are driving, move to side of the road and stop. Stop the vehicle away from flyovers, building walls, slopes, electricity wires/cables/poles, advertisement boards and stay inside the vehicle.

- What to do after the Earthquake?

- Keep calm, switch on the transistor radio and obey any instructions you hear on the radio.
- Expect after shocks
- Check for injuries and first treat yourself, then help others.
- Remain calm and self assured and help others who are distressed.
- Do not turn on switches if you have electric connection in your house.
- Use your torch
- If there is a fire try to put it out with help of people around you.
- Clean up any spillage of inflammable material like kerosene, oils, paints, alcohol, etc.

- If people are buried under the debris, call for help of the rescue teams and render your help.
- Avoid places where electric wires are hanging loose and do not touch any metal object in contact with them.
- Do not drink water from open sources/ containers without filtering or purification.
- Eat something to make you feel better and more capable of helping others.
- When you can move out of the house carry with you essential food, water container, torch, transistor radio and medicines you normally use at home.
- Do not go near damaged structures or enter badly damaged buildings
- Do not go sight-seeing or wandering in the streets aimlessly to see what is happening around.
- Keep the roads clear for the movement of relief and rescue teams.

3.1.2 **Cloud Burst and flood due to heavy rainfall**

A cloudburst is an extreme amount of precipitation, sometimes with hail and thunder, which normally lasts no longer than a few minutes but is capable of creating flood conditions. Sudden cloudburst can cause a flood to occur. This is one of the natural disasters. Flooding may occur due to the following reasons:

- ★ If the rainwater does get the access to the natural stream or municipal drains
- ★ Delay in water flow from all runoff towards the natural stream like river, nalla (or sea).
- ★ Slow discharge of water
- ★ Flow diversion
- ★ Chocked up drains, nallah, river bed.

✓ **Mitigation Measures:**

Particularly in Andheri, areas having poor drainage characteristic experience floods by accumulation of water from heavy rainfall. Following precautions would be taken by Starwing Developers Pvt. Ltd to manage flood disasters:

- Storm water system will be checked and cleaned periodically.
 - Mapping the areas within or leading in or out of the building that will be water logged, flooded or isolated due to the flood. The areas will be marked after completion of the project.
 - Basement area will be mapped.
 - Dewatering pumps will be installed at vulnerable locations.
- Even if heavy rain fall are received, a well designed storm water drain is proposed at the project site as also there is a municipal storm water drain of adequate capacity.

3.1.3 Cyclones

Cyclones are caused by atmospheric disturbances around a low pressure area distinguished by swift and often destructive air circulation. They are usually accompanied by violent storms and bad weather.

✓ **Mitigation Measures:**

There is no history of any cyclone in this area. However in such an instance, the occupants will be advised to stay in the shelter in tightly secured windows and doors. The glass of windows etc. will be covered with paper/cardboards to avoid glass breaking due to flying objects outside.

3.1.4 Lightning Strike

Lightning can strike branch circuitry wiring in the walls of the building. Lightning can strike an object nearby, such as a tree or the ground itself and cause a surge. Voltage surges can be created by cloud to cloud lightning. A highly charged cloud which passes overhead can also induce a voltage surge.

✓ **Mitigation Measures:**

Buildings are protected from lightning by metallic lightning rods extending to the ground from a point above the highest part of the roof. A lightning arrester is a device used on electrical power systems and telecommunications systems to protect the insulation and conductors of the system from the damaging effects of lightning. The typical lightning arrester has a high-voltage terminal and a ground terminal. The conductor has a pointed edge on one side and the other side is connected to a long thick copper strip which runs down the building. The lower end of the strip is properly earthed. When lightning strikes it hits the rod and current flows down through the copper strip. These rods form a low-resistance path for the lightning discharge and prevent it from travelling through the structure itself.

3.2 MAN MADE DISASTERS: These kinds of disasters generally occur due to human error or negligence.

3.2.1 Fire

Fire is a hazard which is caused mainly due to human negligence. There are other reasons like electrical short circuit, rain water seepage in electrical installations, gas cylinder malfunctioning, domestic gas leakage which can cause fire disaster in a residential building. A full proof fire fighting system is designed for the buildings which meets all fire safety norms and has a mitigation plan to tackle the fire hazard. During construction all safety precautions will be taken to handle the fire hazard. During construction fire can break out due to following reasons:

- ★ Electrical loose connection
- ★ Electrical short circuit
- ★ Storage of Inflammable material like diesel, paint at site
- ★ From cooking gas cylinders at labour hutment
- ★ Storage of highly inflammable material like diesel, kerosene by residents, fire crackers in festival session etc.

✓ **Mitigation Measures:**

The proposed project is designed with utmost care for all fire safety norms for its residents and the building as a whole with focus on mitigating such calamities during construction and operation phases of the building. Fire proof material will be used as per design for various components of the building. Electrical cables and switches will be IS (Bureau of Indian Standard) certified and will have the minimum fire rating to mitigate any fire hazard. The cabling and jointing will be done by professional agencies to avoid any mistake while installation. A fire tender movement plan has been designed for unobstructed movement of the fire truck. Also each floor of the 3 buildings is provided with 2 fire extinguishers; and refuge areas have been designated in the 3 buildings. Underground Tanks with Capacity 2.0 lac litres for Rehab Building & 2.0 lac litres for Sale Building has been provided for fire fighting purpose.

For each building we will be providing the following Fire fighting equipments:

- Wet riser
- Fire pump
- Sprinkler pump and Jockey pump
- booster pump
- Court yard hydrant system
- Fire Hydrant system
- Automatic fire alarm system

- What to do:
 - Escape first then call for help.
 - Develop a home fire escape plan and designate a meeting place outside.
 - Make sure everyone in the family knows two ways to escape from every room.
 - Plan two exits from the room/home.
 - Practice feeling your way out with your eyes closed.
 - Remember to practice a home escape plan frequently with your family.
 - Keep escape routes clear.
 - Keep combustible liquids away from heat sources.
 - Use the appropriate sized and type power cords to carry the electric load. Overloaded cords can overheat and cause fires.

- What not to do:
 - Never stand up in a fire, always crawl low under the smoke and try to keep your mouth covered.
 - Never go back into a burning building for any reason. Inform fire fighters, if someone is missing, they are equipped to perform rescues safely.
 - Never overload electrical circuits by using multi-plug.
 - Do not forget to turn-off gas cylinder before going to bed.
 - Do not tamper with fire fighting equipment in your premises
 - Do not crowd the fire accident site as it may hamper fire fighting and rescue operations.
 - Do not part your vehicle or store any item to obstruct the access to fire fighting facilities provided in your premises.

We will be installing fire alarm system in each floor of the buildings. The functioning of these fire alarms system will be checked periodically by security manager. The occupants of the proposed building will undergo mock fire drills. These mock drills will be conducted by qualified staff (e.g. fire brigade). Fire extinguishers will be placed in every floor. All occupants will be given training on how to use these fire extinguishers.

Fire extinguisher equipment will be evaluated periodically to ensure that it is in working conditions by Security Manager. If any faulty equipment is observed then it will be repaired or replaced by Society. Proper evacuation plan will be chalked for the building. The map for the evacuation plan will be provided to all the occupants.

The Emergency Preparedness programme comprises the following elements:

- Proper fire escape routes with indicative boards will be placed.

- Fire detection system will be installed in each floor of the building.
- Provision of sufficient capacity of underground tanks for fire fighting.
- Fire pumps, booster pumps, sprinkler pumps, wet risers & jockey pumps will be provided in each building.
- Court yard hydrant system & Fire Hydrant system will be provided in each building.
- Automatic fire alarm system will be installed in each building.
- Intelligent automatic fire detection and alarm system in each buildings.
- We will be installed fire extinguisher in each floor of the building
- We will be providing DG set as a power backup having total capacity (3 no.× 320 kVA). As per the CFO norms we will be providing refuge floor in residential & commercial building with proper provision of signage.
- We will be providing Sprinkler system throughout the floors & all common areas shall be as per CFO requirement and relevant IS codes. Sprinklers must be provided throughout the common areas and internal areas.
- 2 nos. of fire escape staircases will be provided in each building.
- Provision of external and internal hydrants.
- Regular mock drills will be carried out.
- For fire tender movement 18 m wide DP road and 6 & 9 m wide internal roads will be provided.

Figure 3: Fire tender Movement at the Proposed Site



Figure 4: Fire fighting equipments

		
Sprinkler system	Fire extinguisher	Fire alarm
		
Booster pump	Fire escape routes	Fire hydrant

3.2.2 Building collapse

To protect against building collapse, hardening of the buildings structural systems may be required. This is a multi disciplinary effort of the architect, structural engineer, mechanical engineer and other design team members in order to achieve a balance building envelope. Designers should balance the hardening of the building envelope so that the columns, walls, windows and glazing have an approximately equal response for damage/ injury.

3.2.3 Vehicle Accidents

Speeding on congested roads and narrow lanes are a few issues that can lead to accidents. Accidents while mainly arise due to human error can sometimes even be caused due to mechanical failure.

✓ **Mitigation Measures:**

The project site has 6 & 9 m roads with turning radius of 7.5 and 9m which can sufficiently cater to the vehicular needs at the project site. Traffic flow to and within the site will be properly maintained so that there are no obstructions to existing traffic flow on access roads. Also, road side parking will be avoided. The entry/ exit to the site will be with adequate curvature at kerbs so that vehicles coming out/ entering the building do not impinge on road traffic directly. Regular maintenance and upkeep of the internal roads within project site will ensure smooth traffic flow.

3.2.4 Security breach

Included in this category are Break-ins, Bomb Threats, riots & vandalism. Bomb threats could be genuine or false and many a time they turn out to be a hoax. Unscrupulous elements with the intention of

creating a panic tend to resort to such hoax calls. Confirmed militants however resort to such deeds with the intention of destruction and strike terror. It would therefore be prudent to assess the genuinity of bomb threats. The threats are usually through phone calls, giving very little time to react or through mail, giving a certain date of an explosion that could occur. It is very rare that the caller will identify himself and the message sent through any messenger for fear of easy identification.

✓ **Mitigation Measures:**

The most important component for plan development is the set of controls or measures used to prevent a security incident. Physical security controls/measures are grouped into three broad elements: operations, architecture and technology. High perimeter boundary walls will be constructed and efficient and trained security guards will be employed to tackle any possible breaches.

3.2.5 **Malfunctioning of Lifts**

Due to Technical snap or power failure lifts could get stuck in between floors, or the wire could snap and the lift may fall down the shaft.

✓ **Mitigation Measures:**

Regular maintenance of lifts and other Building Management Systems has to be conducted. There should be a specific committee appointed for maintaining the systems during the operation phase.

3.2.6 **Power failure**

Power failure to a building will have a serious impact on its operations, particularly if the failure occurs during normal operating hours when the building is fully occupied. They can be caused due to Manmade/ Technical Fault or as a result of Natural Events.

✓ **Mitigation plan**

Buildings have emergency and standby power systems to provide safety and comfort to building occupants during interruptions in their normal power supply.

- We will be providing 3 no. of DG sets having capacity of 320 kVA each, as a backup for electrical supply for elevators, common lighting areas, fire fighting equipments, STP etc.
- We will be providing independent electrical circuits for critical equipments like fire pumps, sprinkler pumps.
- UPS will be used as a backup to protect computers, telecommunication instruments, data loggers etc.

4. ONSITE EMERGENCY PLAN

For the incidents which could affect people and the environment inside the building.

- We had displayed the emergency phone nos. (Includes phone number and address of nearby hospital, fire station, police station, public help service etc.)
- We will be carried out periodically maintenance and checking of all equipment.
- We will give training to all occupants for different type of emergencies
- We had prepared the building emergencies manual
- We will be carried out training program for the tenants, security guards, housekeeping staff and other stake holders of the building.
- We had prepared the evacuation plan, floor plan, site plan, elevation marked with refuge area etc.
- We will be regularly carried out fire & emergencies drill programmes
- We will prepare the Posters, other templates, showing emergency preparedness for children and building occupants.
- We will be updating the plan to improve effectiveness.
- Each building has the following Inventory resources equipment:
 - ✓ Overhead and underground water storage tank
 - ✓ Portable fire extinguisher on each floor
 - ✓ Fire Hydrant system
 - ✓ Automatic fire alarm system detection
 - ✓ Smoke detecting system
 - ✓ Proper fire exits and signage at entry and exit
 - ✓ Proper fire and electric audit at regular intervals will be conducted

5. OFFSITE DISASTER MANAGEMENT PLAN

List of nearest clinics and hospitals is been maintained for medical emergency as also any other eventuality. The table below is ready and will be distributed to all members within the building and later for off-site plan to neighborhood. This information we will be updated every six months before safety drills. The updated information will be shared with occupants.

Table 4: List of External Agencies

Sr.	Name	Contact No.	Distance
Police Station			
1.	Andheri Police Station	022 2683 1562	1 km
2.	Meghwadi Police Station		1.8 km
Hospital			
1.	Raksha Multi speciality hospital	022 2832 9512	0.75 km
2.	Criticare Hospital	022-30103020	1.3 km
3.	Amardeep Nursing Home	022 2822 3497	0.28 km
4.	BSES MG Hospital	022 6648 7500	1.5 km

6. OFF-SITE EMERGENCY COVERAGE

Role of the Local Authorities

The local authority will carry out its duty in preparing for a whole range of different emergencies within their jurisdiction area. The responsible personnel from proposed redevelopment will coordinate with the local authorities to obtain the information to provide the basis for the plan. This liaison will ensure that the plan is continually up dated and communicated to all stake holders.

It will be the responsibility of the local authority to ensure that all those organizations which will be involved off site in handling the emergency, are well versed with their roles and responsibility. Sufficient staff and appropriate equipment arrangement shall be the responsibility of respective person. Rehearsals for off-site plans will be organized by the local authority.

Role of Fire Authorities:

The control of the fire normally be the responsibility of the senior fire brigade officer, who would take over the handling of the fire from the site controller on arrival at the site. The senior fire brigade officer will also have a similar responsibility for other events, such as explosions and toxic release. Fire authorities in the region will be appraised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They will be involved in onsite emergency rehearsals both as participants and on occasion, as observers of exercise involving on-site personnel.

Responsibilities of Fire Brigade Station Officers, Fire Brigade

The Fire Brigade Station Officers in co-ordination with the Ward Officer will be responsible for the following field activities:

- Fire fighting operations in the affected area
- Rescue operations
- Transport of injured to the hospitals on a priority
- Evacuation of persons from the affected area
- Ensure safety from electrical installations or power supply at disaster site
- Clearing of roads or pathways due to uprooted trees
- Salvage operations
- Co-ordinate with MIDC for rescue operations in house collapses
- Communicate to fire brigade control room details on the field activities including deployment and reinforcements of staff and resources and communicate nature of additional requirements.

7. SUMMARY OF DISASTER MANAGEMENT MEASURES TO BE IMPLEMENTED IN THE PROPOSED PROJECT

Details	Information	
Certification from Structural Engineer regarding EQ Resistant Design.	We design our building as per earthquake resistant structure.	
No. of staircases in buildings and no. of fire escape lifts.	Details	
	No.	
	Rehab building	2 staircase
	Sale building	4 staircase
	TT/Snooker/Billiards	G/Stilt Floor
	Gym	G/Stilt Floor
	Library	G/Stilt Floor
	Shop	G/Stilt+ 1 st Floor (Rehab)
Society office	1 st Floor (Rehab)	
Width of each staircase	Width of each staircase landing proposed is 1.5 m	
Refuge areas details	Refuge floor (Rehab): 7 th floor ,14 th floor and 21 st Floor Refuge floor (Tower 1):At Even Floors Refuge floor (Tower 2): 8 th floor ,15 th floor and 16 st Floor	
Width of roads around the buildings for fire tender movement.	Main road: 18 m wide Road (Parsi Panchayat Road). Internal road : 6m and 9 m	
Fire tender movement	Details on slide no. 40-42	
Capital cost , O & M cost	Capital cost : 406 Lakh O & M cost : 25.6 Lakh/year	

Figure 5: Evacuation Plan-Rehab

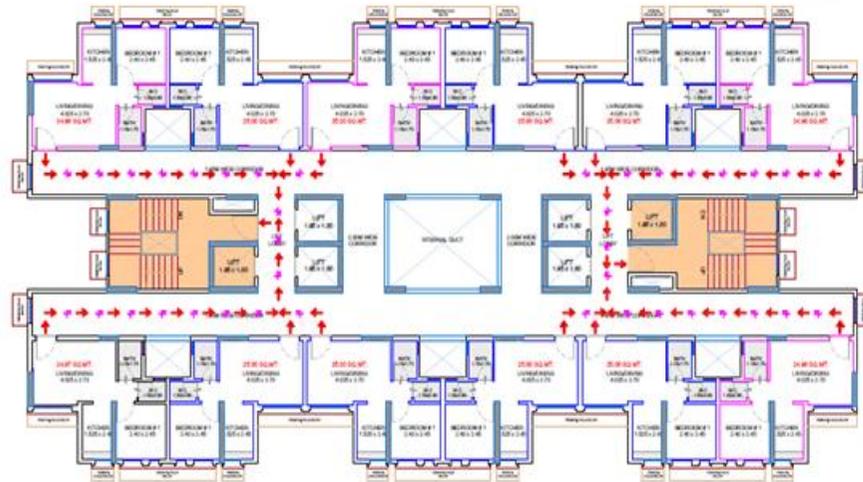
Evacuation Plan - Rehab



21st Floor- Refuge



7th and 14th Floor- Refuge



Typical

Figure 6: Evacuation Plan-Sale: Wing A&B

Evacuation Plan – Tower 1

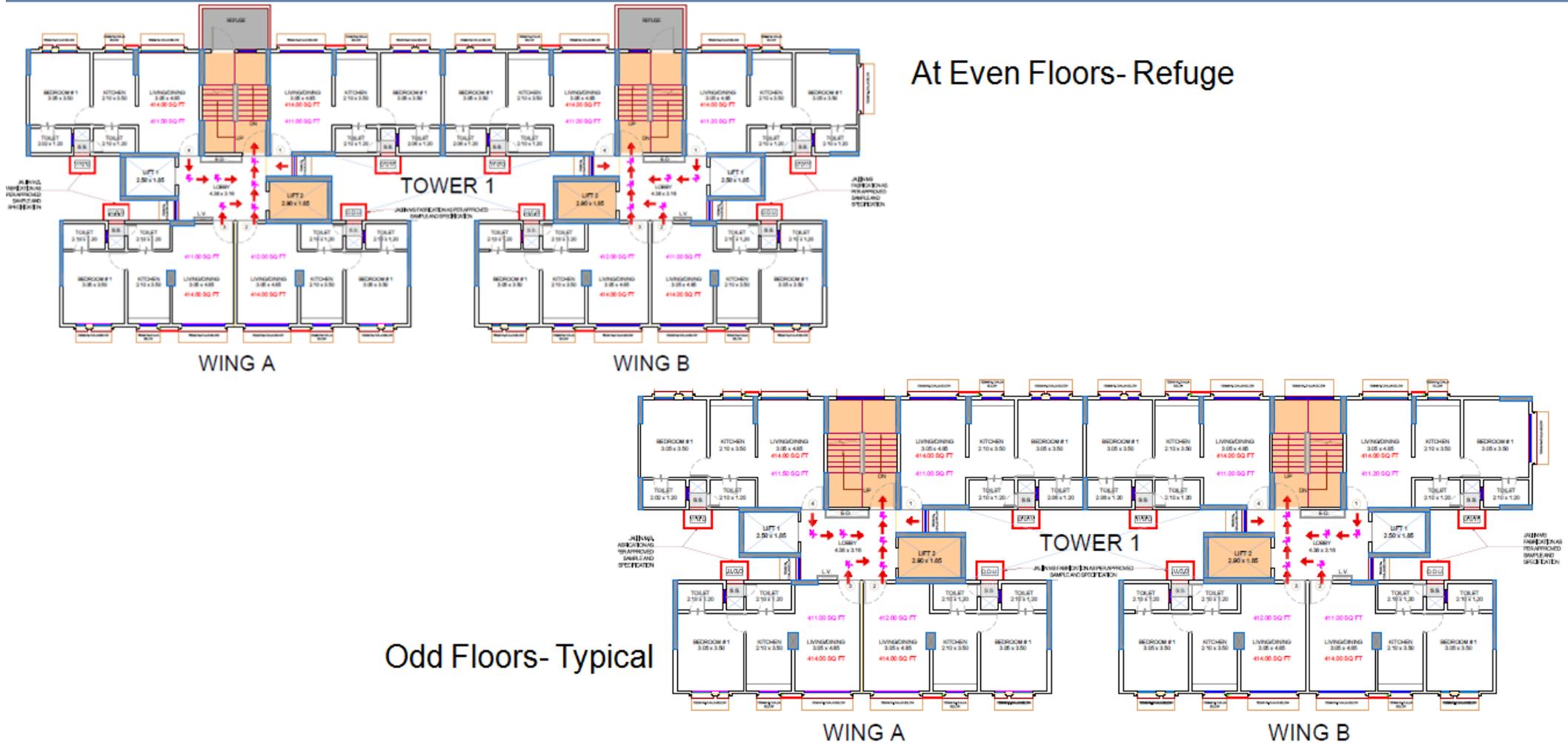


Figure 7: Evacuation Plan- Sale: Wing C&D

Evacuation Plan – Tower 2



WING A
16th Floor-Refuge

WING R



WING A

WING B

8th and 15th Floor- Refuge

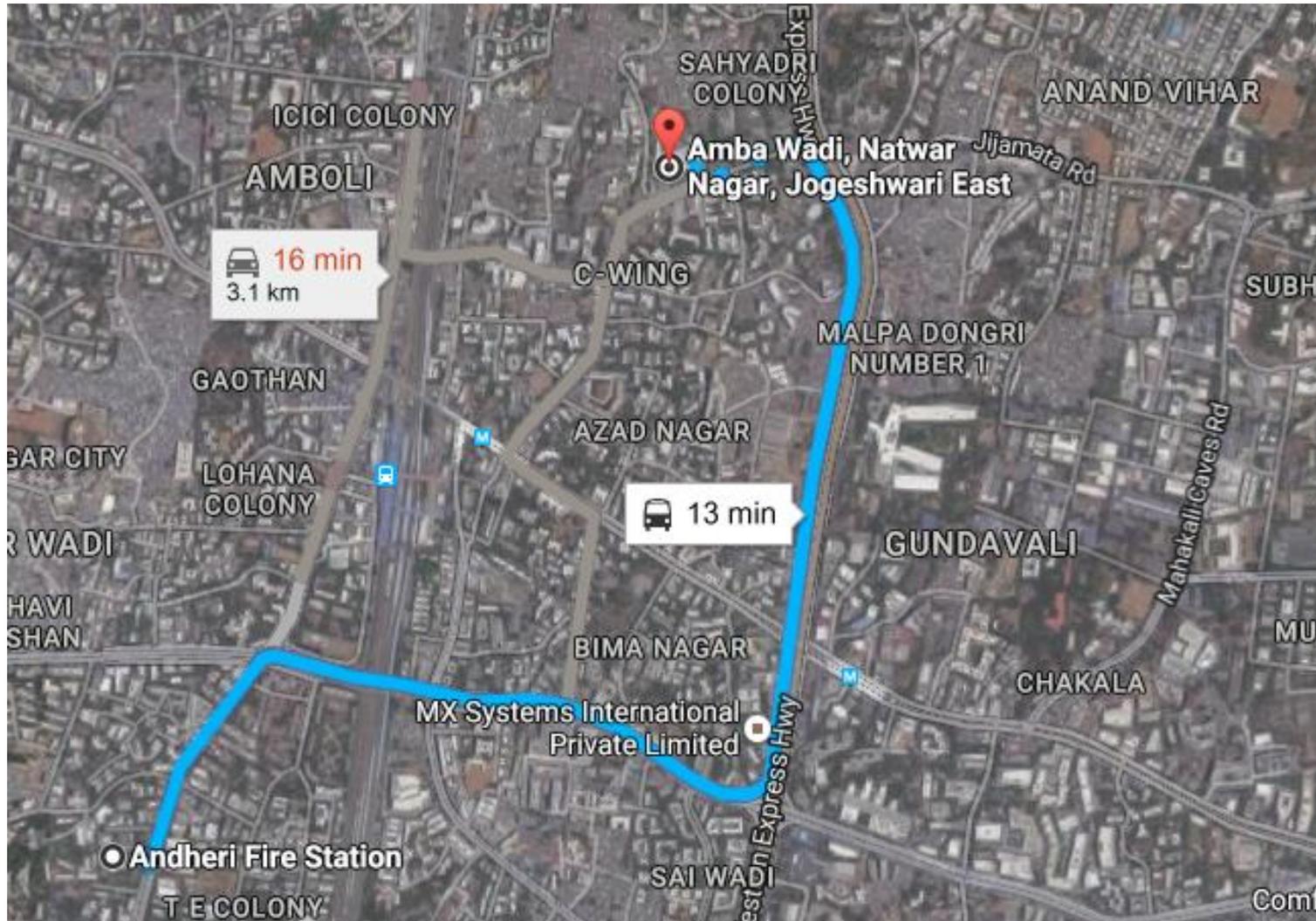


WING A

WING B

Typical

Figure 8: Distance of the Proposed Site from the Fire Station



DMP COST
CONSTRUCTION PHASE

Sr. No.	Parameters	Particulars	Cost (Lakh)
1	Safety tools	Periodic inspection, proper hand gloves, safety belt	3.5
2	Construction and debris waste & Dust suppression	Installation of safety nets, inspection of these nets time to time, if possible recycling of maximum material	6.5
3	Passenger Lift	Certified /approved passenger lift	1.5
4	Excavation & Remaining construction material	Use of protective system whenever it is required Regular medical check ups at site Use of barricading	12.5
5	Tower or crane used for construction material	Periodic check, use of Personal protective equipments, the crane should be operated by trained worker/operator	3.2
6	DMP personnels		1.5
	Total		28.7

OPERATION PHASE

Sr. No.	Parameters	Capital Cost (Lakh)	O & M Cost (Lakh)
1	Fire Fighting measures (Sprinkling System, Fire alarm, Portable fire extinguishers, Fire Tanks, Water lift pumps, Fire Hydrant Cabinets with hose reels, Fire Hydrants pumps, Fire Lifts, Fire alarm, fire Curtains)	345	12.5
2	Disaster Management Kit (First Aid Facility, Stretcher, A portable battery-powered radio, Flashlight and extra batteries, First aid kit and first aid manual, Safety shoes, helmets, Hand gloves, fire mask, fire blanket, Axe, Cutter)	25	2.5
3	Well-equipped Control Room , CCTV	16	1
4	2 way Public announcement system	10	2.5
5	Diesel Pump for emergency	5	2.3
6	Disaster Management training to Residents and Security Staff, Mock Exercise		2.5
7	Alternate source of power supply / D.G sets	5	2.3
	Total	406	25.6