

7.0 GENERAL

This chapter covers Risk Assessment Studies for the construction and operation phase, the safety precautions that have to be taken during construction phase and the Disaster Management Plan and Emergency Preparedness Plan Onsite and Offsite.

7.1 RISK ASSESSMENT

STEP 1: DEFINE THE PROJECTS/TASKS
Project Proponents : “M/s. Goel Ganga Developers (I) Pvt. Ltd

a) Are you using (Tick Boxes)

- | | |
|---|---|
| ☒ plant/equipment | ☒ scaffolding |
| ☒ portable electrical equipment | ☒ ladders |
| ☒ pressure vessels/boilers | ☒ lifts/hoists/cranes/dogging/rigging/load shifting |
| ☒ hazardous substances | machinery |

b) Does the project/task involve (Tick boxes)

- | | |
|---|--|
| ☒ using tools/equipment with moving part(s) | ☒ working around electrical installations |
| ☒ using tools/equipment that vibrate | ☒ working near traffic |
| ☒ working with x-rays ,or lasers | ☒ working at a height (>3m) |
| ☒ electrical wiring | ☒ working in isolation. |
| ☒ asbestos removal | ☒ working in a confined space |
| ☒ welding | ☒ manual handling |
| ☒ hazardous waste | ☒ repetitive or awkward movements |
| ☒ excavation / trenches (>1.5m) | ☒ lifting or moving awkward or heavy objects |
| | ☒ demolition work |

c) Is there (Tick boxes)

- | | |
|--|--|
| ☒ Noise | ☒ Slippery surfaces/trip hazards |
| ☒ Dust/fumes/vapours/gases | ☒ Poor ventilation/air quality |
| ☒ Extreme temperatures | ☒ A poorly designed work area for the project/task |

[√]Risk of fire/explosion

3: ASSESS THE RISK

During Construction Phase:

	Air Pollution	Water Pollution	Noise Pollution	Soil Pollution	Occupational Hazard
A. Material Handling:					
Cement	+M	-	-	+M	+M
Steel	-	-	+	-	+M
Sand	-	-	-	-	-
Stone	-	-	-	-	+L
Wood	-	-	--	-	-
Glass	-	-	-	-	+M
Hardware	-	-	-	-	-
Colour	-	+H	-	+M	-
B. Construction Machinery					
Rotary Driller	+L	-	+L	-	+L
Mixers	+M	-	+M	+L	+M
Excavator	+L	-	+L	-	+H
Material Lift	-	-	+L	-	+H

Risk Factor:

- + : Positive**
- : Negative**
- L : Low**
- M : Medium**
- H : High**

4: CONTROL THE RISK

For any projects/tasks that present a high or extreme risk, a Safe Work Method Statement must be completed.

a) Note how you will control the risk following the priorities listed to the right. This may include controls like redesigning the workplace, using guards or barriers, ventilation, using lifting equipment or personal safety equipment.

1. Eliminate the hazard
2. Keep the hazard and people apart
3. Change work methods
4. Use personal protection

b) Note any specific risk assessments required for high-risk hazards. Check whether any hazards noted in step 2 require further assessment or action

☒ hazardous substance risk assessment ☒ confined spaces risk assessment

☒ test and tag electrical equipment ☒ sound level test

c) Note Permits/Licenses/Registration required

☒ Demolition work

☐ Friable asbestos removal

☒ Electrical wiring

☐ Ionizing radiation sources

☒ Pressure vessels

☒ registers for chemicals, Personal protective Equipment, training, ladders, lifting gear

d) Note certificates of competency/licenses for operators

☒ Scaffolding

☐ Pesticide application

☒ Rigging

☒ Crane operation

☒ Load shifting machinery operation

☒ Hoist operation

e) Note emergency systems required

☒ first aid kit

☒ Fire control

☒ extended first aid kit

☐ remote communication mechanism

☐ emergency stop button

☐ others

☒ additional emergency procedures

7.3 DISASTER MANAGEMENT PLAN

Disaster is a threat to Environment and Society. Disaster Management Plan (DMP) deals with the preparations to reduce the impacts of Natural and Man-made disasters. Recent rise in the incidence 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.

Emergency prevention through good design, operation, maintenance and inspection are essential to reduce the probability of occurrence and also making the occupiers aware of what to do in case of any emergency. 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:

- Prevent Disasters.
- Minimize the effects of the accident on people and property.
- Initiate the rescue and medical treatment of casualties.
- Safeguard other people.
- Evacuate people to safe areas with care.
- 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.
- Provide training to residents through drills of how to enact in the such situation.

DMP follows the Basic structure as shown in Figure 16.

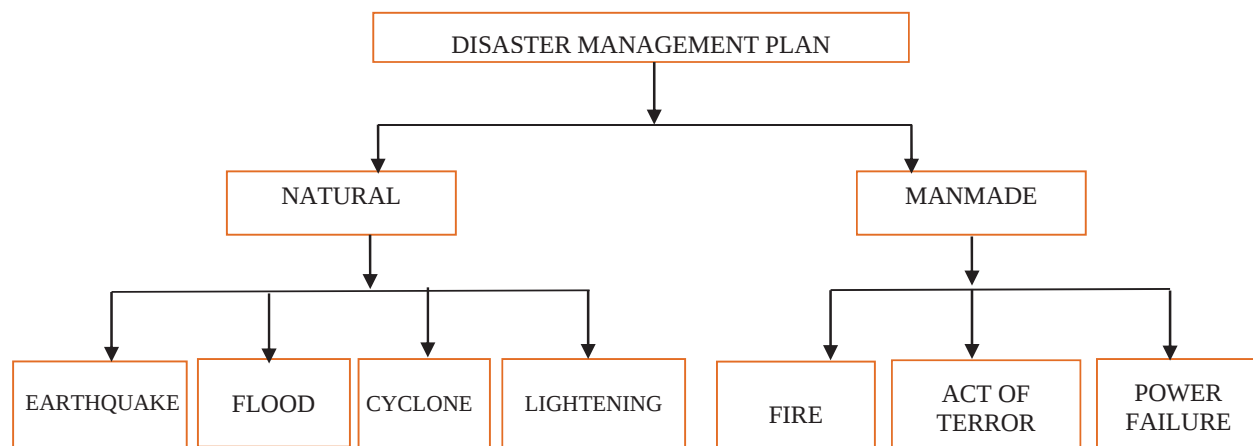


Figure 16 :Basic Structure of DMP

7.3.1 NATURAL DISASTER

A. Earthquake:

Seismic Environment & Precautions

As per the Seismic Zoning Map of India, Pune region falls under Seismic Zone-III. The structural design shall be certified as per IS code 456-2000 Plain & reinforced concrete – code of practice IS 1893 – 2002, criteria for earthquake resistant design of structures.

B. Floods:

Following precautions would be taken by the Project Proponent to manage flood disasters.

- a. Storm water system would be checked and cleaned periodically.
- b. 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 (as final ground levels etc. will be available after completion).
- c. Dewatering pumps shall be installed at vulnerable locations.

C. 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.

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

D. Lightning:

Lightning is an atmospheric electrostatic discharge accompanied by thunder which typically occurs during thunderstorms and sometimes during volcanic eruptions or dust storms. It often leads to physical damage to the building and occupants. It can also lead to short circuits, failure of power supply and fire.

Lightning arrestor systems shall be provided for buildings in this project to abate the impact of lightning hazard.

7.3.2 MAN-MADE DISASTER

Fire

Fire could take place through various means; one of them is through electrical fire. Hence, all the electrical works and material of the building would adhere to the standards. Regular maintenance and audit of the electrical systems would be carried out by external auditors.

Fire alarm would be installed. The functioning of these fire alarms would be checked periodically by security manager. A report of the same would be submitted to safety manager. The occupants/residents of the proposed buildings would undergo mock fire drills. These mock drills would be conducted by qualified staff (e.g. fire brigade). Fire extinguishers would be placed in every floor. All occupants/residents would be given training on how to use these fire extinguishers. Fire extinguisher equipment would be evaluated periodically to ensure that it is in working conditions by security manager. If any faulty equipment is observed then it would be repaired or replaced by society. Proper evacuation plan would be chalked for the building. The map for the evacuation plan would be provided to all the occupants.

Fire fighting measures

The fire pumping system shall comprise of independent electrical pumps for hydrant, sprinkler, common stand-by diesel engine driven pump for hydrant & sprinkler, jockey pump for hydrant & sprinkler system.

Following Pumps are provided at fire pump room located below ground, adjacent to UGT's. Pumps shall be vertical type, end-suction multi-stage.

- Single zone is proposed for all buildings.
- 1 No. of Wet-riser.
- Single/Double Headed Hydrants shall be provided at each Landing Level.
- The System shall be fully charged.
- Automatic sprinkler system in each building.

Fire Alarm System

- Main Conventional Analogue Fire Alarm Panel
- Conventional Control Zone Module
- Conventional Monitor Module
- Conventional Manual Call Point
- Fault Isolator Module
- Cabling
- Repeater Fire Panels at strategic locations

Fire Appurtenances

- Fire Extinguishers
- Fire Buckets

Sprinkler System

- Single zone is proposed for all buildings.
- 1 Nos. of Multi-stage Single-outlet Sprinkler Pump.

Response Sequence during Fire:

i. Person noticing the fire should attempt to isolate and extinguish the fire with the available equipment and Inform or arrange to inform the security regarding the:

- Location of the fire
- Material of burning
- Extent of fire
- Callers name and number

“A proper code of communication shall be maintained wherein the caller makes sure that the message has been conveyed to the right person”.

ii. Security or the coordinators will

- Respond to the scene of the incident.
- Arrange to send the necessary fire fighting equipment to the scene of the incident.
- Extinguish the fire with the available equipment.
- Ensure closure of gates immediately to regulate traffic in such a way that free movement of outside assistance like fire tenders, ambulance etc is available.
- Security will cordon off the area and local city fire fighting staff should be notified for further assistance.
- All the occupants will need to stop their operations/ work, switch off lights, fans, machines etc. All persons should assemble to refuge or designated area for fire and hazardous situation.

iii. Reporting and Follow up System

- All cases of fire occurrence, no matter how small, must be reported promptly to the Security for further action to avoid such incident.
- Fire extinguishing equipment once used, should not be returned to its location without it is being recharged/ certified fit by the security.
- All fire extinguishers after use should be laid horizontally to indicate that they have been exhausted.

b) Refuge Area

The Refuge Area will have the following resources available:

- i. Copies of the Disaster Management Plan.
- ii. Layout Plan of the complex.
- iii. Information regarding Safety Equipment, Fire Fighting material.
- iv. A list of important telephone numbers like those of neighboring police station, Fire Brigade, Hospitals etc.
- v. First - Aid Kit.
- vi. Communication equipment - Internal and External telephones and other communication equipment.
- vii. Drinking water facility.

In addition to many of the above measures an attempt will be made to add any site specific steps and manpower based instruction. Instruction should be in multiple languages including “Marathi and Hindi”. The communication equipment will be checked periodically to ensure that they are functional.



Figure 17: Fire Tender Movement

Table 25: Emergency Contact Numbers

1.	Police Control Room	100
2.	Fire Brigade	101
3.	Pune Heart Brigade	105
4.	Women Helpline Number	020-26050191
5.	Women / Child Helpline	020-26111103
6.	Senior Citizen Helpline	1019

Act of terror:

After completion of this project even if each building shall have its own security services, precautions should also be taken at individual level.

A. Power failure:

Power failure is a short- or long-term loss of the electric power to an area. Failure of electrical power 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.

a. Causes of Power Failure:

There are many causes of power failures in an electricity network which are caused by either of the following faults:

i. Manmade / Technical Fault

- Faults at power stations.
- Damage to electric transmission lines, substations or other parts of the distribution system.
- Short circuit.
- Overloading of electricity mains.
- Collision of person or object with utility poles or power transformers,
- Human error in operating equipment within the building or outside (such as at the utility company supplying the power), or malicious tampering.

ii. Natural Events.

Natural events include storms, floods, and earthquakes, lightning.

b. Types of Power Failure:

Power failures are categorized into three different phenomena, relating to the duration and effect of the failures:

- i. A transient fault is a momentary (a few seconds) loss of power typically caused by a temporary fault on a power line. Power is automatically restored once the fault is cleared.
- ii. A brownout or sag is a drop in voltage in an electrical power supply.
- iii. A blackout refers to the total loss of power to an area and is the most severe form of power outage that can occur.

c. Effects of Power Failure:

- Loss of visibility
- ii. Safety is at risk.
- iii. Stoppage of elevators.
- iv. Computer memory loss and equipment damage.
- v. Stoppage of working of Fire fighting system.
- vi. Stoppage of working of building utilities like water pumps, Sewage treatment plants etc.
- vii. Loss of comfort

c. Mitigation plan:

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

i. Diesel Generators

In case of emergency, 3 Nos. of D.G will be provided as backup for electric supply for the common area lighting and utilities like elevators, water pumps, fire lifts, fire pumps & Sewage Treatment plant, OWC etc.

ii. Provision of Independent electrical circuits for critical equipment's as per Norms

Also as per specific requirement of Fire fighting department the Electric supply for Fire pumps, booster pumps, sprinkler pumps will be on independent circuit.

iii. Uninterruptible power supply (UPS)

Uninterruptible power supply, also uninterruptible power source, UPS or battery/flywheel backup is an electrical apparatus that provides emergency power to a load when the input power source, typically the utility mains, fails. A UPS differs from an auxiliary or emergency power system or standby generator in that it will provide instantaneous or near-instantaneous protection from input. Even if DG sets are provided as power backup a UPS is typically used to protect computers, data centers, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption or data loss.

Structure of Disaster Management Plan (DMP)

In consultation with the international consultants, a structure of the Disaster Management Plan was developed. The Disaster Management Plan (DMP) has three components: (a) Risk Analysis & Vulnerability Assessment, (b) Response Plan, and (c) Mitigation Strategy. At the state and district levels, the same structure has been followed.

The Risk Analysis and Vulnerability Assessment depict the present picture for each disaster-exposure, loss of life, property damage, etc. It also shows geographic distribution of each hazard. The various monitoring facilities, regulatory regimes, countermeasures available for each disaster, etc. have been presented in this analysis.

The response plan presents an organisational structure of all the state, central and non-governmental agencies to effectively deal with the disaster in a co-ordinated and quickest possible manner to mitigate the impact of disaster during and after its onset. It identifies functional areas such as relief, communications, information, transport, health services, etc., and proposes assignments to various departments, including identifying lead and supporting departments. The response plan also lays down preparedness checklists, standards of services, operating procedure guidelines, and reporting formats.

The mitigation strategy and plan focus on the long-term planning for disaster reduction. It deals with the issues of continued commitment to hazard identification and risk assessment, applied research and technology transfer, investment-incentives for mitigation, and leadership and co-ordination for mitigation. The mitigation strategy makes an argument for better land use management, building codes, traffic standards, health standards, etc. These objectives are to be secured through disaster legislation, mitigation regulation, and incentives for mitigation.

Safeguard Requirements for Natural and Manmade Disasters:

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

Off-site plan addresses all issues which can have impact out-site of the site. Off-site Emergency Plan has many components which need to be in place for effective plan

7.3.3 OFFSITE DISASTER MANAGEMENT PLAN

A. On Site Emergency Preparedness plan :

Mitigate measures in the Construction phase / O & M of Equipment and facilities:

- i. Regular health check-up of construction workers
- ii. Adequate safety instructions to given to all employees.
- iii. Provide necessary protective equipment, safety appliances e.g. safety helmet, goggles, welder's equipment for eye and face protection, earplugs, safety belt, hand gloves, safety shoes and clothing, and to ensure their proper use.
- iv. Create awareness of employees about materials, equipment or processes used in their work, which are known to be potentially hazardous to health or safety
- v. Keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and up-to-date knowledge.
- vi. Provide appropriate facilities for first aid and prompt treatment of injuries and illness.
- vii. Proper implementation of fire prevention methods and an appropriate fire fighting service.
- viii. Maintain collection of data on accidents with a view to take corrective, remedial and preventive action.
- ix. Regular safety inspection by a competent person at suitable intervals of all buildings, equipment.

- x. The working personnel will be given the following appropriate personal protective safety gears.
- xi. Display of Emergency phone nos. (E.g. nearby hospitals, fire station, police stations, etc.) at following places :
 - At security cabin
 - At the entrance
 - Near the lift doors on all the floors and at every staircase landing on every floor
 - All occupants shall be provided the copy of these documents and shall be asked to keep handy.
- xii. Training to all occupiers for different type of emergencies.
- xiii. Periodic maintenance and checking of all equipment.

B. OFFSITE DISASTER MANAGEMENT (EMERGENCY PREPAREDNESS) PLAN

Safeguard Requirements for Natural and Manmade Disasters:

List of nearest clinics and hospitals shall be maintained for medical emergency as also any other eventuality. This will be distributed to all members within the building and later for off-site plan to neighbourhood. These information need to be updated every six months before safety drills. The information thus updated should also be shared with occupants.

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7.4TRAFFIC AND EMISSION MODELLING

7.4.1 Study components

- i. This study will cover traffic impact assessment and air emission dispersion modelling i.e. Construction and operation phase.
- ii. Project site traffic volume count will cover current traffic pattern on access roads – neighbouring road network and incarcerate traffic emanation from new developments and adjacent properties. Also analyze forecast project traffic in conjunction with base traffic. Conduct an Impact Analysis of project traffic as well as study impacts and suggest mitigation measures.
- iii. Traffic volume count for period of 24hr from survey – with current scenario, construction phase and 25yr down the line. Fugitive dust emissions estimation during construction phase along with present and operations phase.
- iv. Site Appreciation, Existing Transport Network and Base Traffic