

RISK ASSESSMENT & EMERGENCY PREPAREDNESS PLAN

RISK ASSESSMENT

The phases of an emergency includes:

- 1. Risk assessment*
- 2. Mitigation*
- 3. Preparedness*
- 4. Response*
- 5. Recovery*

Areas of Risk includes:

Naturally occurring events

Technological events

Human related events

Events involving hazardous materials

RISK = PROBABILITY X IMPACT

The risk assessment of the proposed health care campus reveals following critical areas:

<i>TABLE 17: RISK ASSESSMENT</i>							
<i>S. No</i>	<i>Area</i>	<i>Assessment</i>	<i>Probability Rating*</i>	<i>Anticipated Impact</i>	<i>Impact Rating#</i>	<i>Risk Rating</i>	
<i>1</i>	<i>Naturally Occuring Event</i>	<i>Flood</i>	<i>Causative Factor River Kosi-1.82 Km, SW</i>	<i>Possible</i>	<i>The slope of Koisriver basin lies from North- East to South West. The proposed project lies westwards from the Kosi river. As per past record available no flood situation has arisen. Therefore,</i>	<i>Marginal</i>	<i>C 4</i>

					under worst case scenario the anticipated risk has been shown to affect Minor or limited or short term service interruption of the project.		
2	Human Related Events	Mass Casuality	Disease Spread, Trauma	Highly Likely	death of staff or patient	Serious	A 7
Bomb Threat	-	Likely	Injury, Illness or death of staff or patient	Serious	B7		
3	Technological Event	Electrical Failure	Failure of 300 KLD Effluent Treatment Plant designed on continous flow of 12.5 KL/hr hospital waste of general specialities, diagonistics and other para clinical services and domestic effluent.	Likely	Moderate physical plant or equipment damage requiring moderate replacement costs and recovery time; Adequate drainage system to control flow of effluent to the discharge point. Drain= 300 Ø RC.C	Marginal	B 4

					<i>Slope 1:350. UPS & Inverter load has been proposed for waiting & common area, OT complex, block 3 and service room area and Fire Fighting.</i>		
<i>Transportation Emergency</i>	<i>Requirement of Emergency Ambulances, Battery Operated Transport from Entrance to OPD/Trauma</i>	<i>Highly Likely</i>	<i>Significant/widespread or long term service interruption. The proponent has covered adequate ambulance facility-with staff to combat such situation</i>	<i>Serious</i>	<i>A7</i>		
<i>Fire</i>	<i>During Evacuation -Patients are dependent on staff</i>	<i>Likely</i>	<i>Fire protection installations, fire compartments, smoke ventilation, safety equipment and fire safety design incorporated; approach road adequate for 45 tonne fire tender movement; The geometry of the building is designed so that patient transport is possible in</i>	<i>Serious</i>	<i>B7</i>		

			<i>beds</i>				
4	<i>Events involving hazardous material</i>	<i>HazMat Incidence</i>	<i>Mercury Contaminated & biomedical waste</i>	<i>Possible</i>	<i>Daily BMW & mercury contaminated waste disposal has been planned but no design safety for storage facility covered in the project design.</i>	<i>Serious</i>	7
<i>Radiological Exposure</i>	<i>Possible</i>						
<i>Highly Likely (A)</i>	<i>nearly 100% probability in next year</i>						
<i>Likely (B)</i>	<i>between 10 and 100% probability in next year, or at least one event in next 10 years</i>						
<i>Possible (C)</i>	<i>between 1 and 10% probability in next year, or at least one</i>						

	<i>event in next 100 years</i>						
<i>Unlikely (D)</i>	<i>less than 1% probability in next 100 years</i>						

Conceptual Plan- Expansion of Base Hospital Almora at Village- Khatyari, ParganaBaramandal, Tehsil & District- Almora, Uttarakhand. Environmental consultant- M/s Sawen consultancy Services Pvt. Ltd., Lucknow Page | 59

<i>Catastrophic (11-12)</i>	<i>Facility cannot provide necessary services without extensive assistance from provincial or federal resources</i>
<i>Critical (8-10)</i>	<i>Facility can provide a normal level of service with assistance from outside the local community or region; or, facility can provide a minimal level of service with normal resources</i>
<i>Serious (5-7)</i>	<i>Facility can provide a normal level of service with assistance from within region or within local community; or, facility can provide a reduced level of service with normal resources</i>
<i>Marginal (3-4)</i>	<i>Normal level of functioning or increased level of service required from within</i>

Earthquake

The study area falls within seismic zone IV as per seismic zone map of Indian Standard IS 1893. Therefore, at the time of designing and construction of the bASE hOSPITAL, ALMORA, the design parameters shall be considered in compliance with IS 1893 with due consideration of prevailing MDDA construction & development guidelines together

with National Building Code. The mitigation of earthquake has been assessed and shall be ensured in the construction of Hi-rise buildings.

8.1 FIRE FIGHTING

As most of the material and finished products are inflammable, no smoking and no fire will be allowed. In case of fire, fire extinguisher will be used. Fire extinguishers are put at the entrance of storage rooms. The Fire Extinguisher System has been provided as per fire safety plan in all floors of the institute. The phone number of nearest fire service stations has been displayed at various points and also near the fire extinguishers. The proposed project is to provide with fire protection arrangements such as, Wet Riser system (as per N.B.C standards), Hose Reel (as per I.S – 3844 standards), Yard Hydrant and Automatic Sprinkler System in every building. Manual call points, Automatic Detection System in every building, portable appliance, Exit signs, P. A. System, Mechanical Ventilation, Smoke extraction system, Pressurization shafts, staircase etc. for fire safely point view.

There is no objection for the construction of institutional building as subject to the compliance of the following fire safety recommendations:

1. Access: It must be ensured that the access roads all around the building must be kept clear all the time for free movement of fire engines and 4.5 m head clearance shall be provided. The access internal road shall be provided as per approved plan.

2. Exit Requirements: Exit requirements shall be in accordance with provision as per National Building Code of India Part – IV (Clause 8.1 to 8.15.1).

(a) Means of escape/exit shall be continuous and unobstructed way of exit travel from any point in the building to a public way. All exit doorways shall open towards means of escape that is away from, but shall not obstruct the travel along any exit. No door when opened shall reduce the required width of staircase/corridor/passage way.

(b) All exit and exit way marking signs, emergency lights shall be on separate circuit/laid in separate conduit, exit signs must be illuminated and wired to independent circuit supplied by alternate source of power supply. The wiring Conceptual Plan- Expansion of Base Hospital Almora at Village- Khatyari, ParganaBaramandal, Tehsil & District- Almora, Uttarakhand. Environmental consultant- M/s Sawen consultancy Services Pvt. Ltd., Lucknow Page | 60 and all accessories in the electrical circuit shall be fire resistant and low smoke material duly ISI marked.

3. Material for construction: The material used for construction of the building shall be of non-combustible. The interior finish materials shall be of very low flame spread ability, i.e. Class-I. All the fabric used for seats, curtain, covering on sidewall, matting carpeting etc. shall also have Class-I rating as prescribed in NBC part-IV.

4. Compartmentation: The building shall be suitably compartmentalized so that the fire/smoke remain confined to the area where fire incidents has occurred and mechanically exhausted as approved in the meeting, so smoke does not spread to the remaining part of the building. The services, standby generator, store etc. must be segregated from other by erecting fire-resisting wall of not less than 2 hours rating. Each of the compartments must be individually ventilated and the opening for entry into each of these

compartments must be fitted with self-closing fire/smoke check doors of not less than one hour fire rating fitted with magnetic latches. All electric cables shall be laid in separate shafts shall be sealed at every floor with fire resisting material of similar rating. The partition wall in between and all around the shafts shall also be of minimum two hours fire rating. Under no circumstances, two services shall pass through the same shaft, i.e. separate shaft be used for different purpose. The entry to the staircase from all levels shall be segregated with a self-closing fire/smoke check door of not less than 1 hour fire rating. All vertical and horizontal opening at each floor level in entire building shall be sealed properly with the noncombustible material. Wherever false ceiling/suspended ceiling is provided, the same shall be of non-combustible in nature and that the compartmentation shall be extended up to ceiling level.

5. Ventilation: The building shall be provided with the ventilation strictly in accordance with Part-VIII Section-I and Clause D-1.6 of Part IV of National Building Code of India Mechanical ventilation system having interlocking arrangements as well as upper floor also. Extractor system shall be designed to permit 30 air changes per hour in case of fire in basement. The smoke extraction system shall be designed as per NBC Part-IV and approved by the department.

6. Air Conditioning System: Air conditioning system shall conform to Section-3 PartVIII and Clause D-1.17 of Part-IV National Building code of India 1983. Following points shall be ensured.

- All ducting shall be constructed of substantial gauge metal conforming to IS: 655. Air duct serving main floor areas, corridors etc. shall not pass through the staircases enclosures.

- Automatic fire dampers shall be provided in the ducts at the inlets of the fresh air and return air of each compartment/floor.

- Automatic fire dampers shall be closed automatically upon operation of a detector sprinkler.

Conceptual Plan- Expansion of Base Hospital Almora at Village- Khatyari, ParganaBaramandal, Tehsil & District- Almora, Uttarakhand.

Environmental consultant- M/s Sawen consultancy Services Pvt. Ltd., Lucknow Page | 61

•	The air ducts for every floor/compartments shall be separated. In no way inter connected with the ducting of any other compartment
•	Under no circumstances, plenum shall be used as "Return Air Passage" for air conditioning purposes.
•	

7. Essential Emergency Electrical Services: Separate electrical circuits to feed emergency services such as fire fighting pumps, lifts, staircase and corridor lighting blowers, panel and such a smoke venting and signage circuit shall be laid in separate conduit so that fire in one circuit will not affect the others. Master switches controlling essential services circuits shall be clearly labeled. The electrical wiring shall be provided in metal conduits. MCBs and ELCB shall be installed. The electrical services shall be strictly in accordance to Clause D.1.12 of Appendix-'D' of NBC Part-IV fire resisting cables shall be used.

Power supply cables and the ducting shall not be taken through the staircase or any passage way used as an escape route. All the cables shall be only of Fire Resistant Low Smoke type.

8. Emergency Power Supply: The standby electric generator shall be installed of adequate capacity to supply power to staircase and corridor lighting circuit, lifts, exit signs and fire pump in case of failure of normal electric supply. The generator shall be capable of taking starting current of all the machines and circuits stated above simultaneously and must be automatic in action.

9. Static Water Tank: The underground water storage tank of the adequate quantity shall be provided. The replenishment through bore well or from the town main shall be ensured. This shall conform to the requirements given in National Building Code of India Part-IV. An additional overhead tank as proposed on the terrace shall be provided for fire-fighting as an alternative source of water supply. The underground water storage tank shall be approachable by the fire engine.

10. Stationary Fire Pump: Two electrically driven pumps – one each for Wet Riser and sprinkler system with 70 meters head shall be provided for wet riser and sprinkler system so as to give adequate pressure of 3.5 kg/cm² at the farthest point. The standby diesel engine driven pump of similar capacity and the two-jockey pumps – one each for wet riser and sprinkler system shall be installed. All the pumps shall be automatic in operation shall be provided. The pumps shall have positive suction.

11. Automatic Sprinkler System: The system shall be installed in entire building in accordance with BIS 15105/2002. Flow alarm switch/gang shall be incorporated in the installation for giving proper indication/sound. The pressure gauge shall also be provided near the testing facility. The entire system including pump capacity & head, size of pipe network, housing control panel etc. shall be provided in accordance to relevant code. Fire service inlet shall also be provided at ground floor level. Testing/flushing facilities shall be provided at each floor. The welding shall not be done for the pipe less than 50 mm diameter.

12. Wet Riser: The wet riser system shall be provided in the building as per NBC -05 standards.

Conceptual Plan- Expansion of Base Hospital Almora at Village- Khatyari, ParganaBaramandal, Tehsil & District- Almora, Uttarakhand. Environmental consultant- M/s Sawen consultancy Services Pvt. Ltd., Lucknow Page | 62

13. Hose Boxes, Fire Hose and Branch Pipe: Hose boxes of suitable dimension shall be provided near each internal hydrant. Its design shall be such that it can be readily opened in an emergency.

Each box shall contain two lengths of 63 mm diameter, 15 m length, rubber lined delivery hoses conforming to IS:636 complete with 63 mm instantaneous coupling conforming to IS:903 and short branch pipe conforming to IS:903 with a nozzle of 16 mm diameter.

14. *Hose Reel:* A hose reel near each internal hydrant containing 30 m of length of 20mm bore terminating into a shut-off nozzle of 6.5 mm outlet connected directly to riser shall be provided. This will conform to IS: 3844.
15. *Automatic Detection System:* Automatic fire detection (smoke/heat) shall be provided in all the areas of the building and shall conform to IS: 2189/1999.
16. *Portable Fire Extinguishers:* The portable fire extinguishers of water CO2 type and CO2 type ISI mark shall be provided as marked on the plans. The number of the fire extinguishers may have to be increased later when the layout of the partition etc. is known. All the fire extinguishers will be installed and maintained in accordance with IS: 2190-1992.
17. *Public Address System:* The public address system shall be provided having loud speakers on each floor level at strategic location. The microphone, amplifier and control switches of public address system shall be installed in the fire control room.
18. *Lighting Protection:* The lighting protection shall be provided in the building as per IS: 2309.
19. *Intercommunication System:* An emergency inter-communication system shall be provided in the entire complex. The instrument shall be provided in the common areas on each floor.
20. *Yard Hydrants:* Yard hydrants shall be provided in the building as per BIS specifications.