Disaster Management Report, Risk Assessment and Management Plan

1. History of Disasters in Odisha:

The state of Orissa is having a geographical area of 1, 55,707 Sq. km with population of 41,947,358 according to 2011 census. The state has tropical climate characterised by medium to high temperature, high humidity, short and mild winter.The mean annual rainfall is 1503 mm .The coastal part of the state is frequented by natural disaster like flood and cyclone almost every year.

1.1 Mapping Major Disasters in Odisha

In general, Odisha come across following disasters.

1.1.1 Cyclone

The Super cyclone (1999) and Phailin (2013) are two important cyclones of present time.

1.1.2 Flood

Before draining into the Bay of Bengal, all the major rivers of Odisha flow long distances; some of them originate beyond the state of Odisha. The intensity of floods inundating the rivers depend much on the topography of the State, the drainage system with low channel capacity, low flood slope, sand banked mouths, high concentration of rainfall in a small or limited number of days in the catchments basin etc.

The Flood prone area of the state is assessed at the level of 33.40 Lakh Hectares. Mahanadi, one of the major rivers flowing in the State and its tributaries has the potential to cause major floods. Out of a total geographical area of 15, 571 lakh hectares, 1.40 lakh hectares are usually very flood prone. The State is also vulnerable to flash floods and landslides. However, the proposed Shamuka site is not within the flood prone area.

1.1.3 Tidal Ingress

Odisha Coast particularly area between Puri and Paradeep is venerable to Tidal Ingress. Major damage due to Tidal Ingress was witnessed in 1971 Cyclone and 1999 Super Cyclone.

The Super Cyclone of 1999 witnessed a cyclonic gale of 300 km/ h. More than 10,000 died and 2 million people are affected by this Cyclone The tidal surge of 6 to 7 m arising out of wind speed of 300 km/hr swept across a 100 Km of coastal stretch in Jagatsinghpur and Kendrapara districts, submerging the entire area and destroying all most all kucha houses and infrastructures. Ersama area near Paradeep was one of the most affected area during Super Cyclone. However, the Shamuka project site was not affected in the 1999 Cyclone.

1.1.4 Earth Quake

Earthquakes are caused by natural tectonics activities and strike without warning and are thus unpredictable. The middle part of the coastal Odisha, including Puri come under Seismic Zone III. Depending on the severity of tremor, degree of devastation varies in earthquake area. However, Orissa has not faced any such severe earthquake in near past.

1.1.5 Area Affected by Multi Hazards

The project site has not experienced any multi hazards during recent past.

2. Design Parameters for Multi-Hazard Resistance Structures

Major Design Parameters to be considered while building the structure:

- Sustainable Use
- Accommodation Capacity
- Location and Orientation of structure
- Building Design and Structural Stability
- Building Components
- Structural Specifications
- Material Selection
- Other Considerations

2.1 Sustainable Use

The proposed hotel & tourism infra is planned for accommodation of tourist and pilgrims visiting the golden triangle including Puri. Therefore it will be of use throughout the year, although more incumbency is expected during the peak season. In such a case, all precautionary measures will be kept ready for the wellbeing of the tourists. Such a sustainable use should also generate required finances to supplement proper maintenance of the structure as well as to maintain safety measures in case of any causality.

Therefore, more a hotel is used in normal time, the better it is maintained, the more successfully it serves in emergencies. Regular use also provides economic justification for the investment and safety of the incumbency.

2.2 Accommodation Capacity

Generally, the capacity of accommodation during disaster for vulnerable populations consisting of incumbency and staffs. in such case, following points will be considered while taking safety measures for the concern vulnerable populations.

- Safety shall be provided to the incumbents as well as local vulnerable people in need of shelter.
- Provisions for food, water supply and other emergency services need to be augmented to the incumbency.

2.3 Location and Orientation of structure

Proper location of any structure in multi hazard coastal belt is the first step towards making it to hazard proof. Emphasis is in the designing the structure is that it is located on the available high elevated land of the site. Guidance on the levels is taken from large scale maps and as much as practicable construction of the structure was made elevated. This will act as Disaster Risk Reduction (DRR) mechanism for better safety of the structure.

Similarly, Orientation Plan of the infrastructure for wind direction, light incidence etc also shall to be considered to increases the carrying capacity of the structure and will reduce vulnerability. The front of the structure shall be designed in such a manner that it will offer least resistance to cyclone, tsunami and flood. Conversely being structurally strong and more sustainable the shorter side faces the wind more efficiently.

2.4 Building Design and Structural Stability (inclusion of appropriate stability certificate)

Shape of the building is very important to make it resistant to Multi hazards such as Flood, Cyclones, Tsunami, Wind and earthquake. In general, simple and compact structure shapes are advised in the Master Plan.

- The design of the structure shall be concrete & metal structure. It allows high wind to go around them causing less injury to the structure during severe cyclone, tsunami, flood.
- It is a longer shaped structure which is designed to withstand the forces of wind.
- To prevent cracks at the corner, the structure shall be strengthened at the corners and rounding the corners, which are considered a good option to avoid wind load.
- The houses shall be designed to be rectangular and layout is planned keeping length is specifically two times the width.

2.5 Building components

Foundation: In view of general soft top soil in coastal areas, pile foundations have been advised in the Master Plan. However, raft foundations in the basement may be considered based on local conditions and soil strata.

Column Structure: Masonry structures shall have (Column Structure) frame structure. The proposed structure is a concrete & metal structure to develop a composite structure

Plinth Band: Proper plinth band have been included in the design in order to provide extra reinforcement in this vulnerable area.

Wind Load: Sufficient structural design has been incorporated in the design of the proposed structure to reduce wind pressure.

BMTPC Guidelines: All structural designs are planned keeping BMTPC in view to meet the vulnerability of disaster usually encountered along Orissa Coast.

RCC Masonry: RCC masonry building has been designed considering with prevailing storm tide level of this vulnerable area. For the high winds in cyclone prone areas it is found necessary to reinforce the walls by means of reinforced concrete bands and vertical reinforcing bars as for earthquake resistance.

Height: Height of the building is restricted to 9 meters as per the provisions of CRZ notification, 2011.

Doors & Windows: Metal, Wood;

Staircase: RCC

2.6 Structural Specifications

Following structural specification proposed for the proposed structure:

1. The structure is designed to withstand the wind velocity of 300 k.m/hr and roof live load of 500 kg/cu.m. as per IS: 875. It is also be designed as earthquake resistant.

2. Wind velocity for East Coast of India: Basic wind speed 65 m/sec with modification factors K1=1.08, K2=1.05, and K3=1.0 as per IS 875 - standards is considered.

3. Vents: Provide as per the norms for adequate ventilation.

4. Shelves: Provided at door-window level in line with seismic band at that level.

2.7 Material Selection

1. Load bearing RCC masonry structure is adopted where no requirement of stilt.

2. Corrosion resistant steel (HCR 500) will be used to increase the service life of the structure.

3. Good concrete with proper cover is planned to reduce corrosion to corrosion resistant steel results in a durable structure

2.8 Other Consideration

1. Provision should be kept for appropriate power back-up facilities such as generator/solar power cells may be made. These should be located above the design surge level.

2. additional communication facilities may be provided during natural calamities.

3. Disaster Management Committees may be formed for effective management during disaster.

3. Structure Management Plan

3.1 Linkage with Administration

The smooth implementation of disaster mitigation plan is to be effective by proper institutional linkage arrangement. For infrastructural safety, proper linkage is to be identified with the departmental administration, Districts Disaster Management Committee, Local Multipurpose Cyclone Shelter Management Committee and rescue team for the infrastructural safety.

3.2 Creation of Management Unit

A realistic management unit is to be prepared for proper managements and maintenance of the structure during the disaster, necessary awareness is to be imparted to the staff.

3.3 Linkage with Disaster Management Unit (State /National)

Odisha has developed an efficient disaster mitigation agency, i.e. OSDMA. Simultaneously, District level, Block level & calamity committees are formed and trainees are developed for rescues and other operations. Therefore, proper linkage is to be established with these units through various media for a smart operation.

3.4 Safeguarding Management Plan

The management body of the project shall develop a management plan for various disasters usually encountered along the above specified coastal stretches such as cyclone, flood, saline ingression, earthquake etc. The management body is to plan properly through mock practices and vulnerability mapping for the safe guard of the Management Plan prepared for the purpose.