Framework for Establishing and Operationalizing State level Health Emergency Operations Centres (HEOC):

A Guidance Document

Ministry of Health & Family Welfare

(Government of India)

Acronyms

BPHE	Biological & Public Health Emergencies
CMO	Chief Medical Officer
CONOPS	CONcept Of Operation
DC	Data Center
DOH	Departments of Health
DR	Data Recovery
DRR	Disaster Risk Reduction
GDMO	Genral Duty Medical Officer
HEOC	Health Emergency Operations Center
IC	Incident Commander
ICT	Information And Communication Technology
IDSP	Integrated Disease Surveillance Programme
IHR	International Health Regulations, 2005
IRS	Incident Response System
IRT	Incident Response Teams
MoHFW	Ministry of Health & Family Welfare
NDMA	National Disaster Managemnent Authority
NDMP	National Disaster Management Plan
PHEIC	Public Ealth Event of International Concern
PM-ABHIM	Pradhan Mantri - Ayushman Bharat Health Infrastructure Mission
RO	Responsible Officers
RRTs	Rapid Response Teams
SDMP	State Disaster Management Plan
S-MSVC	State Media Scanning Verification Cell
SPMU	State Program Management Unit
SSO	State Surveillance Officer
WHO	World Health Organization

1. Background

1.1 Disasters with health impacts and public health emergencies

The United Nations Economic and Social Council - Asia-Pacific Disaster Report 2019, places India as one of the most disaster-prone countries in the South-East Asia region. The country encounters a range of geophysical, hydro-meteorological and technological hazards such as Earthquakes, Floods, Landslides, Lightning, Fires, Cyclones, industrial accidents etc. These disasters in addition to their impact on infrastructure and economies, often also have a variable impact on health of affected communities in terms of morbidity and mortality as an immediate as well as in the aftermath of such events.

In addition, public health emergencies including disease outbreaks, epidemics and pandemics continue to be a major concern worldwide including in India. While majority of the reported outbreaks include those of acute diarrhoeal diseases, vector borne diseases, food poisoning and measles, in recent years many outbreaks/epidemics, Public Health Emergencies of International Concern and pandemics like Zika virus disease, Influenza H1N1 pandemic and the ongoing COVID-19 pandemic have challenged and strained the public health systems in the country.

A Health Emergency Operations Center (HEOC) is designed to serve as a hub for coordinating the preparation for, response to, and recovery from disasters with health consequences as well as public health emergencies. Such preparations include maintaining a state of continuous situational awareness, risk assessment, planning functions including preparation of plans and procedures, capacity building of all relevant stakeholders, exercising and response to such events all in coordination with relevant stakeholders from health and non-health sectors. The response includes all activities related to investigation, response and recovery.

1.2. Scope

The scope of this document is to provide guidance to States/UTs in operationalization of Health Emergency Operations Center (HEOC) being established under Pradhan Mantri - Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) to support States/UTs in preparedness against and to play part in response to disasters with health consequences as well as public health emergencies.

The guidance provided here should be used as a template for States/UTs to operationalize and make optimal use of their respective HEOCs taking into account:

1. Risk assessement to different types of hazards,

2. Existing disaster management plans for different types of hazards with identified stakeholders,
3. Local health priorities,
4. Existing health systems and their capacities,
5. Surge capacities availability in health system and roles
6. Maintaining continuity of business
7. Existing administrative framework at State/District for responding to diasters /disease outbreaks

and in collaboration with designated nodal departments/Ministries as per NDMA's National Disaster Management Plan (NDMP).

❖ The present document also provides guidance on 'Establishment of Performance Benchmarks for Internal Emergency or Annual Outbreak Simulation Exercise' as detailed **Annexure -I**.

1.3. Legal Framework

'Health' is a State subject. The preparedness and response mechanisms for disasters and disease outbreaks are to be primarily that of the State/ UT Administration. Ministry of Health and Family Welfare would provide the State/UT Administration with guidance and logistic support. The Epidemic Diseases Act, 1897 and the recent amendment brought in the same as the Epidemic Diseases (Amendment) Act, 2020 provides for the State to act in a manner to facilitate control of public health emergencies including pandemics.

India as a signatory to International Health Regulations, 2005 (IHR 2005) has a shared responsibility for global health security by instituting mechanisms for prevention, control, and public health response to prevent international spread of diseases in ways that are commensurate with and restricted to public health risks, while avoiding unnecessary interference with international traffic and trade. All States/UTs are required to report about all notifiable disease or outbreak of novel/unusual pathogens and non- notifiable but epidemic prone diseases/conditions as notified under Integrated Disease Surveillance Programme (IDSP) and any type of disaster to the concerned authority as defined under NDMP.

The enactment of Disaster Management Act, 2005 has marked a paradigm shift in India's approach to disaster management from a relief-centric approach to a more proactive, holistic and integrated approach for management of disasters through improved disaster prevention, preparedness, mitigation, and response. HEOCs, when used optimally can improve management of all these phases of disaster management.

More recently, the adoption in 2015 of landmark global agreements - the Sendai Framework for Disaster Risk Reduction, and Sustainable Development Goals (UN 2015) provides for enhanced coherence across in Disaster Risk Reduction (DRR), sustainable development and response to disasters and public health emergencies.

The Model Crisis Management Plan for managing Biogical Disasters, circulated periodically by Union Ministry of Health & Family Welfare also requires States/UTs to activate and make use of HEOCs during such emergencies.

For putting up a collobaorated and well coordinated response to disasters, the National Disaster Management Authority (NDMA) has issued the Guidelines on the Incident Response System (IRS) under Section 6 of the DM Act, 2005. The IRS calls for pooling in of personnel and resources from disaster-concerned stakeholders to provide an institutional framework at the time of occurrence of disasters.

1.4. Institutional Framework

While the NDMA's National Disaster Management Plan (NDMP 2019) pertains to the disaster management for the whole of the country, the said plan identifies hazard-specific nodal Ministries/departments at Central and State levels for Management/ Mitigation of different disasters. As per the said plan, the State/UT's Department of Health have been designated as nodal agency for Biological & Public Health Emergencies (BPHE). Departments of Health (DOH) have also been given the responsibility of providing explicit support for building capacities to minimize/prevent health impact of other types of disasters/emergencies.

Similarly, as per Section 23 (1) of the Disaser Management Act, 2005, every State is required to prepare a State Disaster Management Plan. The NDMP 2019, also fixes certain responsibilities for State/UTs Departments of Health (DOH) making it the nodal department for biological disasters. For all other disaster situations involving human health, especially those having a bearing on public health, DOH would be supplementing the efforts of the concerned departments.

The response to public health emergencies arising in district/cluster of disricts initiates with activation of control room (Health Emergency Operation Center) and placement and activation of Based, an Incident Response System (IRS), in line with National Disaster Management Authority's (NDMA's) guidelines, acting as hubs for planning and operational aspects of the response phase.

HEOC while acting as a central hub for data compilation, analysis and dissemination, should also serve as a hub for coordinating preparedness and response activities before, during and in the aftermath of a disasters with health consequences as well as for public health emergencies. The same is accomplished through facilitating and enhancing communication and collaboration among relevant stakeholders.

As communicated from time to time, as per the Crisis Management Plan of MoHFW, the States/UT's DOH would take support / guidance from Ministry of Health and Family Welfare, Government of India for outbreak investigation, laboratory diagnosis, instituting public health measures and providing logistic support in terms of human and material resources, as required. Requisite cross-linkages and collaboration with IDSP in concernd State and District/s shall be made to get inputs on morbidity and mortaility based indicators including past trends.

2. Introduction

A Health Emergency Operations Center (HEOC) is a command and control facility where designated emergency management functions are performed. A HEOC is responsible for strategic direction and operational decisions regarding coordination, communication, planning, acquiring and managing resources etc. The HEOC will support the entire continuum of disaster management activities related to preparedness, mitigation, response, recovery and rehabilitation. This would be achieved through reliable communication linkages between all stakeholders via data sharing, voice, and video - conferencing.

This document also draws inputs from World Health Organization's (WHO) 'Framework for a Public Health Emergency Operations Centre' which provides methodical guidance for designing, developing, and strengthening public health emergency operations centres.

2.1. Objectives of State level HEOC

- Provide timely, event-specific operational decisions using an all-hazards approach while making use of the best available information, policy, technical advice and plans.
- Communicate and coordinate with stakeholders utilizing information and communication technology (ICT) tools and services to support involvement of multiple jurisdictions, sectors, and organizations in making and implementing collective management decisions.
- Enable response-related decision-making, operations, liaison, risk communication, deployment management, emergency personnel staffing, logistics and planning functions.

- Collect, collate, and analyze the event data from different sources including presentations to enhance dissemination and effective use of data.
- Acquire and deploy human and material resources, including surge capacity, to support all HEOC functions.
- Prepare public communications and coordinate with response partners to support audience awareness, outreach and social mobilization.
- Monitor realization of financial commitments for establishing and operating the HEOC.

Meeting all these objectives requires regular, timely collaboration with designated nodal departments/Ministries as per State Disaster Management Plan (SDMP) for response to Biological and Public Health Emergencies.

Core Components of a HEOC:

The essential functions of a HEOC rely on the following core components:

- **Plans and procedures**: These include Disaster Management planning functions for the health sector. A HEOC is required to undertake planning for response to ensure business continuity or continuity of operations plan shall be developed and practiced.
- **Physical infrastructure**: The HEOC facility shall be housed in a already existing space in State Department of Health. It should be physically and environmentally secure, accessible, and survivable in any emergency, and with adequate space for its staff.
- **Information and communication technology (ICT) infrastructure**: ICT enables internal and external telecommunications and all aspects of information management required to carry out the daily operations of an HEOC.
- **Information systems and data standards**: The goal of an effective HEOC information system is to increase the availability, accessibility, quality, timeliness, and usefulness of emergency operations data. An information system must support all the functions of the HEOC and should respect the principles of data security, privacy, and confidentiality as covered under relevant sections of Information Technology Act, 2000 and any subsequent amendments to the same.

3. Functions of Health Emergency Operations Centers:

- Maintain continuous situation awareness by tracking of health alerts obtained through formal and informal reporting mechanisms.
- Activate surge capacity of the HEOC during public health emergencies and disasters with health impact.

- Support incident management and information management (data, voice and video) during all stages of public health emergency management including highly complex and multi-sectoral incidents.
- Coordinate a whole of Government response that is able to support multiple National/Regional/International linkages simultaneously.
- Function as a hub for data gathering, analysis, information and intelligence dissemination, media management etc. with 24 X 7 operability, as per requirement.
- Optimize emergency communication network using different communication technologies using terrestrial, wireless, radio and satellite to provide required level of redundancy to achieve high reliability.
- Faciliate well coordinated response to public health emergencies including deployment of Rapid Response Teams (RRTs), logistic, technical support etc.

4. Physical Infrastructure, Equipment, Specification and Connectivity:

❖ Detailed **suggestive** layout for physical infrastructure, list of equipment and their specifications for proper functioning of Health Emergency Operation Centres may be seen at **Annexure II**

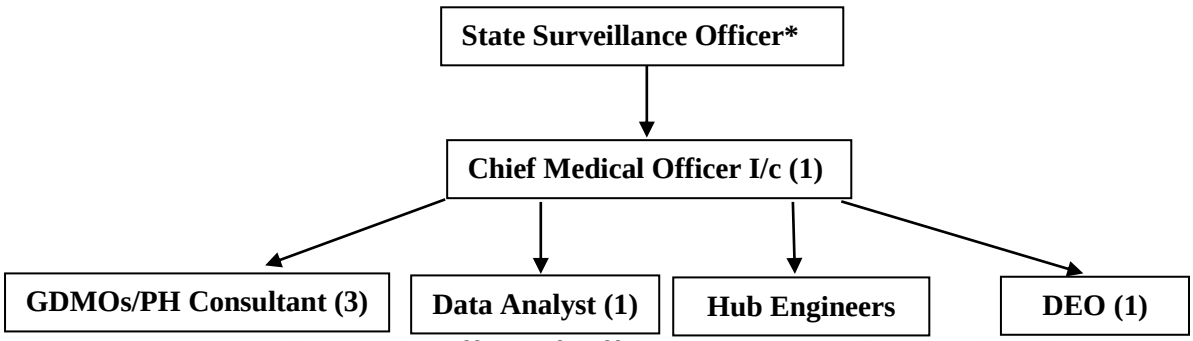
5. Concept of Operation (CONOPS)

5.1 Human Resource Requirement

While States/UTs shall be supported in terms of Human Resource under PM-ABHIM, optimal functioning of HEOCs shall require deployment of at-least 1 CMO, 3 GDMOs/Public Health Consultants, 1 Hub Engineer and 1 Data Entry Operator. The State/UT may further supplement the same as per their assessment and needs.

The deployment of HR at HEOC is a dynamic activity depending on mode of operation. An HEOC has two types of staff:

- **Routine staff:** To work on Watch Mode. A suggestive composition is as detailed below:



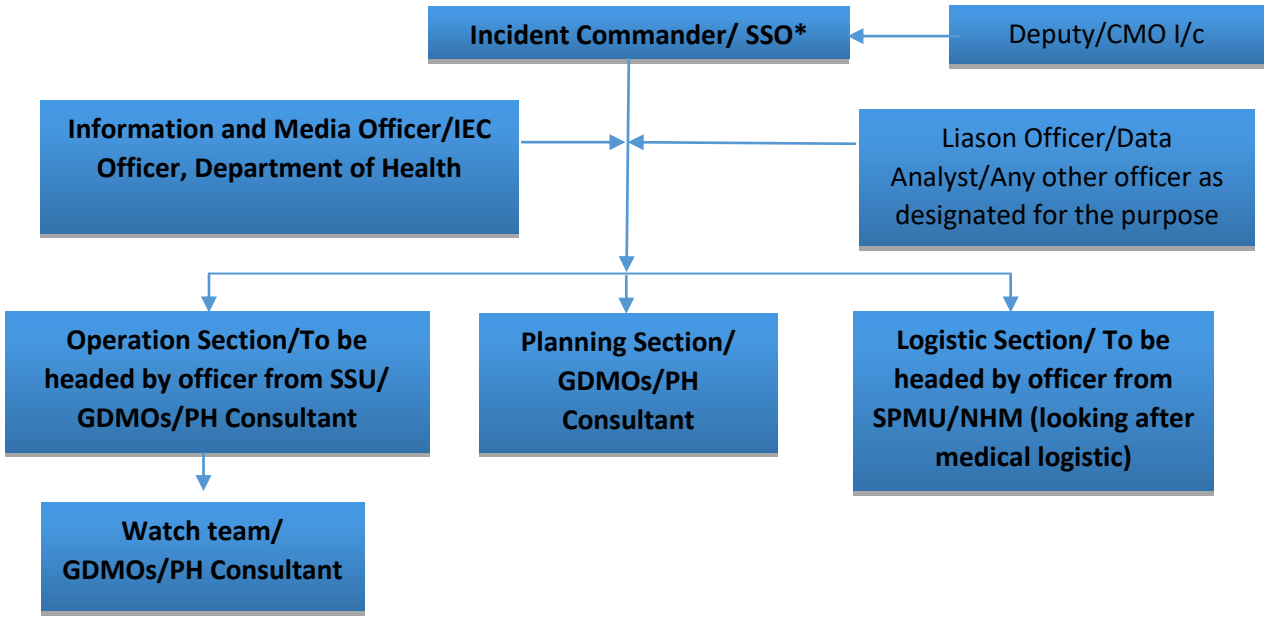
*or any other regular officer of sufficient seniority as designated by the State

- **Surge staff:** Routine staff supplemented by addional human resource based on surge capacity plans and restructuring of HEOC staffing pattern according to scale of disaster/ Public health emergency for temporary basis. This may also require placement of officials from non-Health sector, particularly those from State Disaster Management Authority etc.

❖ Details of these two staffing patterns, their roles and responsibilities are at **Annexure III**.

5.2 IRS organization at HEOCs

Following a similar analogy and structutre, an IRS based re-structuring shall be required during the response phase. However, it is to be remembered that even during activation of "Response" mode, the watch function has to continue. A tentative assignment of roles and responsibilities in an activated HEOC is as detailed below:



*or any other regular officer of sufficient seniority as designated by the State

5.3 Modes of operation: There are three key phases & Modes of Operation within disaster management including management of disease outbreaks/epidemics (event):

5.3.1 Pre – Disaster (Watch Mode): Before an event to reduce the potential for human, material or environmental losses caused by hazards and to ensure that these losses are minimized when the event actually strikes.

Watch Mode: This mode corresponds to the normal day-to-day business activities. The watch staff constantly monitor and triage information on public health events by facilitating the collection, organization, analysis, distribution, and archiving of information. The HEOC is

constantly in watch mode throughout the different modes of operation. The staff continue to monitor events even if the HEOC is in alert or response mode.

- **Watch Mode functions (Annexure IV)**
- **Responsibilities of staff during Watch Mode (Annexure V)**

5.3.2 Risk assessment of an incident

The HEOC conducts risk assessment to determine if the incident requires HEOC activation and recommend the level of activation required. The assessment can be done by the HEOC staff and subject matter experts. All potential hazards and actual incidents may be mapped on a GIS platform (either a Government platform like Bharatmaps or an open-source GIS platform). Risk assessment, identification of resources, identification of stakeholders shall be carried out and be mapped on GIS.

The levels of activation are determined on the basis of the results of a rapid initial risk assessment after an event is reported. The HEOC is activated (within 120 minutes) immediately after the risk assessment is completed and a directive is given. The HEOC should be capable of activating within 120 minutes as required by the IHR indicator for a HEOC to operate according to minimum standards.

- A risk assessment template **Annexure (VI)**

5.4 During Disaster (Alert & Response Mode): It is to ensure that the needs and provisions of affected populations are met to alleviate and minimize suffering. A HEOC shall work during disaster/ disease outbreaks/epidemics to facilitate public health response being managed and monitored by the State/UT DoH's Crisis Management Group. Details of such Crisis Management Group, its role in disaster response are detailed at **Annexure (VII)**

5.4.1 Alert Mode: The alert mode is the early standby phase of activation when an incident or event has occurred or is imminent. The HEOC conducts intensive monitoring of an incident or event in preparation for a potential HEOC activation.

Alert mode activities include, but are not limited to, intensified surveillance, deployment of RRT to undertake an investigation, commencement of coordination with other sectors, initiation of preparation for deployment of financial and logistic resources, and identification of experts to staff the HEOC. To accomplish these activities, the HEOC usually requires increased staff and extended working hours. The HEOC identifies and requests for additional surge staff as necessary.

5.4.2 Response Mode : During response mode, the HEOC can be partially or fully activated. The centre should define levels of activation corresponding to levels of threat posed, response required, number of stakeholders involved, etc. The decision to activate or deactivate the HEOC and the level of activation required should be a dynamic one, based on evolving scenario.

5.4.2.1 Response Activation: Activation of response refers to two main activities:

a) **Activation of Health Emergency Operations Centre**

b) **Activation of Incident Response System (IRS) and**

These two form the essential components of emergency responses, wherein:

(a) Activation of HEOC provides means for facilitating rapid analysis and transmission of information, virtual interaction between various stakeholders, facilitating on field activities etc.

(b) Activation of IRS system provide the institutional framework for on-site and off-site hurdle free execution of planning, operations, logistic, financial and other functions by facilitating close intersectoral coordination with a clear chain of command and supervision of response activity. Regardless of the public health emergency or event for which the activation has occurred, the EOC operates according to principles of the IRS.

Activation of IRS : The Incident Response System (IRS) as proposed by NDMA calls for an effective mechanism and reducing reliance on ad-hoc measures in disaster response. The IRS framework envisages a composite team with various "Sections" to attend to all the possible response requirements. It also emphasises the need for proper documentation of various activities for better planning, accountability and analysis, thus attempting to reducing chaos and confusion during the response phase.

IRS Organisation

The IRS organisation functions through Incident Response Teams (IRTs). As per the administrative structure and DM Act 2005, Responsible Officers (ROs) have been designated at the State and District levels as overall in charge of the incident response management. The IRTs will be pre-designated at all levels; State, District, Sub-Division and Tehsil/Block. The State Level Incident Response Team (IRT) will be activated by the Responsible Officer [Addl. Chief Secretary/Principal Secretary (H)] in the event of occurrence of any major biological emergencies/disasters as the line department (as per NDMP) for biological emergencies or as a supportive department in case of occuernce of any major disaster with

The IRS designates officers to perform various duties and get them trained in their respective roles to be played at the time of disasters, which helps in everyone to know what needs to be done, who will do it and who is in command.

During response mode, the HEOC is partially or fully activated. The Health Emergency Operation Centre should define levels of activation corresponding to levels of response. The lowest level of response addresses lower scale events for which all response activities are largely within the capabilities and resources of the HEOC and low-level augmentation is required.

During the "Response" mode of HEOC, the IRS system shall unite with the usual workforce of HEOC during watch mode.

5.4.2.2 Levels of Activation of HEOC:

A gradient of levels, is based on the increasing level of response resources required, and triggers escalating levels or phases of HEOC activation. The higher the grade of an incident, the more response and management resources will be required, and the more fully developed the HEOC activation will need to be.

There could be three activation levels within the response mode. These are Grade 1, Grade 2 and Grade 3.

- Grades 1 and 2 are **partial activation** (Grade 1 being the lowest and Grade 2 medium) and
- Grade 3 is full **scale activatio**n (the highest level).

The following colour codes are assigned to each level: Grade 1 = purple, grade 2 = orange and Grade 3 = Red.

During responses to humanitarian crisis or disasters, the health sector will provide the required health services and activate the HEOC as necessary.

Grading Template/Annexure –VIII

a) **Partial Activation**: The HEOC may undergo partial activation which refer to lowest and medium scale / grades of activation respectivally in resoponse to relatively mild to medum scale incidents involve a moderate level of destrucution of life and property. In a lowest -level (grade) activation, the HEOC uses the lowest level of resources including routine HEOC staff, relatively minimal augmentation in resources for the response, and reporting requirements. In a medium-level activation, the HEOC uses increased resources, including additional staffing (in addition to the routine HEOC staff), moderate cost for the response, and increased but manageable reporting requirements. The HEOC is activated and surge staff will be called to undertake appropriate

activities, based on their assigned roles and responsibilities. The HEOC mobilizes additional resources and also requires some level of support from other departments. The HEOC will be prepared for any escalation and to work extended business hours up to 24/7.

b) Full-Scale Activation: This phase corresponds to the highest activation (grade) level. The HEOC will deal with the emergency of greatest magnitude, complexity, scope and impact. This requires the greatest resources and coordination. The State level resources and capacities are exceeded and overwhelmed and substantial National support is required. The State level will mobilize its existing resources and requires substantial National support. The health sector will mobilize resources from different sectors and stakeholders. During this level of activation, coordination of the response will be managed by the health sector or might be taken over by a higher coordination body and the health sector will lead the response in line with the ~~national~~ policies and procedures. This level will require 24/7 operation with full staff.

Such an "always on" HEOC facilitates the rapid transition to response model during outbreaks and improves the cost-effectiveness of the infrastructure investment. Routine use of HEOCs during outbreaks and non-outbreak periods helps ensure sustained technical capacity for data analyses, interpretation, and visualization tools and equipment, as well as the knowledge to analyze and interpret incoming health information

5.4.2.3 Activation Criteria: Some or all of the following criteria will trigger activation:

- **a)** The capacity of the district /State where incident occurred is overwhelmed
- **b)** Any condition that has met the criteria to be declared as potential public health event of international concern (PHEIC) in line with IHR 2005 guidelines
- **c)** An emergency with high public health burden potential
- **d)** Additional resources are required
- **e)** A condition with the potential of cross border effects
- **f)** Leadership / policy group directive
- **g)** High media interest
- **h)** Wide geographic extent (to be defined by the State)

5.4.2.4 Authority for Activation of HEOCs:

Addl. Chief Secretary/Principal Secretary/ Commissioner of Health or designated authority will direct for activation of the HEOC following a proposal by the HEOC Nodal (State Surveillance Officer). Activation will be based on results of risk assessment. State Health

Minister/ Principal Secretary or designated authority may also directly provide directives for activation for political reasons or foreseen situations.

Proposed activation procedures (align to the procedures in the overarching health response plan):

- Conduct risk assessment
- If criteria for activation is met, determine activation level
- Proposal to Addl. Chief Secretary/Principal Secretary/ Commissioner of Health or designated authority for activation
- Authority's approval to activate the HEOC
- Designation of Incident Commander (IC) and activation of incident response system (IRS)
- Exceptional activation by direct order by authority
- Approval of resources required (corresponding levels of activation) to kick off response

5.4.2.5 Activation notification

Activation notification will provide information on activation of HEOC, level of activation, assigns lead responsibility to a specific organizational unit; identifies the initial IRS structure to be implemented including designation of the incident manager.

The notification should be communicated with relevant stakeholders. The HEOC needs to define recipients of the notification.

5.4.2.6 Activation checklist:

1. Notification sent to relevant stakeholders
2. Incident manager is designated
3. Section heads (Operations, Logistics and Planning) are called upon
4. Personnel assigned to positions on the HEOC report to the HEOC and check in with section heads
5. Determine staffing needs and acquire additional support as required
6. Incident action plan is developed
7. Orientation provided to surge staff on the HEOC
8. Conduct periodic incident situation briefing
9. Task assigned to Incident Response System (IRS) team monitored using tasks tracking tool
10. Issue job action sheets
11. Ensure situation report is regularly disseminated

12. Activity logs conducted
13. Shift change plan and briefing done
14. Emergency contacts list developed and shared
15. Ensure proper documentation of relevant information in a central location
16. Ensure communications equipment is working and ready for operation
17. Necessary logistical supplies and materials are available
18. Ensure partners activities are tracked and used for planning and coordination

- **Incident Action Plan : Incident action plan template Annexure-IX**

- **Template for Summary of incident update to Higher authorities Annexure- X**

5.4.2.7 HEOC working Hours and Shift during activation:

Ideally, HEOC should be functional 24*7 at least with very minimal staff even during watch mode. However, this may not always be possible. During activation where coordination of responses from the HEOC requires working extended hours up to 24/7. According to grade of activation, HEOC will work for 8 hours in Grade-1, 12 Hours in Grade-2 and 24 Hours in Grade-3 HEOC for all week days, qualified staff on the HEOC activities will work in rotation. A complete shift of staffing will be established for the duration of the operations. The incident manager (SSO or any other designated regular officer of sufficient seniority) with support of other staff is responsible for developing a rotation plan. A briefing (at least 15 minutes) must be given to the replacement. It is recommended that each person works maximum of 8-12 hours in a shift. The shift plan will be recorded and displayed in the HEOC.

HEOC working Hours		
Grade of Activation	**HEOC working Hours**	**Time (Can be change as per situation)**
Grade-1	8 Hours	9 a.m to 5 p.m
Grade-2	12 Hours	8 a.m to 8 p.m
Grade-3	24 Hours	24 hours

* **All staff of HEOC have to sign in the attendance sheet (sign in sheet) with mentioning the In and Out timing.**

- **Sign in-sheet are at Annexure -XI**

5.4.2.8 De-escalation

- When the scope, complexity, and severity of the health emergency decreases, de-escalation of the level of activation needs to be considered.
- Considerations for de-escalation include a decrease in one or more of the following:
- No longer a Public Health Event of International Concern (PHEIC) in line with IHR 2005 guidelines
- Human resource surge support required
- Resources required
- Media interest
- Geographic extent
- Executive / leadership directives
- The HEOC will conduct risk assessment and review of activation level in order to make the decision for de-escalation.

5.4.2.9 HEOC Deactivation

When the response is declared over, the HEOC will be deactivated and return to routine monitoring. The Principal Secretary/ Commissioner of Health or designated authority will responsible for deactivating the HEOC.

a) Criteria for Deactivation: Some of the criteria for deactivation include:

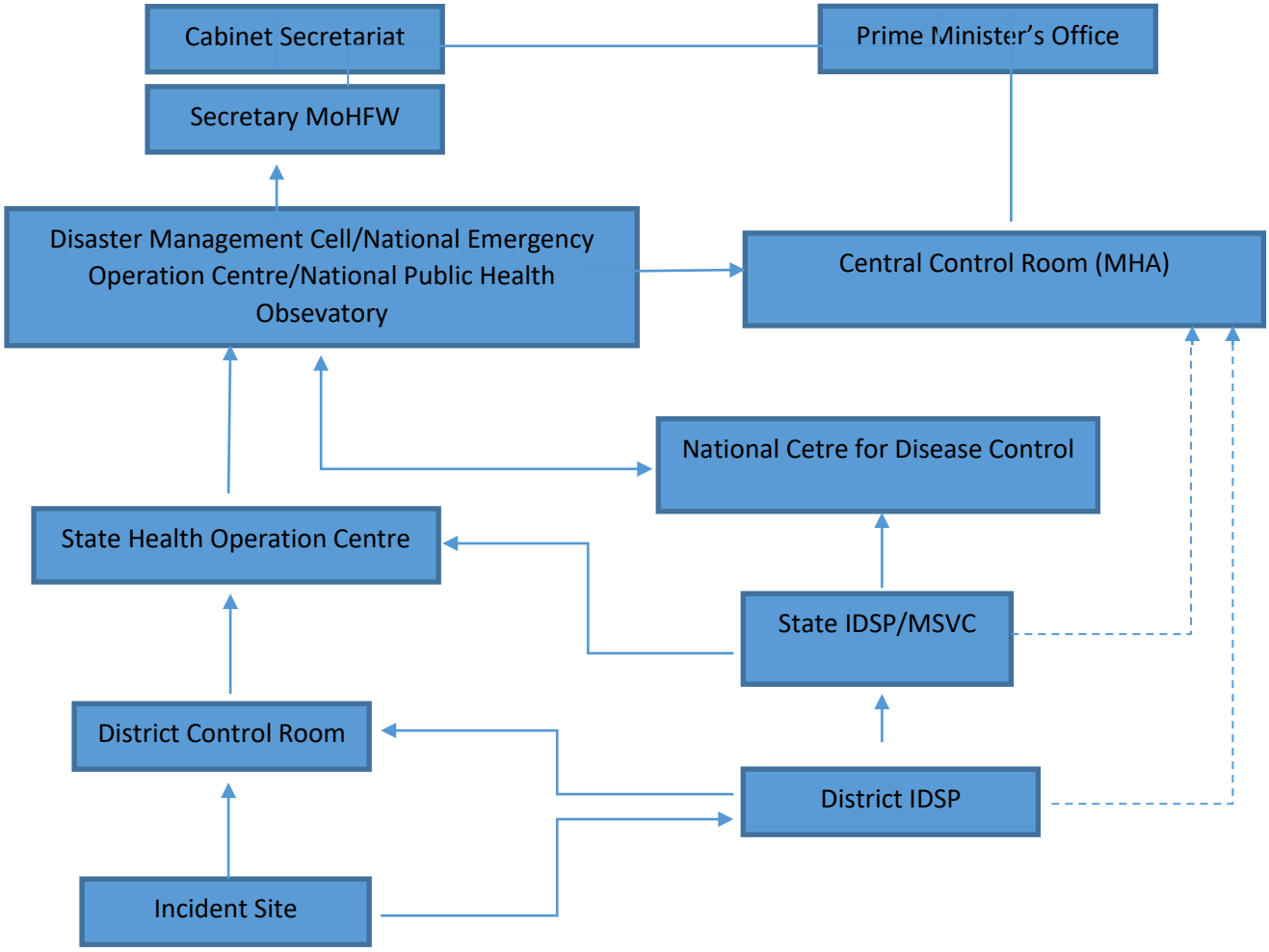
- The data trends from the field begin to suggest that the event being addressed is on the decline
- The issue is no longer a potential public health threat
- The State is no longer overwhelmed and the affected district/s has the capacity to address the incident
- Resources are no longer required
- The incident or state of emergency has been declared over by the MOH or designated authority

b) Deactivation checklist

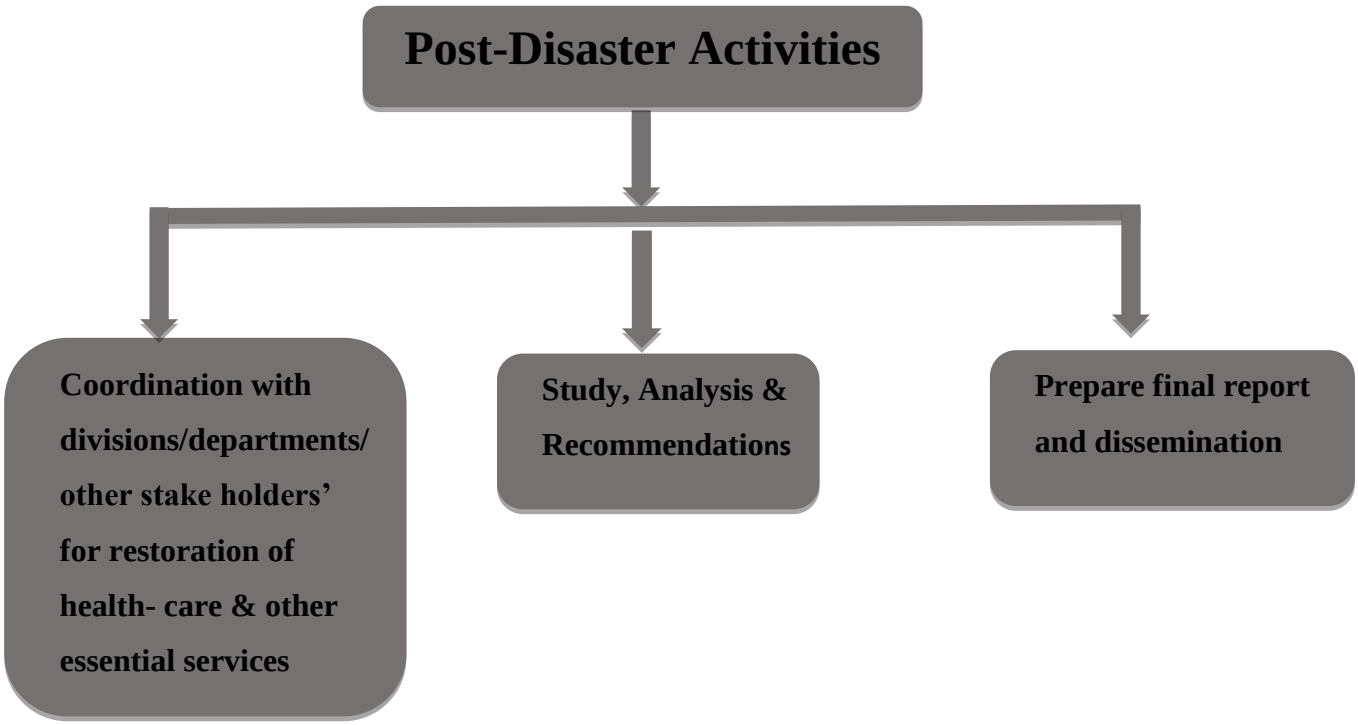
- Notify appropriate agencies through mail and / or telephone regarding the individual sites where the HEOC activation is being deescalated.
- Collect data, logs, situation reports, message forms, and other significant documentation for archiving. The IC to handover to the CMO I/c, HEOC.
- Fold and repack re-usable maps, charts, materials

- Collect items that have been deployed in the field for future response use
- Make a list of all supplies that need replacement and forward to the logistician
- Return identification credentials to the HEOC Manager
- Develop deactivation report
- Deactivate

5.5 **<u>Information Flow Chart:</u>** The flow of the information in all modes of HEOCs will be the same as below. Stae can coordinate with other stake holder i:e Public and private departemnts to get the information in watch mode and response mode.



Post-Disaster Activities : After a disaster to achieve rapid and durable recovery which does not reproduce the original vulnerable conditions.



5.9 Redundancies in connectivity, communication and operations

This plan enables the HEOC to continue carrying out its operations in case of an emergency situation that disrupts normal working conditions. Every HEOC should have in an alternate location with all facilities with all that can be activated with full functionality within minutes for swift resumption of the delivery of critical services affected by a disruption.(Redundant HEOC)

Physical security

This section provides information on the security system available in the HEOC such as fire detection, fire alarm, locations of fire extinguishers, etc. If feasible, a back-up Health Emergency Operations Center (HEOC) site may be pre-identified, if possible, in another seismic zone.

Data security and redundancies

Data and applications may be hosted on premises so as to access by LAN. However, local server or cloud based services, as approved by Central/State Governments may be utilized to avoid loss of data following failure of IT systems, a backup system needs to be put in place.

Data Center (DC) and Disaster Recovery (DR) should be in different geographic locations to protect the data during disasters. A disaster recovery plan / manual for IT systems should be in place for ready reference so that the during the disaster, it can be used for recovering the systems, connectivity and data. It may also have call tree map so the 1st, 2nd and 3rd level contact person may be assigned for each activity like for communications channels, IT system restoration and data recovery / retrieval etc. Regular trainings / drills to all the staff may be given by the trainers so that the manpower can be trained and skilled in management and use of IT systems including cyber security related aspects.

Communications system backup

Communication is backbone of HEOC and multi-tier redundancy of the network is required. In the event of communication breakdown, a backup communication system should be installed to enable continuity of operations. This will include electricity, internet connectivity, communication network, etc.

Power backup

Continuous and lengthy power interruption disrupts HEOC operations. To ensure continuity of operations, it is crucial to have a power generator/UPS in the HEOC. The generators will automatically takeover in the event of commercial electricity power cuts. All computers and other appliances have to be connected to a power generator or an uninterrupted power supply (UPS) unit to protect equipment from power surge and subsequent failure.

Continuity of Operation (COOP)

In case of physical infrastructure failure that does not allow use of the HEOC, the operation of the HEOC should continue from a different location. The state HEOC may identify a location from which operations can continue.

Regular facility checklist Annexure- XII

Annexure-I

Performance Benchmarks for Internal Emergency or Annual Outbreak Simulation Exercise

Area	Sub area	Benchmarks	Fully met (Score 4)	Partially met (Score 2)	Not met (Score 0)
1. Structures	1.1. Fire Safety	Compliance to fire safety norms	Fully compliant	Partially compliant	Not compliant
	1.2. Surveillance & Secure access	CCTV surveillance system	In place and functional	Partially in place/partially functional	Not in place/not functional
		Biometric enabled access	In place and functional	Partially in place/partially functional	Not in place/not functional
	1.3. Video and audio	Video wall display system	In place and functional	Partially in place/partially functional	Not in place/not functional
2. Connectivity	2.1. Internet	Internet uptime (Previous week)	24/7 available	Available but not 24/7	Not available
3. Backup/Redundancy	3.1. Data	Alternate plan in place	Yes	Partial	No
	3.2. Communication system	Back up in place	Yes	Partial	No
4. Staffing	4.1. Watch/Always on	CMO (1); GDMOs/Public Health Consultants(3); Hub Engineer (1) and Data Entry Operator (1)	All core staff in place full time as per norms	Core technical staff partially in place or not full time	Core staff not in place
5. Plans and procedures	5.1. Crisis management	Crisis Management Plan	Available and complete	Available but not complete	Not available
	5.2. Contacts	Contact Directory	Available and complete	Available but not complete	Not available
6. Standard Operating procedures for internal emergency	6.1 Activation	HEOC Activation SOP	Available and complete	Available but not complete	Not available
	6.2 Deactivation	HEOC deactivation	Available and complete	Available but not complete	Not available

		SOP			
7. Training/re-orientation of HEOC staff	7.1 Foundational Training	HEOC core operations training	>75% of core staff received	50-74% of core staff received	<50% of core staff received
	7.2 Reorientation training	Annual Re-orientation	>75% of core staff received	50-74% of core staff received	<50% of core staff received
8 Simulation Exercises	8.1 Mock Drills	One mock drill each quarter	At least one mock-drill conducted in the last quarter	At least one mock-drill conducted in the last 6 months	No mock drill conducted during last 6 months
	8.2 Tabletop exercises	One tabletop exercise each year	Full-fledged tabletop exercise (as per WHO guidelines) conducted during past one year	Partial tabletop exercise conducted during past one year	No tabletop exercise conducted during past one year
	8.3.Documentation	Documentation of simulation exercises and actions taken there off	Detailed documentation including remedial measures taken available	Incomplete documentation	No documentation
Overall performance grading criteria			> 40	30-40	< 30

Annexure II

Suggestive physical infrastructure, list of equipment and their specifications for proper functioning of Health Emergency Operation Centres:

Broad Specifications

1. Physical infrastructure

The HEOC will be housed in a dedicated multipurpose space having access to electricity, water supply and tele-communication infrastructure.

1.1 Site requirement and layout of HEOC: Special engineering and construction requirements must be considered to previously identified and assessed hazards associated with the geographic location where the HEOC is proposed.

The physical HEOC layout will have the following functional spaces:

1) Operational room with work stations
2) Communication center cum conference room
3) CMO in-charge room
4) Separate meeting room for priority discussions (mini conference room)
5) Personal hygiene facility
6) Water/food storage and pantry facility
7) ICT support /equipment room
8) Storage space
9) Back-up electricity room
10) Recreational space
11) Access control

Sample physical layouts are at **Appendix-I**, This will require an optimal space of 250 sq. mtr.

1.2 Electrical requirements including cabling system

1.2.1 Interior lighting requirements will vary depending upon the type of operation. There will be a combination of natural and artificial lighting to accommodate long working hours.

1.2.2 HEOC should be equipped with standalone and independent heating ventilation and air conditioning system (HVAC) that can provide climate control within the premises.

1.2.3 There should be cabling plan for electrical and tele-communication requirement which would address accidental damage, electrical safety, reliability and system redundancy.

1.2.4 Back-up generators/UPS: Back- up generators would take care of electric load requirement of entire HEOC premises. Capacity of the back-up power supply should be able to support continuous back-up to all key/critical functions of HEOC.

1.3 Acoustic treatment

The operational areas including the conference room and Video conference facility should be acoustically treated to minimize external /internal noise disturbance. This includes acoustic insulation of ceiling and walls and windows and doors that would meet sound isolation criteria.

1.4 Office Furniture

The furniture should be ergonomic in design keeping in view the comfort, occupational health and safety of HEOC workers. The furniture layout and its size should not interfere with the passage, work area and should have manoeuvrability.

1.5 Fire safety system

The entire HEOC premises should be compliant to the existing fire safety norms of the fire department including fire detection and alarm system, provision of fire sprinklers, fire exits, signages etc.

2. Office equipment and supplies

2.1 The operational area will have a networkable heavy duty multifunction printer (colour) with copier-scanner-fax capabilities. Similar equipment would also be available in the CMO's chamber. This will ensure adequate redundancy.

2.2 The HEOC studio will have a smart electronic white board which provides advanced features such as multi-party interaction, connectivity to computers, interaction with projected content etc.

2.3 Adequate supply of office consumables should be provided to ensure business continuity. This should include paper, ink/toner cartridges, USB drives, fastners [clips, binders, tapes, staplers (incl. heavy duty staplers)], desk organizers with envelops, binders, albums, boxes and crates.

3. **Physical safety and security**

The HEOC premises should be externally secured through CCTV surveillance system. There should be biometrics (finger print) enabled access control to the main HEOC and to the HEOC studio.

The detailed specifications for physical infrastructure, office equipment and supplies, electrical system, incl. back-up supply, Biometric Access Control System are at **Appendix II**.

4. **Technology infrastructure**

A wide array of information communication Technology will be used the HEOC incident command functions such as planning and information management, operations, logistics, finance and administration.

The technological infrastructure will include the following:

4.1 Computer

4.1.1 All modular work stations will have desktop computers (preferably built in with motorized retractable monitor).

4.1.2 The CMO room, mini conference room will also have two desktop computers.

4.1.3 The mini/additional conference room will have 6-9 desktop computers (preferably built in with motorized retractable monitor).

4.1.4 The HEOC studio cum conference room will have 20 retractable monitors (connected to the main servers).

4.1.5 There will be 2 laptop computers for the incident commander/CMO to work in different part of the facility.

4.2 Video wall display system

The video wall shall be 2 x 3 stacked display of LED units of 45 – 50-inch size with full HD/4K resolution and will be capable of display from multiple sources.

4.3 Full HD video conferencing systems

Two Full HD video conferencing systems shall be required, one in the main EOC studio cum conference room (with 2 cameras) with option to connect a third video input from an additional HD camera. The camera should be motorized and controllable from hand held remote/Touch panel of the VC system.

In addition, there would be another HD video conferencing system (with 1 camera) in the additional/mini conference room (6 seater).

Both the conferencing systems have interface/mechanism to connect seamlessly with the satellite communication system.

4.4 Audio system with PSTN interface

There will be DSP based audio system with minimum 32 AEC inputs with a suitable multi-channel amplifier and wall mount speakers. It shall be connected with 20 Nos. of table microphones, audio inputs from PC laptops and other external devices. It will also support PSTN interface (PRI) for audio conferencing with external PSTN participants.

4.5 High Definition Projector with screen

The projector would be located in the additional/mini conference room or will be use as back up or will be used as portable arrangement for adhoc meeting and presentation at any place. It should support full HD Video Standards and operate through infra-red remote control.

4.6 Matrix Video Switcher

The device will connect external HDMI devices with at least 4 inputs and 4 outputs, and support full HD resolution.

4.7 Multipoint Control Unit (MCU) setup with resource to connect 100 sites

Multipoint Control Unit (MCU) setup should be able to connect minimum 100 videoconference sites (End Points) together either in a single conference or in

multiple conferences with Full HD resolutions. Participants from Desktop/Laptop/Android/IOS device should also be able participate in the same conference. It should also be able to register, connect, invite participant, schedule conference using suitable management system. It should also be able to seamlessly connect sites/user either from intranet or outside network.

4.8 HD Recorder and Streaming Solution

It should have capability to record minimum 5 concurrences recording of HD/FULL HD resolution Video and relay to steaming server for streaming to user over IP network. The server should have capability to transcode video in various resolutions and also should have minimum capacity of 1000 webcast user to join together as webcast viewers.

4.8 Streaming media server solution

The Streaming media server should be able to stream (unicast/multicast/broadcast) over IP network in high quality video resolution/multi resolution. It should be able to handle 1000 unicast clients together and stream more than 5 video channels at a time.

4.9 LED TV (Display Unit – 2)

The HEOC should have cable television/DTH service to receive a broad selection of channels for news scanning. The two LED Smart TVs (43" or higher with Full HD resolution) will be installed in CMO's room and the recreational area.

4.10 Conference room control system

Integrated control system to control equipment installed in conference room (video wall and other sources, switches and other electronic devices) with 15" or bigger colour touch panel to communicate with the control system.

4.11 LCD/LED annotation panel

LCD/LED annotation panel with annotation software with HD /FULL HD resolution, bundled with Windows and Mac compatible annotation software, stylus pen, with requisite cables and accessories.

4.12 Wireless presentation device

The presentation device shall operate over Wi-fi/wireless connections to show presentations/computer screens/ Audio-visuals from laptops or any other display device using DVI/HDMI interfaces.

4.13 Server

To support the information Communication Technology, there will be a server with 15 core CPU and 128 GB memory or higher. The server will host web applications, data storage, back up services.

4.14 UPS with battery bank

In addition to the back-up generator, there will be a 10 KVA online UPS with maintenance free battery bank to support the HEOG conference system.

The detailed specifications for equipment required for the technology infrastructure is at **Appendix III**.

5. Telecommunication and Networking Infrastructure

5.1 Telephone and intercom connectivity

Telephone services should include internal and external (with STD and ISD provisions) telephone communications. The provision of telephone and intercom connectivity will exist in all functional areas such as work stations, CMO's room, Studio, conference room, recreational area etc.

5.2 Internet connectivity at HEOC

5.2.1 HEOC with LAN of minimum 25 nodes will be connected to existing NIC network for seamless audio video conference, media streaming and high speed data transfer.

5.2.2 LAN Setup for minimum 20 nodes will be required at all the HSEOC location for connecting devices to IP network.

5.2.3 Internet connectivity at HEOC and SHEOC will be through NIC network

5.2.4 At SHOECs NICNET connectivity will be taken from nearest NIC PoP's. The leased line connectivity of 10 Mbps link with redundancy will be taken from the service providers namely BSNL/PGCIL/ Railtel based on the feasibility.

5.2.5 IP address segment will be taken from NIC for HEOC and SHEOC

5.2.6 The whole HEOC premises shall be provided with high speed wi-fi connectivity.

5.2.7 The network security will be enhanced through firewall, anti-virus, anti-malware software installation.

5.3 Emergency call center

The HEOC will also act as a Public Health Emergency call center to receive calls from the public, medical professionals, suspects/patients or care givers. For such purpose a Private Branch Exchange (PBEX) will be installed to support connectivity to support intercommunication between telephone end points inside HEOC. It will also have integrated VoIP support which enables integration of telephonic services and automatic call handling system. It will also have an automatic call distributor (ACD) to accept, queue up, deliver and report telephone calls. An integrated system of ACD and PBEX is desirable. Integration of this system with the work station computers through computer telephony integration (CTI) server will be made.

5.4 Cellular communication

The HEOC functionaries will be provided with smart phones.

5.5 Satellite phones

The HEOC will be provided with 2 satellite phones (to be carried by the Central / State Rapid Response Teams) to communicate with disaster affected areas,

wherein the other modalities of communication are rendered dysfunctional. BSNL (Bharat Sanchar Nigam Ltd.) will provide Satellite phones.

5.6 VSAT System

One VSAT (Very Small Aperture Terminal) will be installed in each of the regional/states HEOC to ensure connectivity in the event of failure of terrestrial networks. BSNL (Bharat Sanchar Nigam Ltd.) will install the VSAT in the HEOCs. Considering that VSAT will be used in emergency basis only, bandwidth of 3 Mbps (Mbps for Inbound and 2 MBPS for Outbound w.r.f to HUB) would be taken from BSNL. The IP address segment on VSAT LAN will be provided by NIC.

The data from VSAT working at SHEOC will be routed to NIC, HQ CGO Complex from the BSNL VSAT HUB for seamless integration with EOC network.

5.7 E-mail services

The HEOC staff members will be provided with email accounts through dedicated NIC e-mail. There will be provision for mass e-mailing facility.

5.8 Short Messaging Service (SMS)

HEOC should have the provision to push messages containing alerts and updates to relevant persons.

The detailed specifications for Telecommunication and Networking Infrastructure are at **Appendix IV**.

6. HEOC Information system

6.1 The purpose of the HEOC information system is to collect, collate, store, analyse and share data to support all functions of HEOC (planning, operations, logistics and finances). Various types of "software applications" are needed to ensure the full functionality of HEOCs.

6.2 Special surveillance at time of disasters has a minimum data set which is being in-built into the IHIP (Integrated Health Information Platform) software that it will also be configured with the servers of the HEOCs for HEOC information system management. Thus this platform should be fully compatible with the proposed HEOC architecture. It has all aspects of data collection and information management during special surveillance (which include surveillance in post disaster settings, surveillance for potential public health emergencies, surveillance for exposure to technological hazard; and surveillance for mass gatherings).

6.2.1 Integrated Health Information Platform (IHIP) is operating system – independent and can work from PCs as well as Mac OS. The platform allows data collection and management in real-time. It is fully operational and accessible from all the 36

States and UTs. IHIP's mobile data collection module is fully operational from all of the villages and remote location of India.

6.2.2 IHIP has built – in geospatial architecture with over 1.2 lakh latitude – longitude based public health facilities throughout India. More health facilities will be updated to the platform, including all of the NHSRC – surveyed health facilities (approximately 6 lakh public and private facilities).

6.2.3 IHIP has the architecture to support importing of numerous GIS layers. Currently IHIP has GIS layers of: train station, airports, seaports, boundaries of blocks, sub – districts, district boundaries.

6.2.4 IHIP also has the ability to embed or import real – time satellite images for disaster response from entities such as UN OOSA's on – demand Copernicus satellite images.

6.3 for statistical analysis, Open Source/Free Statistical software application such as R Statistical software will be provided. For Geo – spatial analysis, open source/free GIS software (such as Grass GIS, QGIS or similar software) will be provided.

6.4 For Inventory management also, the bidder will provide Open source software compatible with the hardware.

6.5 The hardware should be compatible with PFMS software of NIC.

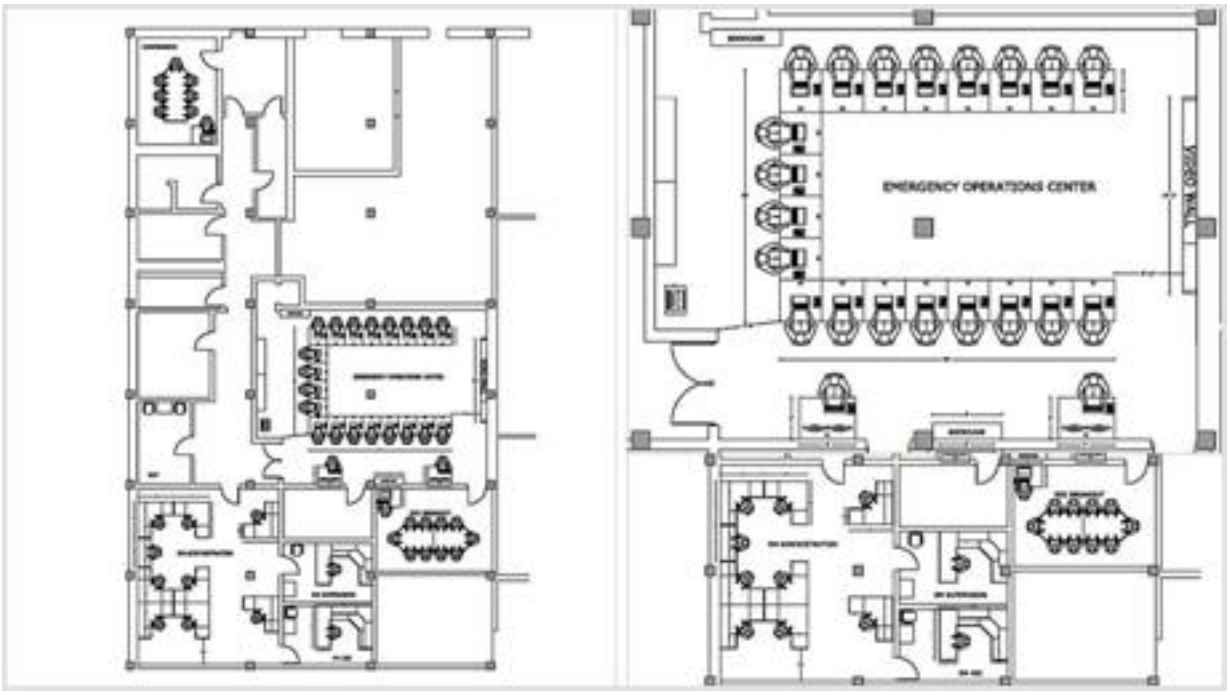
6.6 The bibber will provide latest version of 'Windows' Operating System and Microsoft Office 365 (Professional version. The hardware will also seemingly integrate with existing e-office system of NIC for document management and it's administrative and financial management tools. It will also be compatible with security protocol of NIC.

****The detailed specification is available in the table below ****

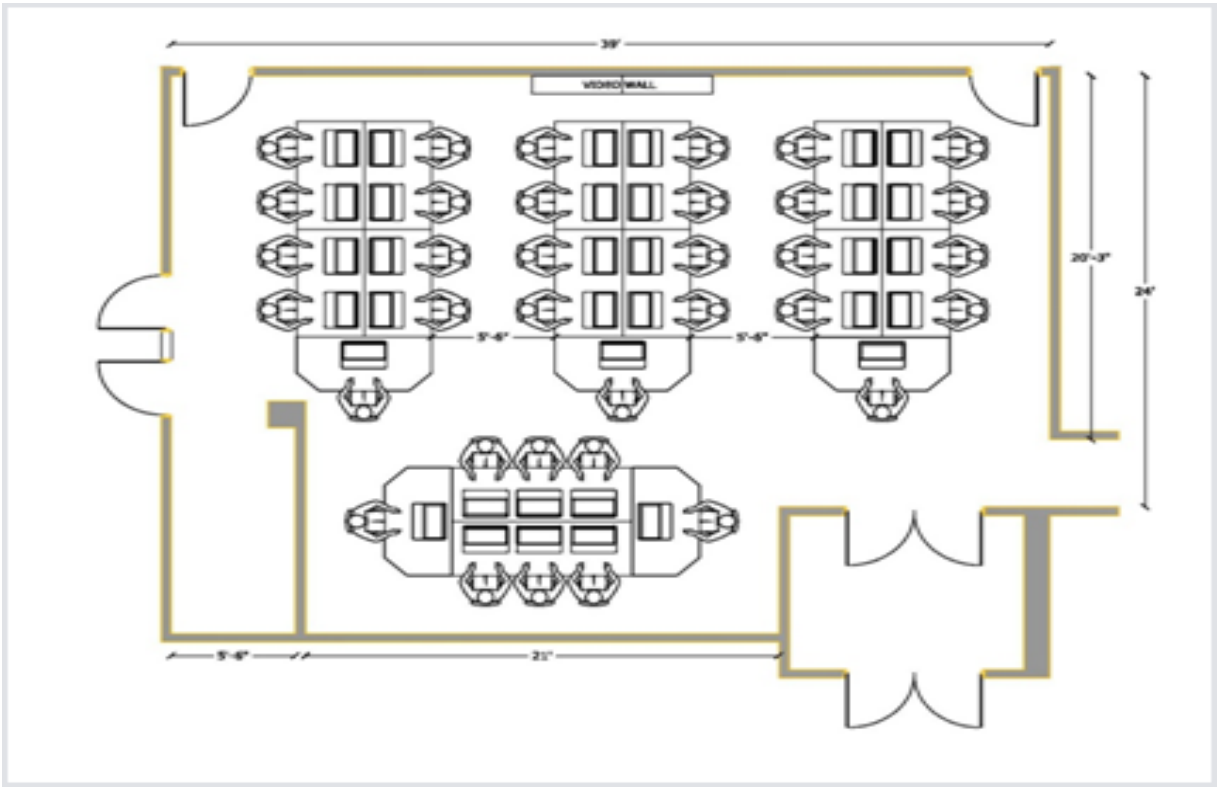
Appendix-I

Sample physical layouts for HEOCs

Option 1



Option 2



Appendix II

Detailed specifications for physical infrastructure, office equipment and supplies, electrical system, incl. back-up supply, Biometric Access Control System

1. Detailed Specification of EOC ROOM/STUDIO

Sl. No.	Item	Specifications
1.1	Wall	1.1.1 EOC Studio cum conference room - Brick wall partition up to ceiling height, acoustical treatment on walls with wall panelling tiles (soft board & perforated). - Backed with resin bonded glass wool fixed metal/ wooden framework upto ceiling level of approved shade.
		1.1.2 CMO'S Room - Providing & fixing 1200 mm heights partition walls (QED) with provision of wire management for /data/computer/telephone cabling. Toughened glass partition up to 150mm below ceiling.
		1.1.3 Operational room with work stations - Providing & fixing 1200 mm heights partition walls (QED in true plumb and line comprising of 100 mm thick solid calcinated phosphor- gypsum panels of size 666mmx500mm having tongues on two edges and grooves on the other two jointed to each other, and to the floor and other masonry structures, with recommended bonding plaster. The panels shall have a density of 900 kg/m3 and a compressive strength of 9.3 kg/cm2 and a co-efficient of thermal conductivity of 0.35 kcal/m^2/hour /C. The fire rating of the panels as per BS476 shall be 180 mins. With provision of wire management for data/computer/telephone cabling.
		1.1.4. Rest Room, Pantry, Toilet & Equipment Room - Brick wall partition up to ceiling height.

1.2	Flooring	1.2.1 EOC Studio cum conference room Wooden flooring of approved shade on resilient support underneath. Providing and fixing kiln dried, identified lacquer polished solid hard wood flooring having tongue and groove with double dovetail system suspended to clip system on an underlay of polyfill (Weighing 500 gm/sqm) complete as per approved sample. The wooden floor shall be 18mm thick (±2mm variation), width will be from 120mm to 180mm, length will be 1200mm (± 100mm variation) except at ends which will be as per requirement at site.
		Tongue & grooved, micro bevelled/right angled on all four sides, having moisture content 8% (±2%) resistance to indentation 34N/mm square (minimum) wooden floor shall be coated with a lacquered surface on top and will be coated with a UV varnish/lacquer/oil at bottom or back as a moisture balances. The priming shall be several coats of UV-light curing primer and top finish two component polyurethane lacquer or aluminium oxide coating. Total film thickness is 40 micron, expansion gap of 10 to 12mm has to be provided along the periphery of the walls.
		1.2.2 Consultants Cabin, CMO'S Room. Sound Room. Rest Room, corridors, pantry and toilets - Providing and laying polished/Antiskid vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption's less than 0.08%, using 5 kg, adhesive per sqm of tile area, in average 3mm thickness, including grouting the joints with white cement and matching pigments etc., complete
1.3	DADO	1.3.1 Pantry, Toilet - Providing and fixing vitrified wall tiles (thickness to be specified by the manufacture) of approved make in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge in skirting, risers of steps and dados over 12mm thick bed of cement Mortar 1:3 (1 cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete. Size 300x600 upto ceiling height.

1.4	Internal Finish	- Internal faces of walls above skirting shall be finished with acrylic emulsion paint of approved shade. - Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade: (a) Two or more coats on new work. Providing and applying plaster of Paris putty of 6mm thickness over plastered surface to prepare the surface even and smooth complete. - Applying wall putty mixed with Synthetic enamel paint on existing wall by scrapping, rubbing and sand papering etc. compete as per direction of Engineer-in-Charge.
1.5	False ceiling	Providing and fixing 15 mm thick densified regular edged eco-friendly light weight calcium silicate false ceiling tiles of approved texture spintone/cosmos or equivalent of size 600x600 mm in true horizontal level suspended on inter locking metal grid of hot dipped galvanized steel sections (galvanizing @120 grams per sqm) consisting of main 'T' runner suitably spaced at joints to get required length and of size of 24X38mm made from 0.33 mm thick (minimum) sheet, spaced 1200mm centre to centre, and cross 'T' of size 24X32mm made out of 0.33mm (Minimum) sheet, 1200mm long, spaced between main 'T' at 600mm centre to centre to form a grid of 1200X600mm and secondary cross 'T' of length 600mm and size 24X32mm made out of 0.33 mm thick (Minimum) sheet to be interlocked at middle of the 1200X600mm panel to form grid of size 600X600mm resting on periphery walls/partitions on a perimeter wall angle pre-coated steel of size (24X24X3000mm made of 0.45mm thick (minimum) sheet with the help of rawl plugs at 450mm centre to centre with 25mm long dry wall screws @ 230mm interval and laying 15mm thick densified edged calcium silicate ceiling tiles of approved texture Spintone/ Cosmos or equivalent in the grid including, cutting /making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required, Main 'T' runners to be suspended from ceiling using 50mm long M6 dash fasteners, 6mm G.I. fully threaded rods with galvanised steel L-cleat level adjusters of size 80x25x2.0mff, spaced at 1200mm centre to centre along main "M", exposed bottom of all T-sections 24 mm wide shall be pre-painted with polyester baked paint, for all heights, as per specifications, drawing and as directed by engineer-in-charge.

		Note: - Only calcium silicate false ceiling area will be measured from wall to wall. No deduction shall be made for exposed frames/opening (cut outs) nor shall extra payment be made either for extra materials or labour involved in making. The calcium silicate ceiling tiles shall be regular edged having Noise reduction coefficient (NRC). Value 0.50 (Minimum), light reflection> 85% noncombustible as per B.S. 476 part IV 100% humidity resistance and also having thermal conductivity < 0.043 w/m^0KC as per ECBC code 2007, density of $450kg/m^3$ on the edges having 24mm collar and average density of $350 kg/m^3$ across the tile.
1.6	Doors	1.6.1 EOC Studio, CMO's Room Frame less door with toughened glass 1.6.2 Main Entry + side entry from staircase. - Double skinned rebated on 3 sides filled with composite timber completely covered with steel sheet and glued over entire surface with access control of Hormann India Pvt. Ltd. With aluminium frame (powder coated) or equivalant. - Biometric Reader RS 485 — Interface to GCDU200 high-resolution optical biometrics Sensor with 500-dpi, PIN keyboard 10-28 V DC 115X65X50mm Enclosure rating: IP 65 $-10^{\circ}C$ to $+50^{\circ}$ Celsius on request: integrated i Class reader 1.6.3. Pantry, Rest Room &, Sound Room and Toilet Providing and fixing ISI marked flush door shutters, decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. (a) 35mm thick including IS1 marked Stainless Steel butt hinges with necessary screws.
1.7	Windows/ Ventilators	- All windows shall be UPVC frame with grill only on openable shutters and toughened float glass shutters. - All windows shall have granite cladding with moulded edges at CILL level full width.

1.8	Counter	1.8.1. Toilet & Pantry Black granite stone counter. Providing and fixing 18mm thick gang saw cut mirror polished (pre-moulded and pre-polished) machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size of approved shade, colour and texture laid over 20mm thick base cement mortar 1:4 (1 cement : 4 coarse sand) with joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing and moulding.
1.9	Curtain	Vertical blinds - Providing and fixing vertical blinds made of fabric waves in required shade I/c operating system complete of approve brand and manufacture (MAC/VISTA LEVELOR or equivalent or as per direction of Engineer-in-charge I/c all accessories required to operate including cutting and making openings for Air Conditioner wherever required.
1.10	Fixtures	- vitreous China wash basin size **550X400mm** wan bottle trap min pedestal recessed at back for reception of pipes & fitting etc. - Soap dispenser: Providing and fixing C.P. Brass soap dispenser - Towel hanger: Providing & fixing C.P. Brass towel rail of 600mm long - Toilet paper holder - Providing and fixing Napkin dispenser of approved size - Shower panel - Wall mounted WC with health faucet - Providing and fixing colored vitreous china water closet (European type W.C. pan) double symphonic wall hung with seat and lid with CP Brass hinges and rubber buffers with toilet low level flushing cistern with fittings and C.I./M.S. brackets, 4mm Flush bend, over flow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete including painting of fittings and brackets, cutting and making good the walls and floors where required (WS pan with colour plastic seat and lead with coloured vitreous china flushing cistern and CP flush bend of or equivalent; all complete as per direction of Engineer-in-charge. - Mirror —size 600x600mm - Stainless steel sink in pantry with mixer.

		- Heat normal and cold water dispenser voltas or equivalent make - Water heating unit -25 L- or equivalent in washroom and instant geyser in pantry.
1.11	Communication	- Provision of telephone & Intercom connectivity between work stations, CMO room, Studio and Audio room, Provision of Fax. - Provision of WI-Fl Internet, as per NIC specification, LAN of minimum 25 nodes from existing LAN network of MOHFW. (Extension of existing MOHFW LAN with WI-FI). - Dedicated Leased line for internet connectivity with data capability of Audio-video Conferencing.
1.12	Office Equipment	- Writing Magnetic with board with magnetic duster and markers: Size: 1200 X 1600 mm
1.13		**Multi - functional laser Colour Printer & scanner: Quantity: 01** • Max original size: A3 • Paper Size: A3, A4, A4R, ASR, Envelope, custom sizes • Resolution: 600 dpi X 600 dpi (reading, copying), 1200 dpi X 600 dpi (printing) • Copy/ print speed: up to 40 ppm (BW, A4), 15 ppm (BW, A3) • Scan Speed: 45/34 ipm (A4, 300 dpi, colour BAN) • Zooming: 25% - 400% • Warm — up time: 30 seconds • Multiple copies: 1 — 999 sheets • Paper Capacity: 550 sheets per cassette • Connectivity: Ethernet (100 Base - TX/ 10 Base -**T);** USB Host I/F 2.0 X 1 port; USB Device 1.0 X 1 port; EIO slot; Fax port; FIH port; PCI express • Duty cycle (monthly, A4): up to 200,000 pages • Memory: Minimum 512 Mb
1.14		**Fax: Quantity: 01** • Size support: A4 • Modem speed: upto 33.6 kbps • Fax resolution: 406 X 391 dpi • Transmission time: approx. 3 seconds

1.15		**Laptop Computer: Quantity: 02** • CPU: Quad — core, minimum i5 processor, 3M Cache, 3.8 GHz • Memory: Minimum 8 GB RAM • Hard Drive: > 1 TB SSD • Optical drive: DVD read/ write • Windows **10.0 or more** with license office application • Interface: Gigabit Ethernet; Wireless LAN: 802.11 ac, 802.11 ac, 802.11 b/g/n; Bluetooth v4.0, Wise screen LCD of size 14" or 15.6 or higher • Weight < or = 1.7 KG
1.16		**Server: Quantity: 01** • CPU: 16 cores; 2.5 GHz; L3 cache 37.5 MB; (Single) • Memory: 128 GB • RAID Support: 1+0, 1,5 • DVD- RW • 6*1200 GB 10K SAS; 2*400 GB SAS SSD • 6*Giga Ethernet ports • Redundant Power Supply (100 -240V, 50 - 60 Hz)
1.17		**Data Storage:** RAID
1.18		**Media Streaming:** Media streaming server
1.19		**Satellite Phone: Quantity: 02**
1.20	Miscellaneous	- Provision of fire detection with fire alarm system as per the requirement of Delhi Fire Services and their certification. - Water proofing of existing roof to prevent future water seepage - Termite treatment and pest control of the walls to prevent damage to wall panelling, flooring and false ceiling.

2) <u>Electrical & Miscellaneous items</u>

Sl. No.	**Item**	**Quantity**	**Specification**
	Electrical provisions		- Provision of recessed mounted CFL light fixtures with diffused/indirect lighting 600X600 shall be fixed in the ceiling. Provision of split A.C. and ceiling fans, ASC points, power points shall be made - All wiring shall be concealed in walls and ceiling.
1.3.1	100 KVA DG Set	**1 (One)**	- S/I/T/C of 100 KVA Silent DG Set with engine, alternator, base frame, radiator/heat exchanger, fuel tank, control panel, Fuel Piping, foundation, all electrical interconnection, loop earthing, silencer pipe and all connected standard accessories and sound

			proof enclosure, batteries with leads, AVM pads along with AMF panel with MCCB etc. complete as required. - UG armored aluminum conductor XLPE cable,end termination, earthing with G.I. earth plate/GI strip and vertical TP DB with MCB etc complete as required.
1.3.2	Electrical work	52 Points	- Wiring for light/fan/call bell point, with 1.5 sq.mm FRLS PVS insulated copper conductor with modular switch/front plate etc as required.
1.3.3		100 M	- Wiring for light circuit with 1.5 sq.mm PVC insulated copper conductor cable in steel conduit/aluminum channel etc as required.
1.3.4		22 Nos	- Wiring for 15 Amp power point with 4 sq. mm size FRLS PVS insulated copper conductor cable in steel conduit/ aluminum channel with modular switch/socket etc as required.
1.3.5		13 Nos.	- Wiring for plug point for computer etc. with 4 sq.mm size FRLS PVC insulated copper conductor cable in steel conduit/aluminum channel with modular switch/socket etc as required.
1.3.6		8 Nos.	- Wiring for power points for AC with copper wiring & MCB etc. as required.
1.3.7		26 Nos.	- S.I.T.C. of 600mmX600mm CFL light Fitting Complete as required.
1.3.8		7 Nos.	- S.I.T.C. of 1X18 watt CFL down light fitting complete as required.
1.3.9		1 L.S	- Provision for strengthening of EDBs as required.
1.3.10		7 Nos.	- S.I.T.0 of ceiling fan as required
1.3.11		2 Nos,	- S.I.T.C. of exhaust fan as required.
1.3.12		250 M	- Provision of aluminum channel/for communication/wire etc.

3) Air condition (A/C) System & Pdq AFAS

Sl. No.	Item	Quantity	Specification
1.4			
1.4.1	Split AC Type	10 Nos	Supply of 1.5 TR capacity split AC unit complete with indoor & outdoor units as required (5 star).
1.4.2		10 Nos.	Installation, testing and commissioning of 1.5/2 TR capacity split AC unit i/c fixing of cooling coil, condenser unit and drawing of copper piping from condenser unit to cooling coil complete as required.
1.4.3		40 mtrs.	P/F of 100X5O mm size riged PVC trunking with the help of rawl plug, steel screws i/c dressing etc

			complete as required
1.4.4		20 mtrs.	P/F extra refrigeration gas piping comprising of 1/1" & 5/8" copper tube i/c insulation of copper piping & 3-core wire of 80/0.20 size PVC drainpipe connection, welding etc. complete as required.
1.4.5		10 No.s	S/F wall/floor mounted type powder coated M.S. stand for condenser unit of 1.5/2 Tr. Capacity split AC unit with fastener, nut bolts etc, complete as required.
1.4.6	Pdg AFAS system		
	Pdg AFAS system. (a)	50 Mtr (2 X1.5 sq.mm)	Supplying & Fixing, of following size PVC insulated, PVC sheathed, armoured copper conductor cable ISI marked suitable for 1.1 KV grade on ceiling/cable Tray/surface complete as required.
	(b)	100 Mtr 3X1.5 sq.mm	
1.4.7	(a)	19 Nos.	S/F following type detectors with universal base and circuit in place of defective & cold detector of existing fire alarm system suitable for electrical fire alarm system and LED indicator i/c connection testing and commissioning etc as required. Optical type smoke detector with indicator.
1.4.8		2 Nos	S/F response indicator made of 18 SWG M.S sheet in place of defective and old response indicator having 2 Nos. LED connection testing commissioning etc as required
1.4.9		9 Nos	S/F of surface mounted junction box made out of (polycarbonate) of size 150mm X8O mm dia suitable for fixing of detector base & termination of cable complete as required.

4) <u>Detailed Specifications of Furniture & Miscellaneous items</u>

Sl. No.	**Item**	**Quantity**	**Specification**
1.5.1	Work Station	10 (Ten)	• Modular Workstations 1200X600mm with tile based partition of 50mm thick of height 1200mm. The basic framework is made up of aluminium with thickness of 1.3mm Vertical & Horizontal rail is made up of 1.2mm thick of aluminium extrusions. Cover Section (Raceways) is made up of

			0.8mm thick CRCA steel. The Worktop is made of 25mm thick particle board with 0.8mm thick post-lamination on top & 0.6mm thick lamination below with curvica front edge of approved shade supported by pre laminated particle board thick. All flat edges shall be finished with hot melt PVC edge banding of 1.2 - 2mm Thickness • All steel parts shall be pre-treated for seven stage anticorrosion treatments followed by epoxy powder coating. The thickness of the powder coating for all the steel and aluminium parts shall be min 45 microns. (Raceways shall be provided at below the worktop on tile and at skirting level (100mm high) and above the worktop at 900ht. as per requirement. Lower module finish shall be in pre laminated finish and upper module shall be fabric of approved shade. One magnetic pinup and one white grid marker shall be provided for each user. **Keyboard**: Providing and fixing post formed key board tray with telescopic slides (nylon roller slides) of size 600mmx350 mm made out of 25 mm thick particle board with post formed decorative laminate on top and having balancing lamination on the unexposed face in work stations, in approved colour
1.5.2	Staff Table Side Unit	10 (Ten)	Modular side table: Top is made of 18mm with 2 drawers. Side cabinet of size 900mm (L) x 750mm (H) x 400mm (D) (as per salient design and technical feature, specification) and a drawer Box with one drawer of 150mm and 450mm of one filing drawer complete
1.5.3	Executive Table for CMO's room	1 (One)	• Executive table of size 1800mm(L) x 900mm(D) x 750mm (H), The

			Worktop is made of 25mm thick commercial board with 0.8mm thick post-lamination on top & 0.6mm thick lamination below with curvica front edge of approved shade supported by pre laminated commercial board thick. All flat edges shall be finished with hot melt PVC edge banding of 1.2 - 2mm thickness. • One no Modesty panel made of commercial board. • Pedestal - with drawer unit having size 375mm x 750mm or as per the size of the table with 2 drawers + filing cabinet.
1.5.4	Executive Table Side Unit for CMO Room	1 (One)	Top is made of 18mm with 2 drawers Side cabinet of size 900mm(L) x 695mm (H) x 400mm(D) (as per salient design and technical feature, specification) and a drawer Box with one drawer of 150mm and 450mm of one filing drawer complete. Keyboard: Providing and fixing post formed key board tray with telescopic slides (nylon roller slides) of size 600mmx350 mm made out of 25 mm thick particle board with post formed decorative laminate on top and having balancing lamination on the unexposed face in work stations, executive table or side units in approved colour and texture as per salient technical features, specification
1.5.5	Conference Table	2 (Two) (One 20 seater for EOC studio and another 6 seater for mini conference room)	Conference Table having size as per drawing round at the corners, top made of 36mm thick board, pressed with 0.4mm thick membrane foil clad pressed with PU glue. The foil shall be pre-coated with a layer of polyurethane for better scratch resistance. The table shall have under structure with verticals made of 25mm thick post-formed particle board & modesty made of 18mm thick pre-laminated particle board having decorative laminate on both sides. Table shall also have shelf below made of 18mm thick pre-laminated particle board. The Round

			corner piece shall be made up of 36mm thick board pressed with 0.4mm thick membrane foil clad pressed with PU glue and supported with post of 65mm dia. made of CRCA sheet duly powder coated as per salient technical features. The table should be only in one approved colour. The table shall also have provision for carrying wires & mounting switches etc. necessary provision for wire management, data/computer/telephone cabling.
1.5.6	Wooden Cupboard	10 (8+2)	Wardrobe of size 800mm x450mnn x2100mm. using 19mm. thick marine plywood, all external faces to be cladded with good best quality teak veneer (4 mm thick) on all sides including back side, teak veneer should be finished with melamine polish in 2 or more coats as per standard procedure, with 2 nos. of shutters 'C' type, 6" handle of brush steel finished, tower bolts, SS rod for hangers, hinges of best quality, inner sides of wardrobe to be finished with 1.0mm thick laminate of approved brand and shade, melamine polish wherever laminate is not there, all other accessories, complete.
1.5.7	Low Height Credenza Units	3 (Three)	A 400mm deep x 2'-6" ht, side running filing unit as per drawing and details. The storage unit should be made out of 18mm thick commercial ply for top, sides and base, 6mm thick commercial plyback, l8mm thick commercial ply shutters with auto closing hinges and t.w. lipping matching with approved 4 mm thick veneer on all the sides/edges. All external surfaces to be finished in 1.0 mm laminate (suede finish) of approved make. Division of shutters shall be made equally according to the length of the storage, and complete rates shall be inclusive of all necessary approved fittings like auto closing hinges, locks, 75mm long s.s. brushed finish handles, tower bolts, magnetic ball catch and any miscellaneous

			hardware items as per architect's instructions.
1.5.8	Executive Revolving Chair	1 (One)	With overall height 1200 mm max., overall width less than 750 mm, overall depth 750 mm, seat size5Omm (W) x 530mm (D) and back size 530mm (W) x 790 (H). Seat and back are made up of 15 mm thick hot pressed single moulded plywood upholstered with leatherette and moulded with polyurethane foam of 40 densities and 32 densities in the seat and back respectively. The back foam shall *be* designed with contoured lumbar support for extra comfort as shown in drawing, with 1 piece armrest made of 50mm wide and 6mm thick extruded die cast alloy fabricated in the requisite design. The chair shall have knee tilt mechanism with 360 deg. revolution, 17 degree max. Tilt; Tilt tension adjustment and upright locking. The pedestal 650mm pitch centre dia. shall be out extruded die cast alloy fitted with 5 nos. twin wheel castors with castor wheel dia.50 mm. The pedestal shall be covered with a polypropylene moulded cladding as per modern standards. The bellow shall be a 3-piece telescopic type and will be injection moulded in black polypropylene. The pneumatic height adjustment shall have an adjustment stroke of 100 mm and shall be operated at 30 kg's extension force
1.5.9	Visitors Chair	5 (Five)	Chair having Centre Tilt Mechanism with Tilt Locking and upright lock facility designed with contoured lumbar support for extra comfort. **Specification:** • Width - 75.0 Cm, Depth - 75.0 Cm, Height -105 Cm- 117.5 Cm ii) Seat Height - 46.0 Cm - 58.5Cm 3) Unspecified Tol = + 0.5 Cm. The chair shall have 360 deg. revolutions, 17 degree max. Tilt; Tilt tension adjustment and upright locking. The pedestal 650mm pitch centre dia. shall be out extruded die cast alloy fitted with 5 nos.

			twin wheel castors with castor wheel dia. 50 mm. The pedestal shall be covered with a polypropylene moulded cladding as per modern standards. The bellow shall be a 3 piece telescopic type and will be injection moulded in black polypropylene. The pneumatic height adjustment shall have an adjustment stroke of 100 mm and shall be operated at 30 kg's extension force
1.5.10	Office Chair	10 (Ten)	• Chair having Centre Tilt Mechanism with Tilt Locking and upright lock facility with medium high back. The chair shall have 360 deg. Revolutions, Tilt tension adjustment and upright locking. The pedestal 650mm pitch centre dia. Shall be out extruded die cast alloy fitted with 5 nos. twin wheel castors with castor wheel dia. 50 mm. The pedestal shall be covered with a polypropylene moulded cladding as per modern standards. The bellow shall be a 3 piece telescopic type and will be injection moulded in black polypropylene. The pneumatic height adjustment shall have an adjustment stroke of 100mm and shall be operated at 30 kg's extension force.
1.5.11	Conference Room Chair	20 (Twenty)	• Upholstery of approved shade • Arms to Floor Min. 29.5"H • Breathable Mesh Back with Built-in Lumbar Support • One Touch Pneumatic Seat Height Adjustment • Self-Adjusting Synchro Tilt Control • Fixed Back Height • Flip Up Arms with PU Pads • Heavy Duty Angled Polished Aluminium Base with Dual Wheel Carpet Casters • Already assembled Overall Size: 26.5"Wx25"Dx39"H • CU.FT:

			5.44 Seat Size: 20"Wx18"Dx19-22.75"H • Back Size: 21"H
1.5.12	3 - Seater Sofa for rest rc 2 - Seater + 1 Seater for CMO room	1 (One) 1 (One)	Size: 6'-0" X 3'-0" FIT X 2`-6" DEEP. Supplying of 3 Seater Sofa of above mentioned size, using teak wood (best quality BTC) carved frame of 3" x 1.5" size, seat, backrest and armrests — padded with polyurethane foam and upholstered in beige and/ or light grey or as per selection, woven fabric. Frame of sofas made of teak wood and the base of seat and backrest equipped with metal z-shape springs, and for base six nos. of (round legs) of 1 ^{1}/2" outer diameter, using BTC teakwood and superior quality melamine polish finished, complete in all respects, as per enclosed drawing .
1.5.13	Centre Table:	2 (Two)	Centre Table of size (900mm x 450mm x450mnn (H) having top made of 12mm thick bevelled glass and under structure made of 18mm thick prelaminated particle board and having all exposed edges sealed with PVC edge banding tape complete. It should have a proper match with the Sofa set provided.
1.5.14	Side Table:-	2 (Two)	Side table as per the drawing. Top (900X450X705mm) & side panel shall be 25mm thick plain particle board clad with 0.6mm thick post formed laminate and 1 mm thick backing laminate and flat edge duly sealed with 2mm thick PVC beading. Modesty shall be 18mm thick plain particle board clad with 1mm thick decorative laminate on both sides and edge sealed with 2mm thick PVC beading etc. complete as per design, drawing and as per specifications/ additional specifications.
1.5.15	Single Bed with mattress	1 (One)	Outer dimension of the bed: 74" X 38" X 18", Ready Size 6'X3'. Frame made of 2"X1" rectangular CRCA pipe (Prime Quality) and inner frame of 1"x1" pipe (CRCA prime quality) to place the ply. Full structure with thickness 16 gauge/(1.60mm) duly powder coated with

			minimum 4 Supporting pipe in between for better support of ply. Powder coating will be done with 7 Tank Chemical treatments to avoid any rusting in future. Colour: Black. Plywood should be ISI mark, 12mm thickness, size 6'X3', boiling water proof, termite proof, of approved make high density coir form 8 inches of sleep well or equivalent make.
1.5.16	Microwave Oven	1 (One)	• 28 Litre Capacity, Convection Microwave, Convection 1250Watts Power Consumption,230V/50Hz,900Watts Output Power • LED Bar,6 Power Levels, Membrane, Handle, Turntable, Ceramic Enamel Cavity Interior • **Physical Specifications:** 504set / 40ft Loading Quantity 18kg Net Weight 567 x 310 x 460mm Outside Dimension
1.5.17	Electric Kettle	1 (One)	• Features: Cordless electric kettle with 360° base. Optional wall mount, ergonomic handle, one-touch opening, water level indicator, safety lid with automatic switch off and removable lime scale filter. Capacity: 1.2 litre, Power supply: AC 220-240V - 50/60Hz, 2200 W max. Operation temperature: Approx. 120°C • Cable specifications: HO5RR-F 3G*0.75-1.0 mm2 250V-16A L = 0.85 m ON/OFF: ON/OFF button with blue light indication.
1.5.18	Refrigerator	1 (One)	• Description: Frost free Capacity 300-3501itres, environment friendly, 5 Star rating, Safety standard: GS/CE, can work without Stabilizer (can operate within the range of 100-290V & can withstand voltage fluctuations)

Appendix III

Detailed specifications for equipment required for the technology infrastructure

Sl. No.	Item	Quantity	Specification
A	Video Wall Display System	I (One)	1. LCD/ LED display unit of 45-50 inches size with seamless integration with Bazel to Bazel gap of 2.0 mm or less, Response time 5. 12 ms. HDMI/Display Ports interfaces etc 2. Shall have 2 rows and 3 Columns stacked display 3. Each of the display unit shall have resolution 1920X1080p30 or more, min 450 lumen brightness and 1300:1 contrast ratio. 4. Shall be able display multiple displays at the same time with various inputs source. 5. Shall also be able to display on 3x2 displays unit as single entity/input source and display on a combinations of displays as required. 6. Shall be possible to use each of the display unit as independent display unit selectable from the controller for any input 7. Shall be able to operate for round the clock (24x7x365) for at least 50,000 hours 8. Shall have a suitable controller unit with high end-graphics processors (Dual quad core processor) and min 32 GB memory, 1 TB of hard disk with Raid 0,1 support, Graphics Card with 4 GB Memory, Dual Gigabit Ethernet, Minimum 8 output of HDMI/DP as required to connect displays or switches as required, Should be able to accept/have DVI/HDMI/VGA input, 19" or more monitor, Keyboard, optical mouse, redundant power supply with windows/Linux OS 9. Video wall Controller should have following inputs 9.1 Min 8 Nos of HDMI/DVI (1920x1080 resolution/or input interfaces required provide necessary input to video walls system. 9.2 Controller shall have either built-in switcher or interfaces or external switcher to handle above inputs directly without loss of number of inputs. 9.3 Controller shall operate over 100/1000 Mbps Ethernet connection for necessary configuration and control of the display

			9.4 Shall have suitable Wall management software for Configuration, Selection and management of display Layouts 9.5 Suitable configuration Remote Workstation with emulation software for management and control of the Video wall.
B	Audio System with PSTN interface	1 (One)	• DSP based audio system with minimum 32 AEC inputs • Frequency response 20Hz-20Khz, Harmonic distortion < 1% • 20 nos of directional boundary microphone to be fixed on the conference table, Should have good audio pick from a distance of 2-3 feet under normal conditions. Frequency response of 50Hz-15KHz and good Signal to Noise Ratio (typically 60dB or more at 1 KHz), Shall have individual microphone on/off (Mute) • Shall have Chairman override function • Shall automatically mute on silence (when speaker is not talking) • Should be free from mobile signal interference • Shall have suitable multichannel amplifier (100W or more) Amplifier with combination of Sleek Ceiling mount (8 Nbs) and Wall mount Speakers (2 nos) with sufficient wattage for good reception/audibility in the conference room with zoning feature enable for videoconference or local meeting with echo free environment etc. • Shall suitable mixer units for connecting, 20 nos table microphone, 4 nos of audio inputs from PC/Laptops, 4 line level (Stereo) inputs to connect Audio from External devices (DVD Player, Set-top Box for TV and Videoconferencing systems etc). • Shall have two AEC inputs to connect 2 nos. of cordless Handheld Microphones and 2 nos. of cordless lapel Microphones. • Audio Conference system shall support additional direct interface with 2 nos. of PSTN lines for audio conference with external PSTN participants without any echo from any of the microphones. • Should have physical volume control nobs • Audio Amplifier shall have suitable interface for controlling through external control systems. • All items including table microphones, cordless & lapel microphones amplifier, speakers as mention above should be supplied with connection cables.

C	High Definition Projector with Screen	1 (One)	• LCD/DLP Projector should have brightness of 4000 ANSI Lumensor more • Should support High Definition standard with native resolution of 1920x1080 pixels • One HDMI • One DVI/D-sub 15 pin input for PC connectivity with Audio input • Shall support presentation from portable presentation devices (e.g., iPad/Laptops/Tablet/android devices) through Wifi & Wi-Di connectivity either directly or through external device, external device should be supplied with this if necessary? • All inputs of the projector should be supplied with 20m connecting Cables with suitable interface converters. • High gain Screen of 80/100/120" diagonal along with necessary mounting kits/portable stand as required. • Provision of image inversion & keystone adjustments for ceiling mount operations • Serial control port for integrating with external control system • Easy to use infrared remote controller • Replacement of the projector Lamps and other consumables, if necessary during the warranty periods. • 230 V, 50 Hz AC input
D	HD Video — Conferencing System with Two Cameras	1 (One)	• H.323 and SIP standards compliant • Minimum H.264 or higher Video protocols • G.722, G.722.1, G.728 audio protocols • H.281 far end camera control • Built-in Acoustic echo canceller with Noise Reduction • Should support high definition video resolution of 1080p at 30fps for live video and computer presentation in 16:9 aspect ratio • Should have provision to connect 2 HD camera input and one Presentation input • H.239 dual stream for simultaneously sending/receiving HD Content/Presentation along with HD live video on two different HD monitors. • Should have required audio and video outputs to connect with above Video Wall Display unit or LFD/LEDs • Should have a third video input to connect additional HD camera of 1080p resolution • no. of motorized Pan Tilt Zoom HD cameras of 1080p

			resolution along with suitable length of cable for proposed Conference room. Both the cameras should be controllable from hand held remote control/Touch panel of the VC system. Mounting structures required to mount the cameras on top of LCD/wall/ceiling should also be supplied. The HD cameras should be capable of working in normal classroom illumination conditions. • no of high quality microphones along with minimum 7.5m cable each. • One Line level Auxiliary audio input to connect with external audio system • One Line level audio output to connect with external audio system • Should have output/input interface to connect with HD Recording/Capture devices and playback stream to VC Systems input. • Easy to use infra-red hand held remote control/Touch panel with operating distance of 25 feet • Global Directory / Centralized directory support • Serial/Ethernet control port for integrating with external control system • Ethernet interface 10/100/1000 MBPS. • Operating conditions: 230 volts, 50 Hz and PAL video standard.
E	HD Video-Conferencing System With One Camera	**1** (One)	• H.323 and SIP standards compliant • H.264 of higher Video protocols support • G.722, G.722.1, G.728 audio protocols • H.281 far end camera control • Built-in Acoustic echo canceller with Noise Reduction • Should support Full high definition video resolution of 1080p at 30/60 fps for live video and computer presentation in 16:9 aspect ratio with min 1080p 30 resolution. • Should have provision to connect 1 HD camera input and one Presentation input • H.239 dual stream for simultaneously sending/receiving Full HD Content/Presentation along with Full HD live video on two different HD monitors. • Should have required audio and video outputs to connect with LFD/LED TV/Monitor • 1 no. of motorized Pan Tilt Zoom HD cameras of 1080p • resolution along with suitable length of cable for proposed Conference room. Camera should be

			controllable from hand held remote control/touch panel of the VC system. Mounting structures required to mount the cameras on top of LCD/wall/ceiling should also be supplied. The HD cameras should be capable of working in normal classroom illumination conditions. • no of high quality microphones along with minimum 7.5m cable each. • One Line level Auxiliary audio input to connect with external audio system • One Line level audio output to connect with external audio system • Easy to use infra-red hand held remote control/touch panel with operating distance of 25 feet • Global Directory / Centralized directory support • Serial/Ethernet control port for integrating with external control system • Ethernet interface 10/100/1000 MBPS. • Operating conditions: 230 volts, 50 Hz and PAL video standard
F	LFD/LED Smart Monitor 49" (123 cms) or Higher	1 (One)	• Resolution- Full HD (1920 x1080)/4K; Response time: $\leq$ 12ms; Brightness (CD/M2) - 400 or higher; Viewing angle 2178 degree, minimum 3 HDMI Interface. • 1-Ethernet Port, Inbuilt/ integrated speakers (min. 2X 10W), Cables & connector as required with full function remote, Wall Mount kit (VESA compatible) should be supplied, 16x7 hrs Operation.
G	HDMI Matrix Switcher	1 (One)	• Shall connect to external HDMI devices interface, 4 input and 4 outputs with support resolutions up to 1920X1080p60 or more, Support bandwidth of 1.5 Gbps / channel, Have front-end switcher/buttons for selection of input to desired output, Possible to select any input to any output (Matrix Switch), Have Computer Control (RS-232 / RS-485/ LAN). Necessary branded connecting cable should be supplied.
H	LCD Annotation Panel	1 (One)	• 15" or higher size LCD panel which should be able to use as white board collaboration and annotate digital contents, should be scratch resistant, 16:9 full HD resolution of 1920x1080 pixels, Response time 30 ms or less, HDMI In & Out, and a wireless battery free stylus pen with natural writing comfort, Windows/MAC OS compatible; annotation software bundled
I	Wireless Presentation	1 (One)	• Shall operate over Wi-fi/Wireless connection to show presentations/computer screen/Audio Visuals from

	Device		PC/Laptop to a projector / any display device using DVI/HDMI interface, Shall be dongle based/application based to be connected to be loaded in to a PC/Laptop • device working under various operating systems (Windows, Andorid, iOS, MAC OS etc) without any device drivers, should be able to connect 2 PCs/Laptops at any time and necessary dongle if any need to be supplied, Shall transmit full HD Video at 15 fps or more with Stereo Audio, Shall support presentations/videos/Computer screens of 1080p, 720p, WXGA, SXGA or more resolutions, Shall support simultaneously, minimum of two PCs/Laptops devices for presentations at any time with a feature to selection & transmit any PC/device screen at full screen., Shall operate up to 50 feet or more distances from PC/Laptops. to Presentation Device, Shall be supplied with suitable mounting kits, cables etc.
J	Conference Room Control System	1 (One)	• Integrated Control system to control all equipments installed in Conference Room (Video wall, & other sources, switches, Room Lighting and other electronic equipment installed in the conference room) • Should also be able to control basic functions of the conference rooms such as selection of displays, layouts, audio Conference system, various inputs & presentations, Videoconferencing systems etc.) • Should have intuitive and easy to use graphical interface is to be custom developed as per requirements of the conference Room • Should have wired 15" or bigger Colour Touch panel to communicate with the control system • Should also be able to control from any PC/Laptop through LAN and Android/IPAD wirelessly • Should have minimum six number of serial ports • Should have minimum six number of Infrared remote control ports with IR probes. • Should have minimum six number I/O ports • Shall have Lighting control units for dimming the Conference Room and turning off / on of other lighting • Should have minimum six number of Relay ports for ON/OFF equipment, Electronic Gadgets or any other equipment. • Necessary relays, connectors, power sockets to connect various devices in the class room are also to be supplied

			• May have to supply with more number of control ports to meet the requirement and control of electronic device in the conference room. • 230V, 50 Hz operation.
K	IP Full HD Recorder	1 (One)	• Should be able to record minimum Full HD resolution of video • Should have capacity to record 5 parallel video channels • Should have internal memory to record minimum 100 hrs of Full HD video • Should captures high-quality minimum H.264 format at up to HD 1080p resolution at high speed • Allows live feed for streaming of HD video and audio over an IP network • Should be able to integrate easily with existing VC Systems or MCU to record • Should be upload media file to storage server through network • Should have Gigabit Ethernet port • Should record at various resolution up to 1080p30
L	IP Streaming Solution (Media Server)	**1** (One)	• Should supply and commissioned a rack mountable streaming server with necessary streaming software • Should be able to capture source video and audio from IP Recorder • Should be able to stream (unicast/ multicast/ broadcast/ any cast) over IP Network in high quality video resolution • Should be able to stream at least 5 concurrence channel. • Should be able view by any clients and Android devices using regular browser, flash player, QuickTime player, real player etc. Should dynamically serve the different device with continuous streaming. Should supply with necessary transcoder to support various device clients. • Operating on window or Linux OS • Should be able facilitate connect more than 1000 unicast client together in same streaming server.
M	Multipoint Control Unit (MCU)	1 (one)	• It should hardware MCU with capacity of 100 ports @1080p30 • End Point should be able to connect directly to MCU as H.323/SIP protocol without using any external gateway/converter. • It should be able to dial out to End Points or dial in from

			MCU to directly connect to MCU. • It should able to registered End Point/User/Desktop Clients/ Mobile Client on an external/internal network. • It should support presentation/content sharing @1080p30 • It should support scheduling and invitation to users to join the conference. • MCU support Desktop Client min resolution of 720p30 • MCU support for minimum 25 multiple conference /meetings with both softclient/browser based calling and H.323/SIP endpoint with aggregate port capacity of MCU. • It should be able to connect end points both from internal network and external network with minimum 50% sites of MCU port capacity.
N	UPS with Battery bank	1 (One)	• 10 KVA on-line UPS with 2 hours backup with maintenance free battery bank, Necessary Electrical wiring and Ground/erthing shall be done the vendor.
O	Miscellaneous items		• One 42U Rack with cable trays for placement of equipment in the control room. • Cable cubbies with HDMI & RJ-45 LAN interface and Power adapter in a collapsible enclosure to be fitted on the conference Table at 6 locations. Necessary HDMI switch (6:1) with branded HDMI cable to be provided to display each presentation on video wall one at a time.
P	Layer 2 Switch	3 (Three)	• 24 port 10/100/1000 Mbps Full Duplex Layer 2 Switch with 2 SFP ports, a dedicated stacking port & Support • Ipv6 ready & management, SNMP managed, VLAN & Port level authentication. Ipv6 First hop Security supporting various function like NDP, DHCP etc. Basic Layer 3 static routing, Automatic Quality of Service for easy configuration of QoS features for critical applications, ACL classifications-port broadcast, multicast, and unicast storm control, • Switch should be provided with two single mode/multi¬mode SFP module to support Gigabit Ethernet upto 1 kms. • Optical Fiber cable (MMF/SMF) as required to extend upto core switch to be provided and laid. Estimated distance upto core switch is 400-500 mts.

Note. All the ICT equipment should be with 5 years on site comprehensive warranty.

A professional expert on the AV solution needs to be deployed in the premises of HEOC and SHEOC during office hrs/ beyond office hrs in case of necessity for administration/ management and operation of AV equipments/ conferences.

7. SIT Specification for HEOC

The Audio-Video Conferencing system sgould interface seamlessly with the satellite Communication system.

Appendix IV

Detailed Specification of Equipments for Telecommunication and Networking Infrastructure

The equipments to support Telecommunication and Networking Infrastructure would include IPPBX, CTI, ACD and IVRS.

1. IP PBX system with 20 extension lines expandable to 40.

a) The proposed systems shall be a fully smart system that supports Time Multiplexing (TDM), employ Stored Program Control (SPC) using Pulse Code Modulation (PCM), IP switching and conforming to latest ITU-T (earlier CCITT) standards. The IP PBX should be able to integrate with public telecom network infrastructure (PSTN/ISDN). The system shall be fully modular and fully non-blocking type with distributed architecture and should have provisions for redundancy for main system controls. The other specific features as listed below shall be satisfied.

b) It should have facility to connect Computer Terminal, Telephones and FAX through suitable Interface common to all such devices. Tenderers shall indicate full details of the system offered including CPU speed.

c) The system shall also be capable of working in a suitably ventilated non-air-conditioned environment. System design shall be immune to noise from various sources like power supplies, lighting system etc.

d) It should be designed in such a way that any damage in any circuit/Sub-assembly /assembly should be self-containing and should not propagate to other parts of the system.

e) The IP-PBX shall be capable of pulse to tone conversion and vice versa to enable correct operation (originating & receiving calls) with the DTMF and dial pulse signalling having a speed range of 8-12 PPS and break ratio of 50 to 80%.

f) Dial Speed: 10+/0.5 PPS Make/break ratio: 1:2, normal with break period between 65 to 68%. IDP: >>550 ms.

g) Call buffer memory shall be at least 1350 calls. The tenderer shall indicate call buffer memory capacity offered.

h) The equipment shall be capable of working in the howling line & junction limits as under:

i. Extension loop resistance of atleast 600 ohms.
ii. Junction Loop up to 1800ohms.
iii. Insulation lower limit 20 k ohms.

i) Flexibility of opening & closing of limits & modification in class of service will be provided.

j) There must be protection of IP PBX System from high voltage/current transient occurring on junction lines to the Exchange

k) All cards of the same type & design shall be interchangeable without necessitating special adjustments.

l) Cabinet design shall provide for adequate ventilation to dissipate heat due to energy loss.

m) The points for connecting supplies, the power supply to the different plug-in cards shall be standardized & mechanically non-interchangeable to prevent damage due to accidental interchange of connectors.

n) Sub-assemblies & printed cards in the equipment shall be suitably marked. Identification of a type of card in it's connector shall be possible without necessitating its removal. Any plug-in component shall be marked with sufficient information for its complete identification.

o) All instructions labels or any other marking on the equipment shall be perfectly legible.

p) Connecting cables between jacks shall be marked in their extremities with identical designation as on the fixed connecting flanges.

q) Fuses used shall have a suitable marking for the different rating to enable easy identification and replacement.

r) The IP PBX shall be suitable for operation on 230V+/- 10%, 50 +/-2 Hz AC

SYSTEM FEATURES

a) The IP PBX System should have Digital PCM/TDM (non-blocking) technology. They shall indicate the switching IC/CHIP used. They shall furnish calculation showing the non blocking technology /switching

b) Tone and Ringing: The System shall provide the standard tones and ringing current as in Public Telephone Network as follows:

a) Ringing 75 V AC, 25 Hz.
b) Ring back tone 400 Hz. 0.4 sec ON, 0.4 sec OFF.
c) Dial tone 400 Hz modulated by 25 Hz.
d) Busy tone 400 Hz, 0.75 sec ON, 0.75 sec OFF.
e) Operating Voltage 48 V +/- 4 V DC.

c) The equipment and circuits for tones and ringing shall form part of main PABX equipment.

d) The equipment should have Automatic Route Selection facility to determine least cost route automatically based on class of service.

e) Extension-to-Extension Dialling: It shall be possible to establish internal calls automatically by dialling any number without assistance of the attendant.

f) Direct Outward Dialing: It shall be possible to establish external calls automatically by dialing any number without the assistance of the attendant (subject to class of service)

g) Provision of DID & DISA: It shall have facility for direct inward dialling and direct inward station access.

h) Direct Outwards Station Access (DOSA): Any Extension can access the trunk lines of the System through personal pass code to make outward calls from outside. All DOSA calls remain in account of that particular Extension.

i) Access to Exchange Network: It shall be possible for an extension to get access to public network with or without the attendant in such cases, facility shall exist for the attendant to either dial the required no. or to merely extend the junction to the extension and permit the subscriber to dial the number.

j) Privacy of call: Full privacy of conversation shall be available on all calls whether established directly or by the attendant. A warning tone of a specified frequency shall be applied when the attendant exercises trunk-offering facility on an extension user.

k) Class of Service: It shall be possible to exercise control on an extension over the telephone usage by providing suitable class of service.

l) The coding technique to be used is ALAW/CODEC per channel.

m) System should have provision for Automatic Last Number Redial up to 20 times on Junction Line.

n) During night, when the board is shut, external lines should be linked to any pre-defined extensions.

o) Provision for connecting recorded voice / answering to make available extensions to an incoming call without the help of operator.

p) Flexible Numbering Scheme: System should have provision for flexible numbering plan up to four digits for extensions

q) Universal Port Configuration: All ports of the System should be identical to facilitate flexible configuration of the System as per user needs.

r) Discriminate Ringing: The System should support discriminate ringing to indicate internal & external calls.

s) Mixed Station Dialing: To support all the features irrespective of type of telephone instruments Le... DTMF or DECADIC

t) Versatile ASMDR The System should support ASMDR, which is a call accounting application that can record & print up to at least 3500 calls without dedicated printer

u) Power Failure Transfer. In the case of power failure all PSTN lines become available on the pre-set Extensions. Provision for availability of atleast 8 such Junction Lines shall be there

v) Programmable Class Of Service: The System should support programmable class of service for PSTN (STD/SD/LOCAL) dialing as per need.

w) Direct Call Billing In Rupees The System should support direct call billing (near value) through parallel/serial port printer without computer

x) Call Billing Printout Options: The System should support versatile multiple combinations of direct printout options with total amount viz., Extension wise, Trunk wise. Today's call, Group wise, Particular date, Particular Month, Particular Time, Particular Phone etc.

y) Calling Line Identification (CLIP): This is an optional feature and when ordered it enables the incoming calling No. is displayed on Key/ Analog Phone.

z) Remote Maintenance: The System programming can even be done from remote locations

The IP PABX will also have the facility of (i) Automatic Call Back. (ii) Call Forwarding, (iii) Consultation Hold, (iv) Brokers Call, (v) Automatic Call Transfer, (vi) Conference Call and (vi) Call Re-Routing.

The system should be supported by 40 digital business phones with (i) 3 line Backlit Display, (ii) 4 Soft keys & 24 Programmable Keys. (iii) 100 Numbers Call Log. (iv) Ringer, speaker, Handset and Headset Volume Control

2. **Automatic Call Distributor (ACD) and Computer Telephony Integration (CTI) server**

The specified IP PABX will support and seamlessly function with automatic call distributor (ACD) to accept, queue up, deliver and report telephone calls. An integrated system of ACD and PBEX and Integration of this system with the work station computers through computer telephony integration (CTI) server will be made.

3. Call Center

a) The Call Center shall be implemented using a technology, which allows a Multi-site, Multi-channel networked Call Center configuration with the provision to dynamically divert/re-route calls from a given Call Center to another Call Center in future within a zone as a Disaster Recovery measure.

b) The above mentioned CIT server and its capacity, EPBX, announcement cards including Text to Voice software & E1 Ports should be sufficient to support 5000 calls/day but it should be scalable/ upgradeable seamlessly, both from hardware and software point of view, to meet the future requirement.

c) The Call Center should support Interactive Voice Response System (IVRS), which shall logically be front-end for all incoming calls and process them in accordance with a pre-configured call-flow

d) There should be provision to see consolidated hourly report of all calls including overflow & networked calls for supervisory personnel.

e) The Call Center should support the above mentioned Automatic Call Distribution (ACD) and Automatic Call Routing

f) Adequate number of IVRS/ ACD ports to be provided to ensure that all calls meant for the Call Center are able to reach the Call Center and are not lost

4. IVRS

a) The successful bidder will submit IVRS script to the nodal in-charge of the HEOC.

b) There should be option available to opt out for talking to call center representative by pressing pre defined digit any time during IVRS announcements.

c) There should also be an option for the caller to give feedback on the performance of the call center.

d) The IVRS should also announce expected customer's queue waiting time when he/she has requested for agent and is waiting to be attended by one.

e) The Call Center shall provide facility of configuring announcements to the caller such as welcome message, information and shall update the customer with the current queue status at regular intervals. to be defined by HEOC

f) The bidder shall provide the requisite Network Security infrastructure such as Firewalls, Intrusion Prevention System (IPS) and/ or Anti-Virus System at each Call Center

g) Agents should be able to control the telephony features from the agent application like login, logout, away, pick-up, conference, and transfer to another agent or to supervisor. Entire login, logout, away. total call handled, duration of calls, data of the agent should be captured and produced as reports

h) In case the waiting time for caller for speaking to agents exceeds 120 seconds, an option will be given to the caller to register his request for agent call back. In case caller wishes to stop waiting and registers for the said option, an announcement will be played to subscriber that an agent will call him back shortly.

5. Mass E-mail and SMS service

The bidder will provide appropriate software compatible with the above mentioned hardware for mass e mail and SMS services.

6. Satellite Telephone

a) Size: 169 X 52 X 29 mm (without antenna) or 169 X 75 X 36 mm (with antenna).

b) Weight 318 gm (including Battery).

c) Internal speaker with high voice quality. Integrated fold-out GMR2+ antenna and Internal GPS and Bluetooth antenna.

d) High resolution 55 mm (2.2 inch) colour LCD display.

e) Removable long life Battery: 51 X 84 X 13.5 mm. Talk time upto 8 hours. Standby time: upto 100 Hrs based on network configuration.

f) Telephony services: voice and circuit switch data. Short Message Services, Voice mail Services, SMS to-Email GPS Location Data. Multiple languages MMI (8).

g) Ports provided to external GMR2+ and GPS antenna.

h) Bluetooth v2.0 class supported for wireless hands free voice operation (headset and hands free profiles)

i) 92.5 mm pole audio connector for wired hands free voice operation

j) Micro USB Port for data/ Fax services and battery charging.

k) Wall charger

l) Rugged design

m) Assistance button and GPS tracking

n) incoming call alerts even with antenna stowed.

7. VSAT (Very Small Aperture Terminal)

a) IP based VSAT Broadband service.

b) Maximum Trans/ Receive data upto 10/100 Mbps with GE interface.

c) Uniform quailty of service to users everywhere under satellite footprint

d) Voice Telephony with add on ATA (Analog Telephone Adaptor)

e) Power consumption is about 300W (AC input power supply)

f) Compact Indoor Unit (DU) occupying very little space.

g) TCP Accelerator to increase Actual Channel Throughput when serving TCP/IP applications.

h) Supports all IP V4/ v6 protocols.

i) 4 GE ports.

j) Shared and customized Bandwith for customer's requirements

k) Allows VPN access.

l) Supports GRE and IPSec tunnels passthrough.

m) The outdoor Unit consists of antenna (1.0m, 1.2m) and Block Up Converter (BUC), Block Down Converter and feeder assembly. The IDU is connected to VSAT Antenna through RG-6 cable of maximum 30m length

n) Should interwork seamlessly with existing BSNL MPLS VPN and MLLN for WAN applications.

o) The data from VSAT working at SHEOC will be routed to NIC, HQ CGO Complex from the BSNL VSAT HUB for seamless integration with HEOC network.

8. ROUTER

a) The Router should be multi-core Processor, modular architectrue with 1RU form factor and support minimum Performance of 50 mbs, 4 GB Default RAM, 4 GB flash memory & support for fabric based architecture which will allow high-bandwidth module-to-module communication without compromising routing performance.

b) Out of band management access via USB /console/Aux port. The onboard USB 2.0 ports should support storage/USB E-Tokens capabilities.

c) The router shall support adaptive routing adjustments by doing routing path selection based upon advanced criteria like Response time, packet loss, delay, jitter and traffic load on leased lines to intelligently control the traffic to maximise the quality of the user experience. d) The Router should support 3 onboard WAN or LAN 10/100/1000 ports

e) Shall support variety of interfaces like V.35 Sync Serial (64Kbps, 2 Mbps), G.703, Ch-E1, Fourth Generation (4G) Long-Term Evolution (LTE) Network Interface Modules Ethernet Interfaces like 1Gbps, 10/100/1000 Mbps. 802.3af. ISDN PRI. BRI Shall support voice interface like EXO, FXS, E/M and BRI

f) PV4 IP routing Protocols like static, RIP v1 and OSPF, BGP v4 equal cost routing, VRF, MPLS Layer 2 VPN, Layer 3 VPN, BFD, MPLS-TE,NSF awareness, HSRP, FHRP.

g) IPV6: OSPF V3, and static router, ipv6 Routing, IPv6 Multicast, IPv6 QoS, IPv6 VPV over MPLS (6VPE) for IPv6, IPv6 Ready Logo certified by the IPv6 Forum.

h) The router should support VRF- aware firewall, The router should support secure large layer 2 or MPLS network requiring partial or full mesh connectivity by providing tunnel less VPN connectivity using group shared keys.

i) **Security:** The Router should support anomaly-based detection of DDoS attacks, collection of IP traffic Information, mechanism for application performance and usage pattern, as well as security, support Deep inspection mechanism recognizing and classifying applications. MPLS-Aware NetFlow/jflow, The router should support MD5, SHA, SHA-256, SHA-384, SHA-512 cryptography algorithms,

j) **QOS**: support Class-Based Weighted Fair Queuing (CBWFO WRED Hierarchical QoS for Traffic Management inspections, QoS classification with TCP Application traffic

k) **Management:** SNMPV1, SNMPv2, and SNMPv3, Layer 2 traceroute, TFTP, NTP, RMON I and II, Cli Support, Telnet, SSh version 1 & 2. SNMP over IPv6.

l) Should support WCCP Version 2, WCCP Layer 2 Redirection/Forwarding, WCCP: VRF Support.

m) Should support Firewall Zone-based policies, Stateful Firewall, firewall support for ipv6, Multi-Virtual Route Forwarding (VRF) Customer Edge (CE) for firewall, VRF-Aware IPSEC, Suite B Cryptographic Suites for lpsec (RFC 4859), Network performance monitoring and network performance visibility.

n) Should support mechanisms for measuring service-level indicators, including delay, jitter, and availability, mechanism, to monitor network performance for Data, Voice and Video (RFC 6812), shall Have in built voice call processing in the event of WAN link failure to central call processing Engine capability for Voip IP Phones.

o) Should support identification of flows by looking at the Source IP address, Destination IP address, Source port number. Destination port number & support onboard automation for fault detection, troubleshooting, and recovering.

p) The router should have ability to classify application based on various attributes such as: Application group, category, Sub-category, P2P, Tunnel & Encrypted. Router should be able to identify more than 1000 applications and supports application categorization with the ability to perform in-service update of application signatures

q) WAN Router should support Traffic Optimization feature built in the router operating system Proposed bandwidth optimization solution should support acceleration of all TCP base

applications and support up to 200 optimized TCP connections and support WAN throughout of 15 Mbps and Optimized LAN throughput of 50 Mbps.

r) WAN optimization solution should support Centralized Policy based management. Should compress TCP traffic using LZ compression and should be transparent so that it can work with Firewall, ACL VPN, IPSEC and other networking devices in LAN/WAN Environment.

s) Solution should support Binary Increase congestion control for TCP traffic (BIC-TCP) Should support advance network compression that uses a bidirectional database to store previously seen TCP traffic and replace redundant patterns with very small signatures.

t) OEM should be in Gartner's leaders quadrant for routing and switching infrastructure as per latest report.

u) Power requirement 240 VAC, 50 Hz. Operating

v) Temperature 0 to 45 degree centigrade. Operating

w) Humidity 10% to 85% (non condensing).

9. SWITCH L2

24 port 10/100/1000 Mbps Full Dux Layer 2 Switch with 2 SFP ports, a dedicated stacking port Support ipv6 ready & management, SNMP managed, VLAN & Port level authentication. ipv6 First hop Security supporting various function like NDP, DHCP etc. Basic Layer 3 static routing, Automatic Quality of Service for easy configuration of QoS features for critical applications, ACL classifications-port broadcast, multicast, and unicast storms control.

Annexure-III

Details of staffing patterns at HEOCs, their suggestive roles and responsibilities

Routine Staff: The following routine staff deployed at HEOC shall be responsible for the day-to-day operation of the HEOC. These include:

a) CMO I/c

i. Shall function as overall administrative and technical head of the HEOC
ii. Shall oversee timely and regular updation of State Disaster Management Plans
iii. Shall ensure a state of readiness in terms of preparedness in all District HEOCs/Control Rooms/District RRTs
iv. Shall ensure regular assessment of strength and capacity building of District HEOCs/Control Rooms/District RRTs
v. Shall coordinate with nodal agencies to carry out trainings/refresher trainings of district public health officials from RRTs to field level workers
vi. Shall oversee regular updation and completeness of resource mapping
vii. Shall submit daily situational updates about (i) outbreaks reported in the week and follow up action being carried on, (ii) disease trend as being reported under IDSP, (iii) media alerts
viii. Engage with other relevant health and non-health stakeholders depending on disaster risk assessment of the state and establish linkages with relevant nodal officers/their respective EOCs/Control rooms
ix. Overseeing conduct of mock-exercises/drills for the disaster response plans and HEOC activation with other participating units, identify gaps and take actions to rectify the same

b) GDMOs/PH Consultant

i. Undertake mapping of resources in the States in terms of:
   - Health facilities - Including their no., type (1-3/central/State/Pvt.), bed strength (G. Wards, oxygen supported beds, ICU beds, ventilator supported beds),
   - Equipment - (Both in operation and in stores) Ventilators, PPEs, PSA plants, LMO containers, MGPS systems, their functional status and total capacities
   - Essential Drugs and vaccines (Both in health facilities and in stores), major manufacturing hubs, total capacity, total actual manufacturing
ii. Capacity assessment of district RRTs, Need for refresher trainings

iii. Rostering of district RRTs trainings at State Capital/other venues
iv. Preparation and upkeep of State DM plan for biological emergencies
v. Follow up on networking with other stakeholders and their EOCs/Control rooms/nodal officers
vi. Providing help desk services to State HEOCs/Control Rooms/RRTs/District Epidemiologist by connecting them to identified expert/institution for technical queries
vii. Holding mock-exercises/drills for the disaster response plans and HEOC activation with other participating units, identify gaps and take actions to rectify the same
viii. Confirmation of media alerts by approaching respective State HEOCs/Control Rooms/RRTs
ix. Get updates on outbreak response from districts reporting outbreak of disease/disasters with health impact
x. Finalization of media alert reports

c) Data Analysts

i. Analysis of disease trends including GIS mapping of outbreaks and
ii. GIS mapping of resources
iii. Maintain of archives of disease outbreak reporting
iv. Undertaking media scanning for health /disaster related alerts
v. Preparation of media alerts

d) Hub Engineers

i. Management and upkeep of web-portals (IHIP) for health related data to and from all districts
ii. Networking with district level HEOCs/call centers
iii. Maintenance and upkeep of all ICT equipment

e) DEO

i. Assisting GDMOs/PH Consultant; Data Analyst and Hub Engineers in their activities
ii. Maintain and update the directory of all district health officials

Surge Staff: Surge staff to be arranged from the health system as well as non-health sector by the member secretary of crisis management group with consultation with incident commander depending on type of hazard or disaster. However, surge staff should be adequately oriented.

Annexure-IV

Watch Mode functions:

Watch Mode essentially means the normal day-to-day activities of HEOC. During this mode, the HEOC is manned by a routine staff with the basic functions of:

- **Maintaining Situational Awareness:** This involves tracking of about likelihood/occurrence of public health emergencies or disasters with health impacts events with respect to time or space. This is accomplished by constant collection, collation, analysis, distribution, and archiving of routine health information for outbreak prone diseases and disasters with public health impacts.
    - **Media scanning**: Surveillance has been enhanced by the development of several novel approaches complementing conventional methods. The advent of electronic and print media has been a source of informal information for ongoing disease alerts and health related events. They are vital for detecting outbreaks of infectious diseases and are important tool for enhanced surveillance in the detection of outbreaks and events with potential health impacts. State Media Scanning and Verification Cell (MSVC) at SSUs works through daily screening of news (print & electronic), and other social media channels which reports on suspected outbreaks or unusual health events.
    - All potential hazards and actual incidents may be mapped on a GIS platform (either a Government platform like bharatmaps or an open-source GIS platform).
- **Planning**: Preparation, updation, revisions of State Disaster Management Plans for public health emergencies and support functions to be provided during disasters with health impact.
- **Resource mapping**: This includes regular upkeep of information about resources like infrastructure, logistic, human, etc. Risk assessment, identification of resources, identification of stakeholders shall be carried out and be mapped on GIS.
- **Networking**: This involves not only liasioning on but also setting up and upkeep of communication channels/links between various health sector stakeholders (for example Central HEOCs, Other State HEOCs, District level HEOCs, major hospital/medical college control rooms, SDCOs, medical stores/drug stores, etc.), and non-health sector related stakeholders (for e.g. Central/Regional/State level EOCs/Control rooms/Nodal Officers for IMD, Animal husbandry, Home Affairs/Atomic Energy etc.)

- **HR Capacity**: This involves keeping track of number of healthcare functionaries and their training needs assessment, rostering for trainings/refresher trainings of healthcare functionaries by identified institutions/agencies etc.

Help Desk Function: Facilitate technical help to State HEOCs/Control Rooms/RRTs/District Epidemiologist by connecting them to identified expert/institution for technical queries. The HEOC will host necessary resources and data for effective coordination of response in emergencies. There will be a 24/7 HEOC dedicated call line in the HEOC which can be used as an emergency contact point (contact number*****). During emergencies, the center functions 24/7 with trained and dedicated staff. It is equipped with communication and information management infrastructure including land, cellular and satellite telephones, internet, radio frequency based wireless sets; television, computers etc. Thus, being well suited to function as the State Surveillance Officer of the State Health Department will maintain the HEOC database and information.

The State HEOC has to maintain a list of contact of key stakeholders, including all levels of health system delivery, government sector, key staff, partner organization representatives, and disaster management. In addition, the HEOC will maintain contacts details of other States HEOCs including telephone number, address, and video and tele-conferencing detail.

Annexure-V

Responsibilities of staff during Watch Mode

6.1.3 Conducting of video conferencing

All planned activities, video conferences and meetings (regular and ad hoc) will be organized, recorded and regularly displayed in the HEOC. The HEOC in charge will ensures updating of the information. The schedules need to be displayed (during normal and activation time) to help know what activities are occurring at the HEOC

a) **Setting agenda:** Agenda of the meeting/ video conference will be communicated prior to the all concern authorities through letter and other modes.
b) **Identifying chairperson and stakeholders:** Identification of chairperson and stakeholders for video conference and meeting
c) **Documents and presentation:** Prepare all the documents related to the meeting/VC and well define databased presentation. The prepared documents and presentation will be finalized by the Chief Medical officer.
d) **VC platforms:** Communicate video conference platform, date and time to the all participants
e) **Issuance of meeting/VC notice:** Issuance the meeting /VC notice with all the above said information to the participants through mail or any other mode
f) **Conduct of VC:** VC/Meeting should be start on exactly on given time in the notice
g) **Documentation of deliberations held:** The minutes of meeting or any other discussed points in the VC/Meeting will be list down by the PUBLIC Health Manager of the HEOC and will be communicate with all the participants for their inputs or suggestion.

6.1.4 Conducting Webinars/Trainings/Exercises

The HEOC will develop trainings/ webinars programmes and regularly train both HEOC permanent and surge staff. These will allow development and maintenance of critical set skills, and continuous improvement of HEOC functions. During normal time, the HEOC must train its staff and conduct simulation exercises.

Outline:

- Types of training to be conducted
- Persons to be involved in the training (need to be multi-disciplinary / multi sectoral, including response partners)

- Frequency of training sessions per year
- Training sessions are usually followed by an exercise. Simulation Exercises will be regularly conducted to test skills acquired, to validate existing plans and procedures, and systems.

The HEOC framework outlines exercises for HEOC. These are:

- **Orientation exercise:** These are intended to familiarize participants with, develop, or refine current plans, policies, and procedures
- **Drill:** A drill is a coordinated, supervised exercise activity, normally used to test or train a single specific operation or function in a repeated fashion. A drill aims to practice and perfect one small part of a response plan, and should be as realistic as possible, employing any equipment or apparatus necessary for that part.
- **Table-top exercise (TTX)**: A tabletop exercise is a facilitated discussion of an emergency situation, generally in an informal, low-stress environment. It is designed to elicit constructive discussion between participants; to identify and resolve problems; and to refine existing operational plans. This is the only type of simulation exercise that does not require an existing response plan in place.
- **Functional exercise:** A functional exercise is a fully simulated interactive exercise that tests the capability of an organization to respond to a simulated event. The exercise tests multiple functions of the organization's operational plan. It is a coordinated response to a situation in a time pressured
- **Full-scale exercise:** A full-scale exercise simulates a real event as closely as possible and is designed to evaluate the operational capability of emergency management systems in a highly stressful environment, simulating actual response conditions. This includes the mobilization and movement of emergency personnel, equipment and resources. Ideally, the full-scale exercise should test and evaluate most functions of the emergency management plan or operational plan. Differing from the functional exercises, a full-scale exercise typically involves multiple agencies and participants physically deployed in a field location.
- **Games:** Games involve a higher level of simulation, utilizing actual or hypothetical scenarios. Two or more teams may be involved, with exercise controllers providing exercise data and enforcing the rules of the game. They are useful as training tools due to the high level of engagement that is engendered by a gaming environment, and are used to develop higher levels of understanding and capability in implementing plans and procedures.

Annexure-VI

Risk Assessment: Risk assessment of an event (template)

State Rapid Risk Assessment – Event of Potential Public Health Concern	
Event Name / Location	
Date and version of current assessment	
Date(s) and version(s) of previous assessment(s)	

OVERALL RISK

(based on information available at time of assessment)

Regional (District/ State)	Overall risk with reasoning
Low	
Moderate	
High	
Very High	

RISK STATEMENT

Give a brief justification of why the overall risk categorization was chosen. This should be very short and there is no need to repeat all the different aspects of the hazard, exposure and context assessment. The aim is that the first page of the RRT gives a very concise overview of the risk of an event, only including the most pertinent information.

RISK QUESTIONS (assess scenario where no further interventions are implemented)

Risk question		Assessment		Risk	Rationale
		Likelihood	**Consequences**		
		Very unlikely Unlikely Likely Highly likely Almost certain	Minimal Minor Moderate Major Severe	Low Moderate High Very High	
Potential risk for human health? (i)The hazard: morbidity, contribution to overall mortality, case fatality rate (ii) The type of exposure: how frequently does it occur (iii) Transmission: transmission route, how easily is it transmitted,	**Regional (State/ Districts)**				

taking into account the context (iv)Think of the impact on the health of population if they are exposed: how likely is it that the population will be exposed and what will be the consequences for that exposed population?					
Risk of event spreading ? (i) Where is this event occurring? Urban? Rural? Crowded? Level of sanitation? (ii) Mode of transmission (airborne,waterborne, person-to-person, fomites, etc.) (iii) How susceptible is the population? Population	**Regional (State/ Districts)**				

mobility Ecosystem					
Risk of insufficient control capacities with available resources? This question aims to identify if, given the current situation and if no further resources become available, the country is able to implement control measures that are likely to contain the outbreak.	**Regional (State/ Districts)**				
Add additional risk question if needed; otherwise delete (1) Who is likely to be affected, including whether any particular subgroups have a different risk assessment from the general population (consider doing	**Regional (State/ Districts)**				

separate risk assessment for subgroups if helpful) (ii) What is the likely exposure to the hazard? (iii)When, why and how might the population be affected by the exposure to the hazard					

MAJOR ACTIONS RECOMMENDED BY THE RISK ASSESSMENT TEAM

Agree on and tick the actions to be taken; list any immediate actions in section 2 and define due dates and persons responsible for those actions. If no immediate actions are required, state this.

E.g. of immediate actions:

- Immediate activation of EOC as urgent public health response is required
- Develop response plan or activate national contingency plan if available
- Request for technical support to WHO and other partners as required
- Immediate support to response
- Support districts to undertake preparedness measures
- Continue to closely monitor

	Action	Timeframe

+If chosen, list actions and identify persons responsible and due dates for each action in section 2 (Supporting information)

COMMUNICATIONS

Target audience / channel	Planned	Done	First date	Last update
Inform State Authorities				
Inform National authorities				

SUPPORTING INFORMATION

Hazard assessment:

- This section is written as text
- Identify the hazard(s) that could be causing the event
- Review key information about the potential hazard(s) (i.e. characterizing the hazard)
- Rank potential hazards when more than one is considered a possible cause of the event

Exposure assessment:

- This section is written as text
- Brief update on the epidemiology (number of cases and deaths reported, affected area, affected persons (age / sex, gender, occupation or any other relevant characteristics)
- Information on previous outbreaks
    - Number of people or group known or likely to have been exposed (take into consideration mode of transmission etc)
    - Number of exposed people or groups who are likely to be susceptible (take into consideration people who have previously been exposed and may be immune, vaccination coverage etc)

Context assessment:

- This section includes a brief text summary of the context, and a table highlighting the vulnerabilities and capacities;
- Consider social, technical / scientific, economic, environmental, ethical and policy / political (i.e. STEEEP) factors that may influence the public health impact
- State the quality of the evidence used for the RRA (i.e. confidence in available information). Poor quality information may increase the overall perceived risk due to the incertitude in the assessment and requires the urgent need to gather further information.

Capacities	Vulnerabilities
These can decrease the likelihood and impact of the event	These can increase the likelihood and impact of the event

Immediate actions
Not a detailed response plan, state if no action required
Risk assessment team members
List names and roles
Reference documents used for risk assessment

Annexure-VII

Details of Crisis Management Group, its role in disaster response

The HEOC shall function to support the function of a **Crisis Management Group** (as communicated in the template crisis management plan)/an equivalent Disaster Management Group for Biological Emergencies with the following proposed composition:

i.	Addl. Chief Secretary/Principal Secretary (Health)	-	Chairman
ii.	Principal Secretary/Secretary (ME)	-	Member
iii.	Representative, State Home Department	-	Member
iv.	State Mission Director (NHM)	-	Member
v.	Representative, SDMA	-	Member
vi.	Representative, Dept. of Animal Husbandry	-	Member
vii.	Representative Public Health Engineering	-	Member
viii.	Representative, Urban Local Bodies	-	Member
ix.	Regional Director, ROHFW, GoI	-	Member
x.	DHS/ Director, Public Health	-	Member
xi.	State Surveillance Officer	-	Member-Secretary

The Crisis Management Group (CMG) would meet on regular basis during the crisis. Otherwise it would meet every six months to review the response preparedness. To facilitate decision making, the CMG would co-opt as many members as necessary, depending upon the nature and context of the biological disaster.

Annexure-VIII

Grading template for HEOC activation

Grading Template			
Incident name			
Done by technical team			
Date		**Participants**	
Time			
Chair			
Minutes taken			
State name			
Emergency Type			
Grading level decision (e.g. Grade 1, 2,3)			
Agenda (Grading meeting for ...)			
Situation analysis – summary			
Risk assessment – summary			
Assessment of grading criteria Scale (provide assessment for each): 1. Increased number of cases 2. Geographical spread 3. Urgency 4. Complexity 5. Capacity			
Names and contactsof key staff			
Immediate actions			

Agreed Immediate Next Steps			
Action	**Details**	**Person responsible**	**Date**
	1.		
	2.		
	3.		
Decision and approval by leadership Comment: Approval:		Signature:	

Annexure-IX

Incident action plan template

Incident Action Plan (IAP)			
Incident Name and Incident Action Plan Version			
Incident Name		**IAP Type**	Initial Update Final
Operational Period (Date / Time)		**HEOC Activation Level**	
Risk level			
Functional IRS Position	**Name**	**Email**	**Phone**
IRS Management Leadership and Staff			
Incident Commander			
Deputy /CMO I/c			
Core IRS Functions			
Operations Section			
Plans Section			
Logistics Section			
Expanded IRS Functions			
Liaison Officer			
Public Information Officer			
Expanded Operations Branch			
Current Operations Branch			
Laboratory Branch			
Case Management Branch			
Epidemiology Branch			
Situation / Actions for Current Operational Period			
Background			

Current Activities	
Ministry / Department Response Mission	
Response Mode Critical Information Requirements (CIRs)	

Planning Assumptions
Evidence-based facts and assumptions in the context of developing the plan
Response Objectives
SMART: Specific, Measure, Achievable, Realistic, Timeframe
Response Strategies
Sections / Functional Area Operational Objectives / Expected results
Response activities

Sr. No.	**Activity/Task**	**Person Responsible**	**Cost**	**Completion Date**

Triggers that may increase the Response Tempo and / or raise the Response Level

Triggers that may return Centralized Response Operations to a Programme Management Level
Pending Briefings for Operational Period
Scheduled Meetings for the Operational Period
Safety and Security Concerns of teams deployed, if any
Place a visual depiction of the incident location or locations here
Current Organization

Annexure-X

Template for Summary of incident update to higher authorities

Incident update to Higher authority	
As of (dd/mm/yyyy)	**Updates**
Situation Update Very brief summary	
Actions Undertaken Very brief summary in bullet points	
Issues and Challenges Highlight major issues and challenges that require leadership attention	
Next Steps for Decision Bullet points that require high level decision	
EOC Contact Physical address, email, tel.	

Annexure-XI

Sign-in sheet

The sign-in sheet is used to keep a record of all persons who utilize the HEOC. The purpose of this log is to monitor utilization as well as to assist with recreating the event for after-action reviews after response operations have concluded. Each individual must sign in and out upon entering and exiting the room.

Sr. No.	Date	Name	Designation	Sign in time	Sign out time

Annexure-XII

Regular facility checklist

S. No.	Item/equipment	Date	Status	Covered under AMC	Remedy