

Thimphu Dzongkhag
Department of Local Governance and Disaster Management
(DLGDM)
National Center for Hydrology and Meteorology (NCHM)
Japan International Cooperation Agency (JICA)

STANDARD OPERATING PROCEDURE FOR FLOOD DISASTER MANAGEMENT

Ver. 1.0

Thimphu Dzongkhag
Kingdom of Bhutan

June 2024



Standard Operating Procedure for Flood Disaster Management for Thimphu Dzongkhag, Kingdom of Bhutan

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ABBREVIATION

Abbr.	Full Name
AWLS	Automatic Water Level Station
DDM	Department of Disaster Management, Ministry of Home and Cultural Affairs (Former name)
DDMC	Dzongkhag Disaster Management Committee
DDMO	Dzongkhag Disaster Management Officer
DEOC	Dzongkhag Emergency Operation Center
DLGDM	Department of Local Governance and Disaster Management, Ministry of Home Affairs
DM	Disaster Management
DMCP	Disaster Management and Contingency Plan
DPRD	Disaster Preparedness and Response Division, DLGDM
EOC	Emergency Operation Center
EWS	Early Warning System
FFEWS	Flood Forecast and Early Warning System
FMCRC	Flood Monitoring and Command Room, NFWFC, NCHM
HWRSD	Hydrology and Water Resources Services Division, NCHM
ICS	Incident Command System
JICA	Japan International Cooperation Agency
NCHM	National Center for Hydrology and Meteorology
NDMA	National Disaster Management Authority
NEOC	National Emergency Operation Center
NFWFC	National Weather and Flood Warning Center, NCHM
SAR	Search and Rescue
SOP	Standard Operating Procedure
WCSD	Weather and Climate Services Division, NCHM

CHAPTER 1 Introduction

1.1 Background

The Flood Forecast and Early Warning System (FEWS) for Thimchhu (Thimphu River) Basin was established in 2024 for the threatening residents living in the vulnerable flood prone communities along the Thimchhu to evacuate to safe evacuation sites safely during threatening disaster situation or disaster. The FFEWS operating 24/7 was established by the Nacional Center for Hydrology and Meteorology (NCHM) as a part of JICA Technical Cooperation Project for “Capacity Enhancement of Meteorological Observation, Forecasting and Flood warning, for disaster preparedness and response in Thimphu and Thimchhu Basins” (the Project).

This Standard Operating Procedure (SOP) was prepared as a part of the Project for Thimphu Dzongkhag to manage flood disaster responding from preparedness during normal time to response during threatening disaster situation or disaster along with the installation of abovementioned FFEWS. This SOP was prepared with attention to 1) utilization of the FFEWS aforementioned, 2) the roles required of disaster preparedness and response related agencies such as Dzongkhag, Department of Local Governance and Disaster Management (DLGDM) and NCHM and 3) practical and sustainable implementation system based on the capacity and organizational structure of each agency.

1.2 Scope of SOP

Thimphu Dzongkhag formulated the Disaster Management and Contingency Plan (DMCP) in 2019 in accordance with the Section 77 of the Disaster Management (DM) Act of Bhutan 2013. The DMCP includes multi-hazard disaster management action plan and response.

This SOP, on the other hand, focused on the flood disaster management based on the FEWS for Thimchhu Basin responding from preparedness during normal time to response during threatening disaster situation or disaster. Thimphu Dzongkhag Disaster Management Committee (DDMC), especially its Dzongkhag Disaster Management Officer (DDMO) is assumed to be the main user of this SOP.

The objective flood disasters for the FEWS are large scale flood disasters, which may cause wide area of Dzongkhag level flood inundation by the overflow of the Thimchhu mainstream, not isolated nor small scale Gewog level inundation. Therefore, this SOP mainly deals with Type II disaster, which can be managed with available resources and is within the coping capacity of the Dzongkhag concerned as stipulated in the Section 94 of the DM Act 2013.

Therefore, the basic concept of the SOP is as follows:

Concept of the SOP on the Flood Disaster Management for Thimphu Dzongkhag

- The SOP covers the flood disaster management based on the FEWS for Thimchhu Basin responding from preparedness during normal time to response during threatening disaster situation or disaster in Thimphu Dzongkhag, and not deal with multi-hazard action plan and

response.

- The SOP is utilized by Thimphu Dzongkhag Disaster Management Committee (DDMC), especially its Dzongkhag Disaster Management Officer (DDMO).
- The SOP deals with Dzongkhag level Type II disaster, which may cause wide area of flood inundation by the overflow of the Thimchhu mainstream.
- The SOP shall be a reference document for the DMCP stipulated in the Disaster Management Act 2013.

CHAPTER 2 Background Knowledge on Flood Disaster Management

2.1 Flood Hazard Map for Thimchhu Basin

The flood hazard map for Thimchhu (Thimphu River) Basin was prepared by NCHM in 2024 through the Project. The flood hazard map and the facilities and communities vulnerable to flood in Thimphu Dzongkhag is as shown in Figure 2.1.

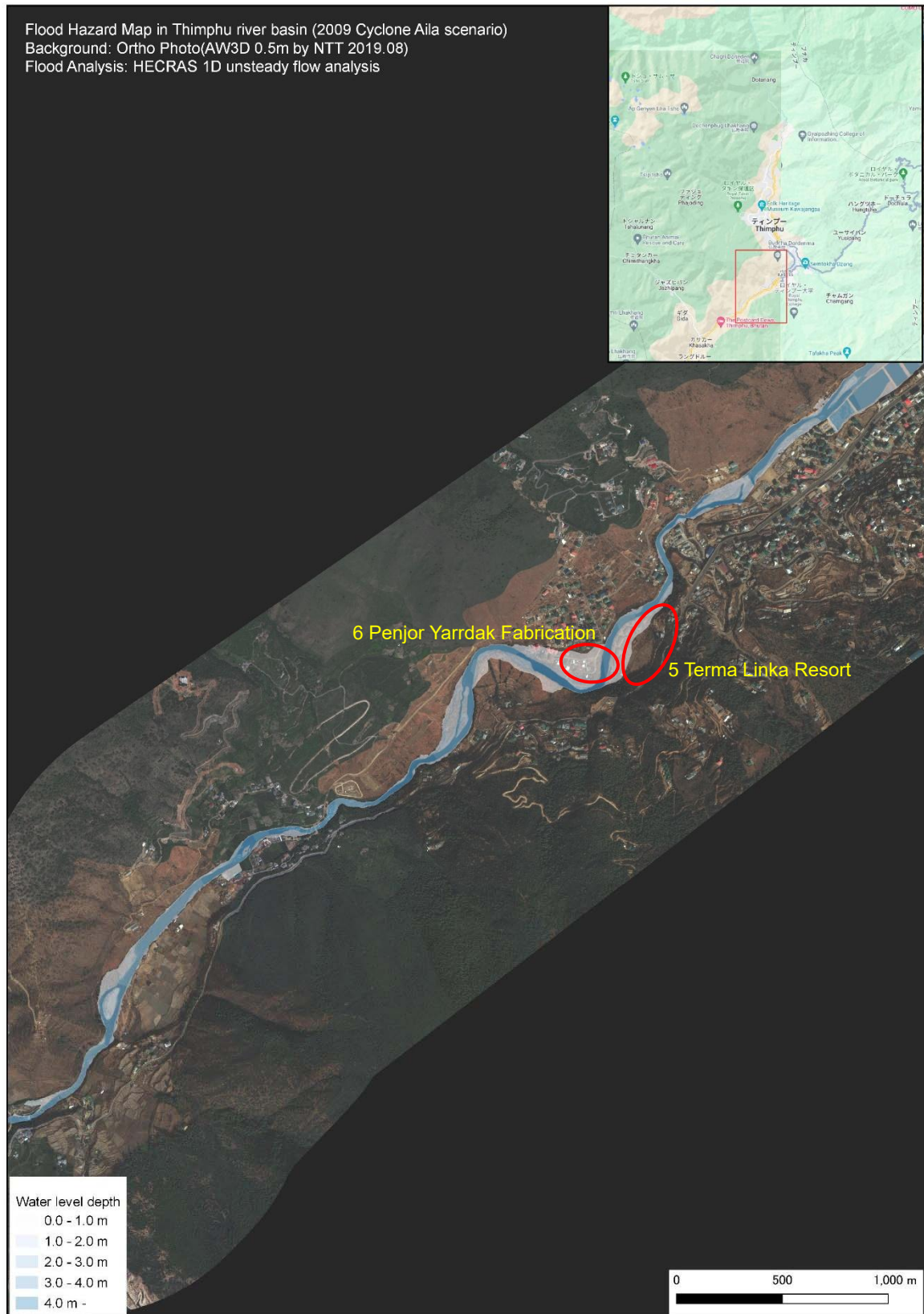


Figure 2.1 Facilities and communities vulnerable to flooding along Thimchhu

2.2 Flood Early Warning System for Thimchhu Basin

The Thimchhu FFEWS established in 2024 by NCHM will issue the Evacuation Alert and Alarm for the facilities and communities vulnerable to flood along the Pachhu to evacuate to safe evacuation sites safely during threatening disaster situation or disaster. The schematic outline of the FFEWS operating 24/7 is as shown in Figure 2.2.

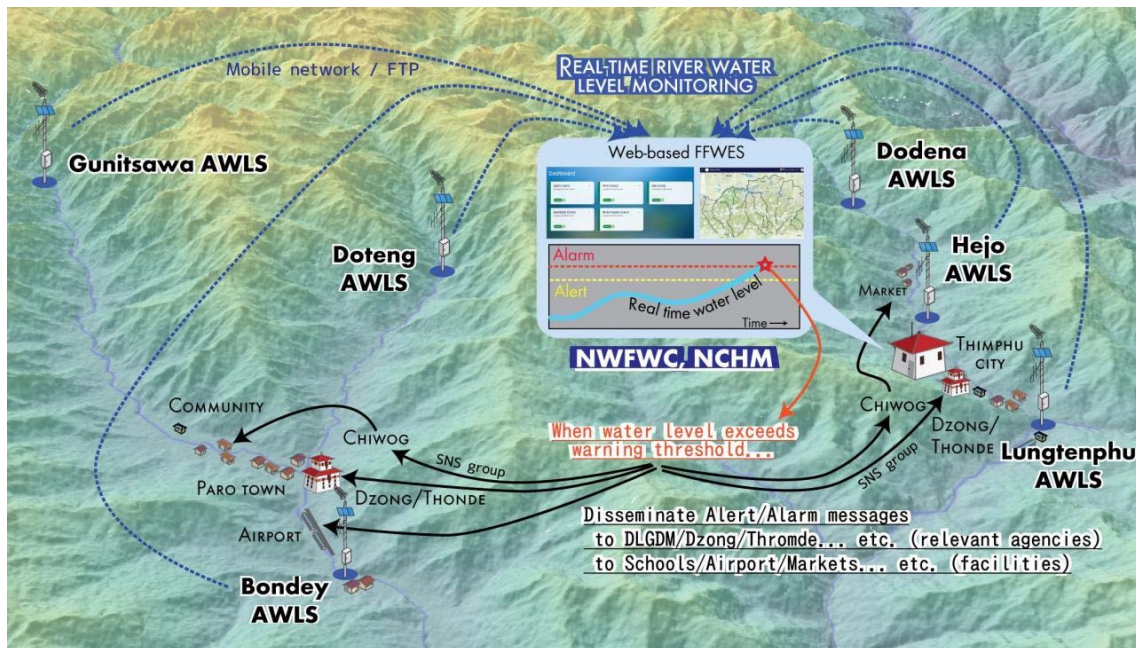


Figure 2.2 Schematic outline of the FEWS

CHAPTER 3 Roles of Relevant Agencies on Flood Disaster Management based on FEWS

3.1 Dzongkhag

The roles and responsibilities of the relevant agencies on the flood disaster management based on the Flood Forecast and Early Warning System (FFEWS) for Thimchhu (Thimphu River) Basin installed by the National Center for Hydrology and Meteorology (NCHM) in 2024 are as follows:

3.1.1 Dzongkhag Disaster Management Committee

The roles and responsibilities of Dzongkhag Disaster Management Committee (DDMC), headed by the Dzongdag, who shall be the *ex-officio* Chairperson, to respond threatening flood disaster situation or disaster are *excerpted* from “Chapter 3 Dzongkhag Disaster Management Committee” of the DM Act 2013 as follows:

<Function of Dzongkhag Disaster Management Committee>

30. The DDMC shall be responsible for coordinating and managing all disaster management operations in the Dzongkhag under the direction and supervision of the National Disaster Management Authority (NDMA).

31. The DDMC shall:

- g) Ensure that information about an event or a disaster is promptly communicated to the NDMA, Department of Disaster Management (DDM) and all concerned;
- h) Ensure that the damage assessments in the field are carried out professionally and efficiently without fear or favor
- i) Coordinate and support disaster response and relief operation including recovery and reconstruction.
- j) Ensure that detailed reports and regular updates on disaster event is provided to the DDM upon completion of field assessment of the situation;

32. In the case of a disaster, the Chairperson of the DDMC may exercise all or any of the functions of the DDMC, subject to *ex post facto* ratification of the committee.

<Function of Chairperson>

38. Without prejudice to the generality of the provision contained in section 37 of this Act, the Chairperson of the DDMC shall:

- d) Provide prompt information on a disaster or an impending disaster situation to the DDM;
- e) Provide regular updates and detailed reports on a disaster event to the DDM upon completion of field assessment of the situation;
- f) Manage response and relief operation in accordance with the directives issued by the NDMA; and
- g) Coordinate delivery of services and resources to disaster affected communities.

3.1.2 Dzongkhag Disaster Management Officer

As stipulated in the DM Act 2013, the Dzongkhag Disaster Management Officer (DDMO) shall be the Member-Secretary of DDMC. The roles and responsibilities of DDMO to respond threatening flood disaster situation or disaster are stipulated in the DM Act 2013 as follows:

64. Subject to the direction of the DDM/Secretariat of NDMA, the DDMO shall:

<Note: The followings are only *excerpted* items from Section 64 related to the management of threatening flood disasters.>

- f) Coordinate response and relief operation during a disaster;
- h) Maintain, update and ensure efficient functioning of the Disaster Management Information System;
- j) Ensure timely submission of a report to the DDM on the occurrence of disaster or threatening disaster situation; and

65. Without prejudice to the generality of the provision contained in section 64 of this Act, the DDMO shall ensure the efficient functioning of the Critical Disaster Management Facility (Note: This means Dzongkhag Emergency Operation Center (DEOC) here.).

3.1.3 Dzongkhag Emergency Operation Center

So far, there is no Dzongkhag Emergency Operation Center (DEOC) has been established in Thimphu Dzongkhag. Thimphu Dzongkhag plans to establish a DEOC in the near future in accordance with the Section 105 of the DM Act 2013 as follows:

105. There shall be a National Emergency Operation Centre (NEOC) established by the DDM including DEOCs.

As stated in the DM Rules and Regulation 2014, the Chairperson of a Committee (DDMC) shall head the DEOC during threatening disaster situation or disaster. The DDMO shall be the Officer in-charge of a DEOC during normal times. A DEOC shall be manned by two full time technicians.

The roles and responsibilities of DEOC to respond threatening flood disaster are *excerpted* from “Chapter 5 Emergency Operation Centre” of the DM Rules and Regulation 2014 as follows:

<Objectives of the Emergency Operation Centre (EOC)>

65. An EOC shall be the information nerve centre and command and control centre for coordination and management of disasters.

66. An EOC shall provide centralized direction and control of any or all of the following:

- (a) receive disaster alerts and warnings from Responsible Agencies and other sources and communicate the same to all relevant agencies;
- (b) issue incident specific information and instructions to all concerned;
- (c) forward reports to all relevant agencies;

- (d) monitor response and relief operations;
- (e) facilitate coordination among agencies providing Critical Disaster Management Facilities;
- (f) facilitate coordination of response and relief operations;
- (g) requisition resources during disaster;
- (h) perform such other functions as may be directed by the Authority and in the case of DEOC by a Committee.

<Operations>

67. The NEOC shall generally supervise and direct the functioning of DEOC and DEOC shall supervise and direct the functioning of Dungkhag, Gewog or Thromde EOC, if any.

69. The Chairperson of a Committee may require competent personnel from other agencies to be present at the DEOC to coordinate and assist in taking prompt decisions during response and relief operations.

<Communication Network of EOC >

73. All EOC shall have a reliable communication network as prescribed in the Emergency Telecommunication Plan.

74. All DEOC shall be linked with the NEOC network and shall be functional throughout the year.

<Monitoring>

75. An EOC concerned shall, once an early warning has been issued to an affected area, implement real-time monitoring in collaboration with responsible agency.

76. An EOC shall be responsible for:

- (a) monitoring the transmission of warning;
- (b) monitoring the effectiveness of warning based on community reaction to it; and
- (c) gathering information on the incident and updating and disseminating information on response and relief operations.

77. The reports on the effectiveness of warning should be fed back to the Responsible Agency in order to facilitate further warning message.

<Resource Requests>

78. All resource requests during disaster shall be made by site responders to the DEOC concerned, which shall be promptly communicated to agency concerned.

<Decision Making>

79. All decisions made in the EOC shall be based on available information.

80. The EOC shall make its decision in consultation with relevant agencies.

<Documentation>

81. All decisions made and actions taken during a disaster shall be documented in the format developed by DDM for record keeping.

82. The EOC is responsible for ensuring that all records are complete and available in the event of a public inquiry.

3.2 Department of Local Governance and Disaster Management

The Department of Local Governance and Disaster Management (DLGDM) shall support Dzongkhag from preparedness during normal time to response during threatening flood disaster or disaster. DLGDM shall also coordinate with NCHM operating the FFEWS for Thimchhu basin, and serve as an intermediary between the Dzongkhag and NCHM.

The roles and responsibilities of DLGDM to respond threatening flood disaster situation or disaster are *excerpted* from their functions as follows. Especially, the Preparedness and Response Division (PRD) plays an important role from the preparedness during normal time to the response during threatening flood disaster or disaster.

<Disaster Preparedness and Response Division (DPRD), DLGDM>

1. Establishing and operationalizing Emergency Operation Centers (EOC) at the national, Dzongkhag and Thromde levels.
2. Ensuring the functioning of the National Emergency Operation Center and the development of related SOP.
3. Ensuring an effective and efficient disaster communications network for the country.
4. Liaising with other relevant sectors and agencies to institute early warning systems (EWS) for various natural hazards and disaster risks.
5. Determining community participation in the development of EWS and ensuring the last mile communication.

The roles and responsibilities of DLGDM to respond threatening flood disaster are stipulated in the DM Act 2013 as follows:

<Secretariat to the NDMA>

59. The DDM/Secretariat of NDMA shall serve as the secretariat and executive arm of the NDMA and also function as the National Coordinating Agency for disaster management.

<Function of the Department/Secretariat>

60. The DDM/Secretariat of NDMA shall:

<Note: The followings are only *excerpted* items from Section 60 related to the management of threatening flood disasters.>

- g) Develop, maintain and update Disaster Management Information System in coordination with relevant agencies;
- h) Ensure the implementation of DMCP and disaster management activities at all levels;
- i) Facilitate the constitution of Disaster Management Committees and ensure its efficient functioning;
- j) Facilitate the formulation of hazard zonation and vulnerability map by relevant agencies;
- k) Facilitate and coordinate the setting up of Critical Disaster Management Facility and ensure its effective and efficient functioning;
- o) Coordinate and support DDMC during disaster response and relief operation including recovery and reconstruction;

<Operation Coordinator>

61. Upon declaration of a disaster, the Head of the DDM/Executive Head shall assume the role of Operation Coordinator under the supervision and direction of the Chairperson of the NDMA.

<Operation Coordinator>

62. The operation coordinator shall designate and direct the concerned agency to operationalize effective response and relief operations.

3.3 National Center for Hydrology and Meteorology

The National Center for Hydrology and Meteorology (NCHM), by utilizing the Thimchhu FFEWS established in 2024, will notify appropriate and on time flood related information to Thimphu Dzongkhag (DEOC), DLGDM (NEOC) and other stakeholders during threatening disaster situation or disaster.

The roles and responsibilities of NCHM to respond threatening flood disaster situation or disaster are *excerpted* from their functions as follows:

<Weather and Climate Services Division (WCSD), NCHM>

- e. Monitor extreme weather events and issue warning/bulletins/advisories.

< Hydrology and Water Resources Services Division (HWRSD), NCHM>

k. Operation of the Flood Monitoring and Command Room (FMCR) of National Weather and Flood Warning Center (NFWFC) 24/7 in coordination with the basin flood warning Control Rooms and Weather Forecasting Section of WCSD.

- l. Issue flood/GLOF early warning during the severe weather conditions.

m. Coordinate with the NEOC/DLGDM, Hydropower Plants and others regarding the inter-agencies Flood forecasting and warning.

n. Prepare and issue flood and inflow forecasts of the selected river basins and sub-basins.

On December 5, 2019, the Government Order “Authorization of NCHM as the Hydro-met Hazard Early Warning Service Provider” was issued. The roles and responsibilities of NCHM on flood disaster management was officially defined by the Order as follows:

This is to notify that the NCHM is hereby identified as the Hydro-met Hazard Early Warning Service Provider in the country in line with Section 108 of the DM Act of Bhutan 2013, to ensure early warning system for identifying Hydro-met hazards and to notify all vulnerable population and responding agencies of the threatening disaster situation or disaster in the country.

The 7th NDMA Meeting authorizes the NCHM as the Hydro-met Hazard Early Warning Service Provider in the country.

The NCHM is hereby instructed to immediately function as the Hydro-met Hazard Early Warning Service Provider in the country.

This Executive Order is being issued for immediate compliance.

CHAPTER 4 Preparedness and Response Actions for Flood Disaster Management

4.1 Preparedness Actions during Normal Time

The following preparedness actions for flood disaster management are to be taken during normal time.

4.1.1 Ensuring the Effectiveness of Flood Disaster Response Systems

(1) Ensuring overall implementation system for flood disaster response operations

The following points should be taken into consideration in order to ensure overall implementation system for flood disaster response operations.

1. Consider establishing a Dzongkhag Emergency Operation Center (DEOC) at the Dzongkhag so that disaster countermeasures can promptly be implemented in each flood prone communities according to the actual conditions of the area.
2. In order to prevent the staff operating the DEOC (Dzongkhag Disaster Management Officer (DDMO) and two full time technicians) from becoming overburdened and dysfunctional during threatening flood disaster, it is necessary to ensure that the various disaster response tasks are shared among the various staff members within the Dzongkhag in line with the Incident Command System (ICS). Therefore, by actively utilizing not only the member of Dzongkhag Disaster Management Committee (DDMC) but the Dzongkhag staff who are not involved in disaster response operations other than the staff operating the DEOC, the DDMO shall conduct training and awareness-raising for the Dzongkhag staff from normal times so that they can respond to disasters promptly and accurately, especially during initial response.

(2) Ensuring staff mobilization system based on flood disaster

The following points should be taken into consideration in order to ensure the staff mobilization system based on flood disaster.

1. Consider the system for mobilization of the DDMC and the Dzongkhag staff in case of flooding, taking into account that some staff may not be able to come to the Dzongkhag depending on the situation and that it may take time to hand over flood related information from one staff to another.
2. After flooding happens, the emergency mobilization of the DDMC and the Dzongkhag staff will be carried out as soon as possible, while giving due consideration to ensuring the safety of the staff.

(3) Securing independent DEOC space

The following points should be taken into consideration in order to secure independent DEOC space.

1. In order to facilitate information sharing and coordination with Dzongkhag officials and related agencies that are implementing flood disaster response and to realize a prompt response to flood

disasters, the DEOC will have a separate space from the offices in the Dzongkhag during normal times.

2. Ensure that the DEOC is spacious enough from the outset, as too little space will reduce its functionality.

For reference, the standard layout for DEOC prepared by DLGDM in 2020 is as shown in Figure 2.3 and the list of the standard equipment for DEOC prepared by the Project in 2022 is attached as Appendix 1. However, as there is no such a independent DEOC building so far, it is necessary to secure a large meeting room in and around the Dzongkhag as an interim measure.

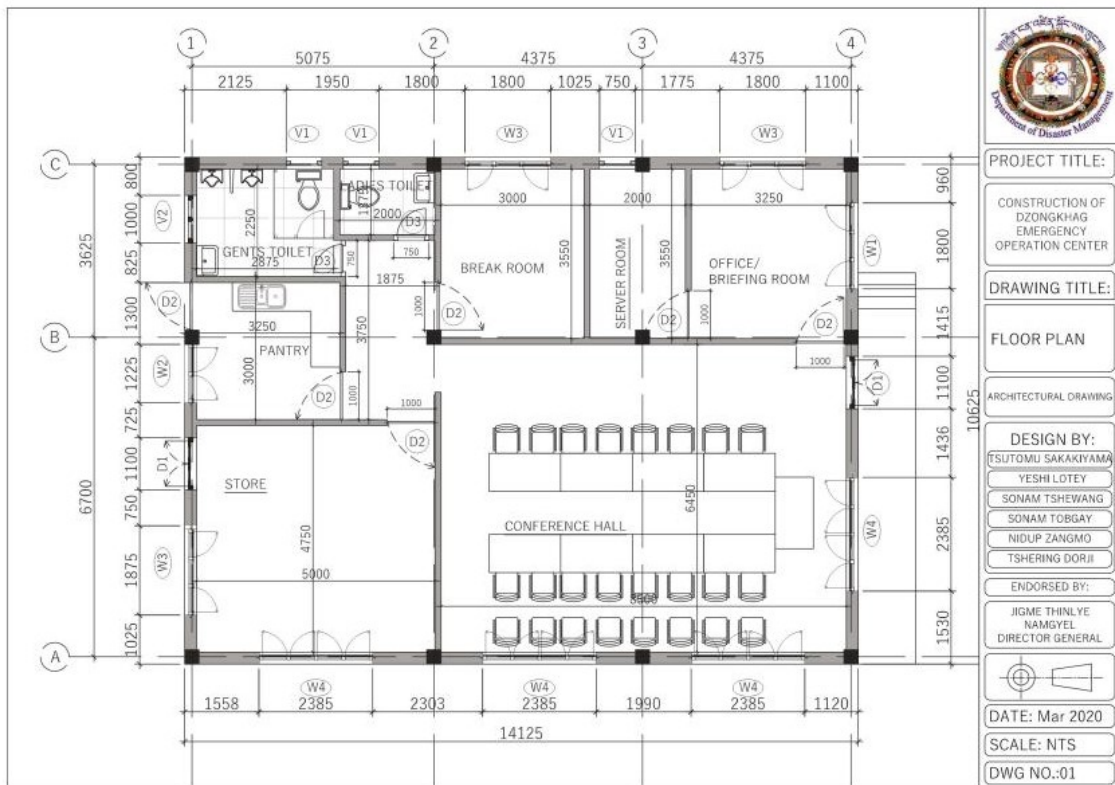


Figure 2.3 Standard layout for DEOC (DLGDM, 2020)

(4) Secure equipment that can receive and transmit information reliably

The following points should be taken into consideration in order to secure the equipment that can receive and transmit information reliably.

1. The DDMC (DEOC) shall ensure that multiple means of communication are in place to ensure that information is received and transmitted to and from the various agencies involved in flood disaster management, including DLGDM and NCHM.
2. In particular, secure the equipment with non-public numbers (e.g., land line, mobile phone, Iridium satellite phone, VHF digital handset and walkie-talkie) in the DEOC.
3. Install an emergency generator at the DEOC to ensure that communication means are not disabled due to a power outage and fuel will be stockpiled to enable continuous operation for 72 hours

(ensure business continuity).

4. DEOC shall conduct the drill to turn off commercial power and run emergency generator once a year.

(5) Consideration of staff mobilization system based on prolonged flood disaster

The following points should be taken into consideration in order to consider the Dzongkhag staff mobilization system based on prolonged flood disaster.

1. Considering the prolonged nature of flood disasters, consider rotating Dzongkhag staff who respond to flood disasters.
2. Pay close attention to health management and psychological care, as flood disaster response duties often place a tremendous physical and mental burden on the staff.

4.1.2 Collection of Flood Disaster Information

(1) Building face-to-face relationships with relevant agencies from normal time

The following points should be taken into consideration in order to build the face-to-face relationships with relevant agencies from normal time.

1. DDMC (DDMO) shall communicate closely with DLGDM, NCHM, and other related agencies during normal times to ensure smooth disaster response in the event of flood disasters.
2. Collaborate with NCHM, which has expertise and technical knowledge on flood disaster and operates the FFEWS for Thimchhu (Thimphu River) Basin 24/7 basis, to share information and exchange views during normal time.

(2) Establishment of a hotline between Dzongdag and NCHM from normal time

The following points should be taken into consideration in order to establish a hotline between Dzongdag and NCHM.

1. Apart from the normal communication line between the DDMC (DEOC) and the Flood Monitoring and Command Room (FMCR) of NWFWC, NCHM, which operates the FFEWS for Thimchhu Basin 24/7, a mechanism during threatening flood disaster situation (hotline) shall be established for Dzongdag, the chairperson of the DDMC to directly request advice from NCHM on the status and outlook of the Thimchhu water level and the timing of issuing evacuation Alert.

4.1.3 Raising Residents' Awareness "Protect Your Own Life by Yourself"

The following actions shall be conducted to raise residents' awareness "Protect Your Life by Yourself".

1. DDMC (DDMO) shall use the Flood Hazard Map for Thimchhu Basin to disseminate the information on the local flood risks and evacuation actions to be taken in the event of flood disaster to residents living in flood prone areas, along with mock drills.
2. Conduct annual disaster prevention education along with mock drills before the monsoon season

in elementary and junior high schools located in flood prone areas.

4.1.4 Flood Disaster Mock Drill

Thimphu Dzongkhag, by the coordination of DDMO, in cooperation with DLGDM and NCHM shall conduct flood disaster mock drill time to time (minimum once in a year) for the early warning and evacuation to be more efficient and effective by utilizing the FFEWS for Thimchhu Basin of NCHM operating 24/7.

The safe evacuation sites for the vulnerable residents living in the flood prone communities along Thimchhu are attached as Appendix XX. The scenario and procedure for the flood disaster mock drill for the vulnerable communities along the Thimchhu prepared is attached as Appendix 2.

4.2 Response Actions during Threatening Flood Disaster Situation or Disaster

The following response actions for flood disaster management are to be taken during threatening flood disaster situation or disaster.

4.2.1 Communication and Information Flow based on FEWS

The general communication and information flow between relevant agencies, communities and stakeholders during threatening flood disaster or disaster based on the Flood Forecast and Early Warning System (FFEWS) for Thimchhu Basin (in Thimphu Dzongkhag part) operating 24/7 is as shown in Figure 4.1.

The Dzongkhag (DEOC) shall seek advice from the Flood Monitoring and Command Room (FMCR) of the National Weather and Flood Warning Center (NFWFC) in NCHM on the future water level of the Thimchhu, rainfall prospects, hazardous areas expected to be at risk due to flood hazards, and the timing of issuing evacuation Alert, etc., as the situation requires.

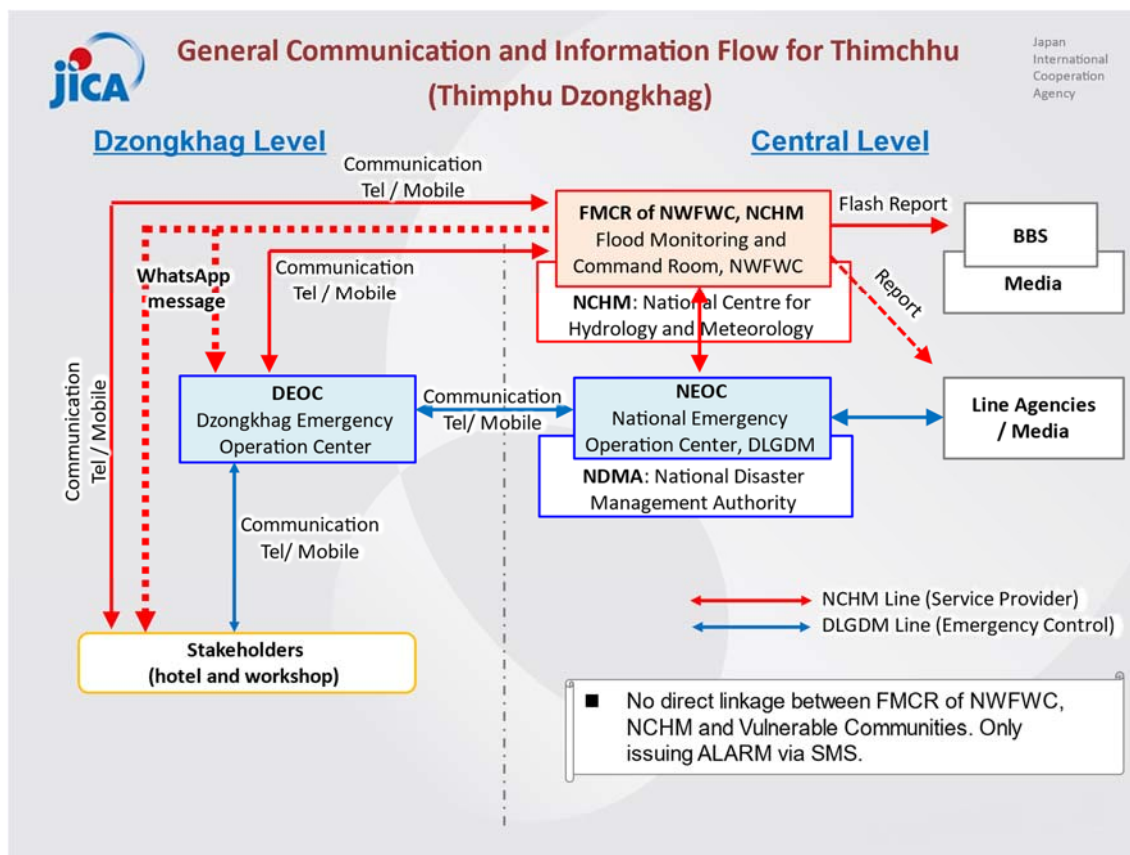


Figure 4.1 General communication and information flow in Thimchhu Basin in Thimphu Dzongkhag

4.2.2 Response Actions during Threatening Flood Disaster Situation

The response actions by Dzongkhag during threatening flood disaster situation are *excerpted* from the “Chapter 11 Response Phase” of the DM Rules and Regulation 2014 as follows:

169. A Committee (DDMC) shall, upon activation of trigger mechanisms, be responsible to manage response and relief operations under the direction and supervision of the Authority.

170. A Committee concerned shall:

<Note: The followings are only *excerpted* items from Rule 170 related to the response actions during threatening flood disaster situation.>

- (a) activate the DEOC;
- (b) activate Critical Disaster Management Facilities in coordination with the notified agency under rule 47 of these regulations;
- (c) establish immediate contact and line of communication with the disaster site;

171. The Chairperson of a Committee shall:

<Note: The followings are only *excerpted* items from Rule 171 related to the response actions during threatening flood disaster situation.>

- (a) operationalize the incident command system for effective response and relief operation;
- (b) maintain the DEOC on a 24 hour basis;

4.2.3 Issuance of Evacuation Alert and/or Alarm Messages and Evacuation

Basically, the Flood Forecast and Early Warning System (FFEWS) for Thimchhu Basin of NCHM operating 24/7 is not configured to automatic mode on the warning process. Therefore, the FMCR of NFWFC, NCHM operate the FFEWS manually and monitors the process and keeps in communication with Dzongkhag and stakeholders.

The DDMO and Dzongdag who is the Chairperson of DDMC and the final decision maker of emergency response in the Dzongkhag level shall communicate and receive the flood situation information from the FMCR.

The procedure of the issuance of evacuation Alert and/or Alarm messages by the FMCR using the FFEWS via WhatsApp group is as follows:

1. The FMCR shall send weather bulletins to the pre-registered stakeholders (relevant agencies and facilities) in the flood prone areas along the Thimchhu via WhatsApp group when there is a threat of flooding in the near future due to heavy rainfall.
2. The FMCR shall issue the evacuation Alert (prepare for evacuation) and/or Alarm (start evacuation) messages to the pre-registered stakeholders via WhatsApp group upon the flood water level of Thimchhu exceeds the Alert and/or Alarm levels at the Automatic Water Level Stations (AWLS) installed along the Thimchhu. (refer to Figure 4.2)
3. The DDMC members, the registered relevant government agencies and stakeholders shall receive the evacuation Alert and/or Alarm messages from the FMCR via WhatsApp group.
4. The DDMO shall make phone calls to the registered stakeholders to confirm they have received the evacuation Alert and/or Alarm messages.
5. Upon the stakeholders receive the evacuation Alert and/or Alarm messages, the stakeholders shall immediately start the evacuation to designated safe evacuation sites (high grounds or upstairs).

The specific information flow of the evacuation Alert and/or Alarm messages is as shown in the Figure 4.3.

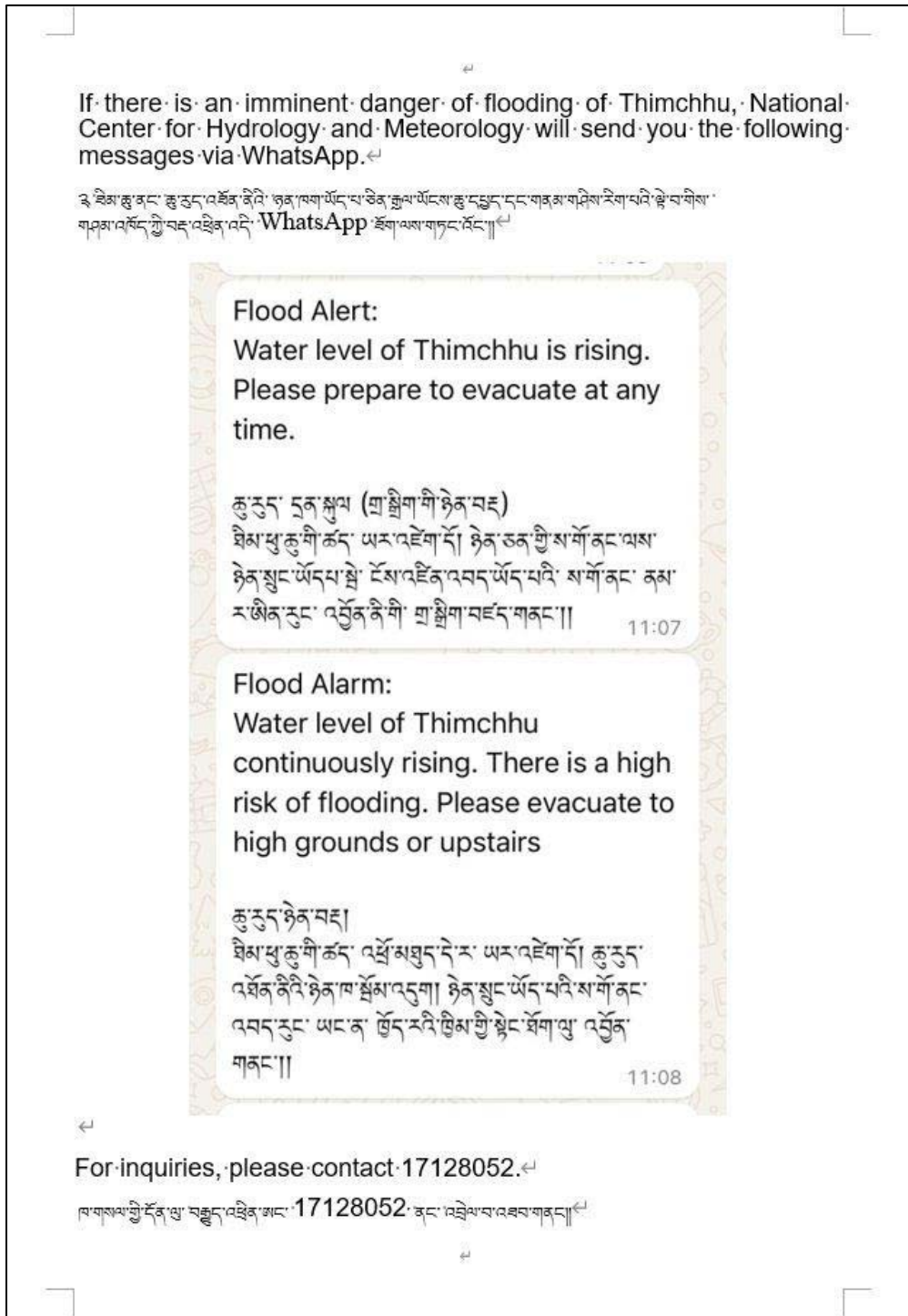


Figure 4.2 NCHM WhatsApp flood warning messages for Thimchhu

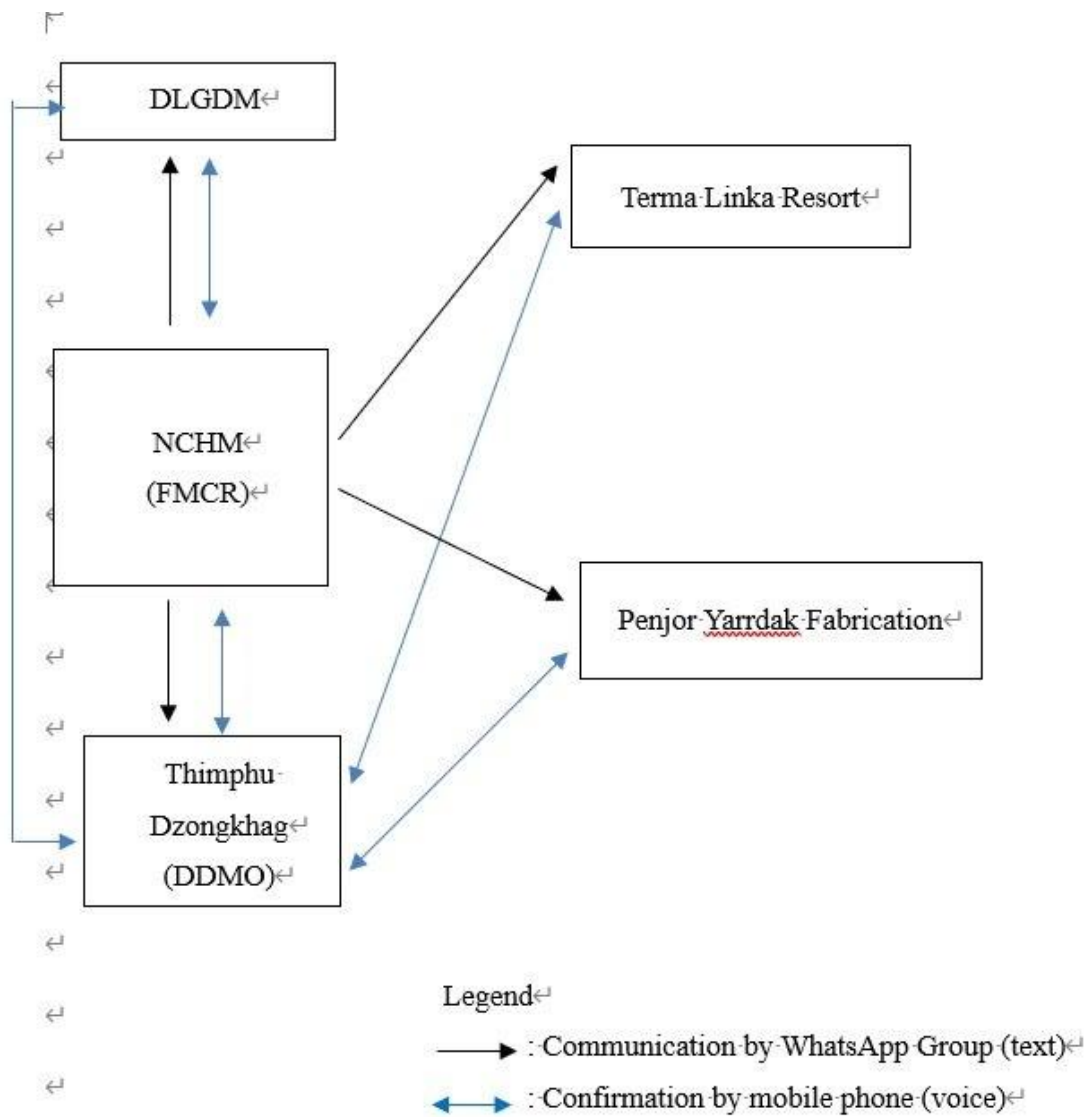


Figure 4.3 Flood early warning message flow for Thimchhu in Thimphu Dzongkhag

4.2.4 Response Actions after FEWS issues Evacuation Alert to Residents

The response actions by Dzongkhag after the FMCR, NCHM issues the Evacuation Alert message to the registered relevant government agencies and stakeholders via messaging apps are *excerpted* from “Chapter 11 Response Phase” of the DM Rules and Regulation 2014 as follows:

170. A Committee concerned shall:

<Note: The followings are only *excerpted* items from Rule 170 related to the response actions during flood disaster situation.>

- (d) direct evacuation of the disaster affected communities or communities at further risk;
- (e) provide regular updated information to the NEOC;
- (f) conduct needs assessment for humanitarian assistance; and
- (g) perform such other function as may be prescribed under these regulations or any law in force or as directed by the Authority.

171. The Chairperson of a Committee shall:

<Note: The followings are only *excerpted* items from Rule 170 related to the response actions during flood disaster situation.>

- (c) deploy Search and Rescue (SAR) Teams or other specialized agencies, if necessary;
- (d) manage immediate response and relief operations;
- (e) manage national and international disaster assistance and other human resources in the field for response, relief and early recovery;
- (f) perform such other function as may be prescribed under these regulations or any law in force or as directed by the Authority, DDM or Committee concerned.

172. The Chairperson of a Committee shall, oversee the distribution and use of relief items including the distribution process to determine equitability, adequacy and appropriateness of the relief items.

Based on the above, the DMCP for Thimphu Dzongkhag 2019 detailed the SOP for response actions as follows:

- a. In case of receiving early warning of an impending disaster situation, the DDMC Chairperson shall immediately activate the Dzongkhag Emergency Operation Centre and relay the early warning to all the Gewog/Thromde offices along with orders for evacuation, deployment of Search and Rescue Teams or any other response as required.
- b. In case of a Type II Disaster
 - i. The DDMC Chairperson shall activate the DEOC and be in contact with the National Emergency Operation Centre (NEOC). NEOC shall supervise the functioning of the DEOC as per clause 107 of the DM Act of Bhutan 2013.

- ii. DDMC shall establish contact and line of communication with disaster site and provide immediate response and relief within their capacity and submit for SAR and other response needs to NEOC, if required.
 - iii. DDMC shall direct evacuation of disaster-affected communities to safe areas and temporary shelters.
 - iv. DDMC shall manage all human and material resources in the field for response, relief and early recovery.
 - v. DDMC shall immediately submit “First Information Report” (FIR) to the DDM along with request for declaration of Type II Disaster (Form I).
 - vi. DDMC shall conduct rapid needs assessment as per Bhutan Disaster Assessment (BDA) tool within 72 hours.
 - vii. DDMC shall conduct detailed damage assessment along with insurance companies for relief and early recovery and submit report to DDMC.
 - viii. DDMC shall provide relief and early recovery/ immediate restoration support as per damage assessment using available funds at Dzongkhag level and submit expenditure report and bills to DDM for further submission to Ministry of Finance for reimbursement.
 - ix. Dzongkhag shall seek for extension of Type II Disaster as per Form III.
- c. In case the incident is beyond the coping capacity of the Dzongkhag, request for up-gradation of disaster from Type II to Type III shall be submitted to the NDMA.

4.2.5 Termination of Emergency Situation

The emergency flood disaster situation of the Thimchhu Basin will terminate when the water level of the Thimchhu falls below the Alert level as well as there is no possibility of future heavy rainfall as follows:

1. The FMCR of NWFWC, NCHM shall issue a message indicating that the water level has dropped below the Alert level to the pre-registered government agencies and stakeholders in the flood prone areas along the Thimchhu via WhatsApp group upon the flood water level of Thimchhu falls below the Alert level.
2. The termination of emergency flood disaster situation shall be judged by the DDMC based on the information provided by the FMCR.
3. Once safety is assured, evacuees return from their evacuation sites.

4.3 Contact List of Relevant Agencies on Flood Disaster Management

Thimphu Dzongkhag

The contacts are as follows:

No.	Name	Designation	Intercom/Tel/Mobile
1	Mr. Phub Dorji	Dzongdag	17810340
2	Mr. Tashi Gyeltshen	Dzongrab	17160582
3	Mr. Tshewang Dorji	DDMO	17752005

Department of Local Governance and Disaster Management (DLGDM)

The contacts are as follows:

No.	Name	Designation	Intercom/Tel/Mobile
1	Mr. Pasang Dorji	Director General	17998997
2	Mr. Yang Dorji	Chief Program Officer	17650223
3	Mr. Thinley Norbu	Chief Program Officer	17333084
4	Mr. Choki Tashi	Deputy Chief Program Officer	17990537

Flood Monitoring and Command Room (FMCR), NWFWC, NCHM

The TDMC members, especially TDFP is able to communicate with the FMCR of NWFWC, NCHM via public communication tools.

No.	Name	Designation	Tel/Mobile
1	Mr. Jigme Wangdi	FMCR Operator	17628951
2	Mr. Aita Singh Tamang	FMCR Operator	77396048
3	Ms. Sangay Wangmo	FMCR Operator	17474707
4	Mr. Pema Dorji	FMCR Operator	17980717
5	Mr. Wangdi	FMCR Operator	17588639

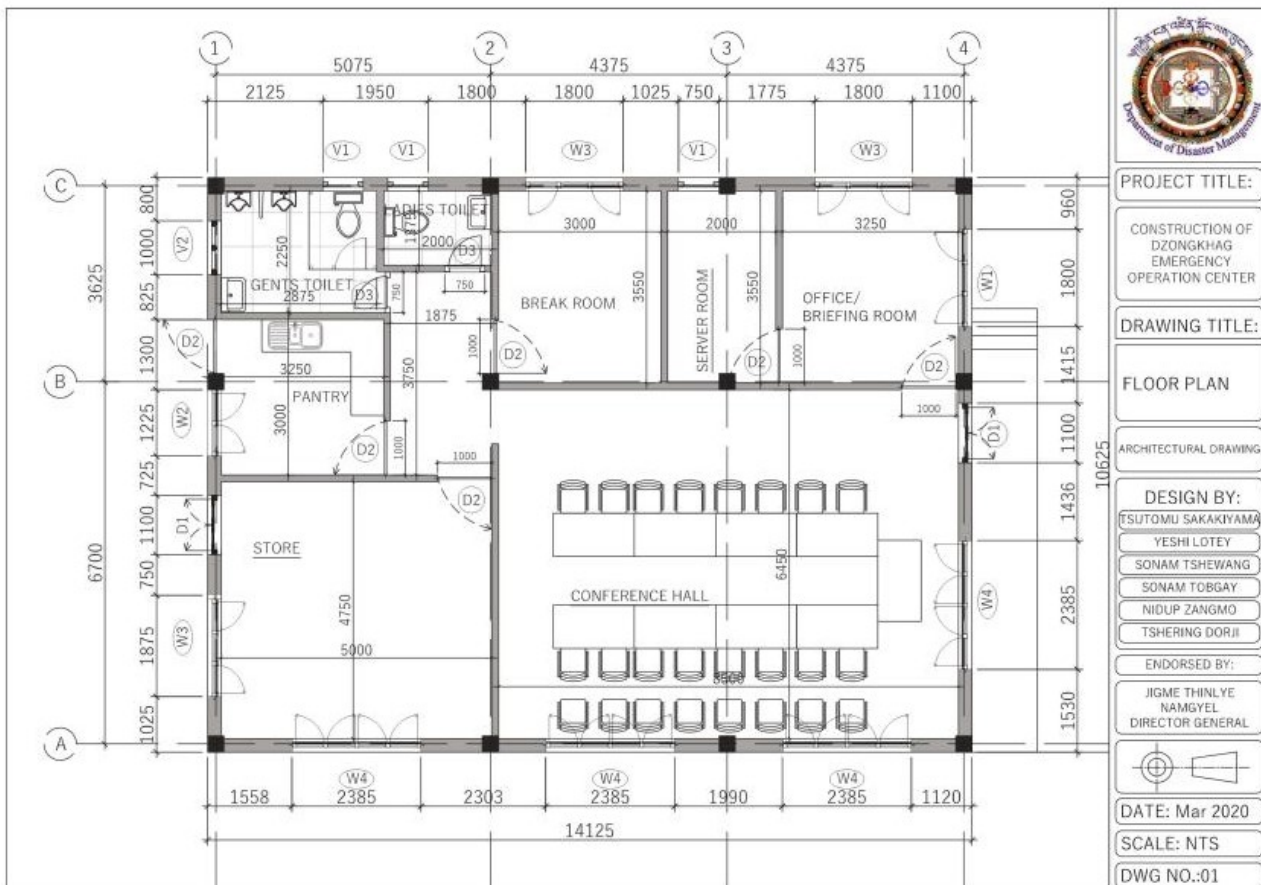
In case of no response from the FMCR of NWFWC, the TDMC members, especially TDFP shall try to communicate with below:

No.	Name	Designation	Tel/Mobile
1	Ms. Yeshe Choki	FMCR, In-charge, HWRSD	17282553
2	Mr. Sangay Tenzin	Asst. Engineer, HWRSD	17711753
3	Mr. Jamyang Phuntshok	Chief, Hydrology and Water Resources Services Division (HWRSD)	17989976
4	Mr. Tandin Wangchuk	Engineer, HWRSD	17563060
5	Mr. Karma Dupchu	Director, NCHM	17629918

APPENDICES

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| Appendix 1 | List of the standard equipment for DEOC |
| Appendix 2 | Scenario and procedure for flood disaster mock drill |
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List of the Standard Equipment for Dzongkhag/Thromde Emergency Operation Centre (DEOC/TEOC)



No	Description	Unit	Qty	Specifications
1. Conference Hall				
1	Table	No	9	OF MR 23001 Conference table (only) 2 seater members table 1400x605x750
2	Chair	No	25	Revolving chair (DW 01 Equivalent) (Imported Leather Chair)/ Revolving HAG SOFI 7300 TASK CHAIR UPHOLSTERED Equivalent /Visitor chair with arm OC 7602 or Equivalent Per number

No	Description	Unit	Qty	Specifications
3	Laptop/Desktop computer	Set	2	Processor (CPU):Intel Core i5 (sixth generation or newer) or equivalent, Memory:16 GB RAM, Storage:500 GB internal storage drive, Monitor/Display:14" LCD monitor, resolution of 1600 x 900 or better. Network Adapter:802.11ac 2.4/5 GHz wireless adapter
4	Projector	No	1	4,000 Lumens 1080p Business Projector, SuperColor™ technology, Dual HDMI inputs and USB power supply, LAN control support-Crestron, AMX, PJ Link and Extron, Auto power on, Smart Energy
5	Projector screen	Set	1	120 inches Projector Screen Projection Screen Manual Pull Down HD Screen 1:1 Format
6	White board	Set	2	Colour: white, Dimension: 3.5 feet (stand height), Input method: marker, Size:4x6 feet
7	Multifunction printer	Set	1	A device that consolidates the functionality of a printer, copier, scanner and/or fax into one machine.
8	Iridium satellite phone	No	1	Mini-USB data port, Battery life: Up to 4 hours of Talk-Time; Up to 30 hours of Standby-Time, 21 supported menu languages, Illuminated weather-resistant keypad
9	Walkie-talkie	No	3	Range: up to 2 miles subject to terrain and conditions, continuous talk time: up to 3 hours, battery life: up to 20 hours, Power source: 3AA , power output: 500mW ERP
10	Land lines	No	2	

No	Description	Unit	Qty	Specifications
11	Digital Handsets (VHF)	No	2	minimum 16 channels, 5 watt power output, narrow banding complaint, IP54 Rated Li Ion battery more than 2000mAh capacity, should include battery, charger, adapter, belt clip, antenna and user manual
2. Break Room				
1	Bunk bed (Complete set)	No	2	HF CR 11101 Bunk bed 1830 x 915 x 1830
2	Couch	No	1	OF MR 23151 Plain Jabla 3 seater DNP type with cushion 1680x650x350
3	Table	No	1	OF GR 21004 Centre table with glass top 1210 x 900 x 500
4	Chair	No	1	OF TC 26010 Chair without arm with fabric 800 x 430 x 480
5	Wardrobe	No	1	HF BR 10404 Cupboard with full door 1000 x 600 x 1800
3. Store (for 72 hours)				
1	Shelf	No	1	Book Shelves rubber wood made with front loading & sliding shutter with 4 shelves size 72inchx36inchx13inch 22
2	First-aid kits	Set	5	Essential medicines
3	Blankets	No	10	The Emergency Blanket is small, lightweight, and compact for easy transportation. Size: 52” x 82.5” (132 cm x 210 cm). Weight: 1.5 oz
4	Tents	Set	2	Water Resistant, Removable Rain Fly & Carry Bag- Easy Set Up-Great for Camping
5	Drinking water	Liter	300	25 heads * 4 liters * 72 hours
6	Food (Non-perishable)			
4. Office/ Briefing Room				

No	Description	Unit	Qty	Specifications
1	Desk	Set	1	1/2 inch thick top and side, 3mm hi pressure PVC lamination touch edge Lock and key for all storage, ex b/b/f, f/f, and lateral file cabinet, steel ball bearing drawer, 168"W x 48"D x 29"H
2	Chair	Set	2	Revolving chair (DW 01 Equivalent) (Imported Leather Chair)/ Revolving HAG SOFI 7300 TASK CHAIR UPHOLSTERED Equivalent /Visitor chair with arm OC 7602 or Equivalent Per number
3	White board	No	1	Colour: white, Dimension: 3.5 feet (stand height), Input method: marker, Size:4x6 feet
4	Desktop PC set	Set	1	Processor (CPU):Intel Core i5 (sixth generation or newer) or equivalent, Memory:16 GB RAM, Storage:500 GB internal storage drive, Monitor/Display:14" LCD monitor, resolution of 1600 x 900 or better. Network Adapter:802.11ac 2.4/5 GHz wireless adapter
5. Server Room				
1	Desktop PC set	Set	1	Processor (CPU):Intel Core i5 (sixth generation or newer) or equivalent, Memory:16 GB RAM, Storage:500 GB internal storage drive, Monitor/Display:14" LCD monitor, resolution of 1600 x 900 or better. Network Adapter:802.11ac 2.4/5 GHz wireless adapter
2	Table	No	1	OF MR 23001 Conference table (only) 2 seater members table 1400x605x750

*Project for Capacity Enhancement of Meteorological Observation, Forecasting and Flood Warning, for
Disaster Preparedness and Response in Thimphu and Paro River Basins
(NCHM-DDM-JICA)*

No	Description	Unit	Qty	Specifications
3	Chair	Set	1	Revolving chair (DW 01 Equivalent) (Imported Leather Chair)/ Revolving HAG SOFI 7300 TASK CHAIR UPHOLSTERED Equivalent /Visitor chair with arm OC 7602 or Equivalent Per number
6. Internet Facilities				
1	Internet land line	Set	1	
2	Wi-Fi adaptor	Set	3	
3	Intra-office connection line	m	50	
7. Power Backup (for 72 hours)				
1	Generator	Set	1	Kohler 15 kVA Diesel Generator, Noise Level: Silent or Soundproof, Frequency: 50 Hz, Material: Mild Steel, Phase: 3 Phase, Voltage: 220 V, Engine Power: 15 Kva, Number of Cylinder: 2, Aspiration: Turbocharged, Charge Air Cooled, Cooling System: Air Cooling, Fuel Tank Capacity: 63 L, Displacement: 1.29 L, Pistons Speed: 4.6 m/s, Rotor Balancing: Dynamically Balanced, Exhaust Temperature At Rated Kw: 305 deg C
2	Fuel	Liter	200	Diesel
8. Water Reserve (for 72 hours)				
1	Water tank	Liter	300	Polythene , Diameter: 2085mm, 2360 mm height

Scenario and Procedure for Flood Disaster Evacuation Drill

Step	Scenario on hydrological/ meteorological conditions	Flood Monitoring and Command Room (FMCR), NCHM	DLGDM	Dzongkhags/ Thromde	Vulnerable facilities and public
1	A large low pressure system developed.				
2	Heavy rain continued and river water level rose considerably.	-Monitors river water levels at AWLSs. -Send weather bulletins to the registered stakeholders (relevant agencies and facilities) via WhatsApp group when there is a threat of flooding in the near future	- Receive the weather bulletins from FMCR via WhatsApp group.	-Receive the weather bulletins from FMCR via WhatsApp group. -Communicates with DLGDM and FMCR.	Registered stakeholders receive the weather bulletins from FMCR via WhatsApp group
3	River water level at AWLSs reached Alert level.	FMCR issues the evacuation Alert (prepare for evacuation) messages to the registered stakeholders via WhatsApp group.	- Receive the evacuation Alert message from FMCR via WhatsApp. -Communicates with FMCR and Dzongkhags (Thromde) to monitor the situation.	- Receive the evacuation Alert message from FMCR via WhatsApp. -Call registered stakeholders to confirm if they have received WhatsApp Alert message from FMCR.	- Registered stakeholders to receive the evacuation Alert message from FMCR via WhatsApp. - Registered Chiwogs (Thromde and Demkhongs) transfer the received Alert message to the vulnerable public via WeChat groups. - Start to prepare the evacuation upon receipt the Alert message.

Step	Scenario on hydrological/ meteorological conditions	Flood Monitoring and Command Room (FMCR), NCHM	DLGDM	Dzongkhags/ Thromde	Vulnerable facilities and public
4	River water level at AWLSs reached Alarm level.	- FMCR issues the evacuation Alarm (start evacuation) messages to the registered stakeholders via WhatsApp group.	- Receive the evacuation Alarm message from FMCR via WhatsApp. - Communicates with FMCR and Dzongkhags (Thromde) to monitor the situation.	- Receive the evacuation Alarm message from FMCR via WhatsApp. - Call registered stakeholders to confirm if they have received WhatsApp Alarm message from FMCR.	- Registered stakeholders to receive the evacuation Alarm message from FMCR via WhatsApp. - Registered Chiwogs (Thromde and Demkhongs) transfer the received Alarm message to the vulnerable public via WeChat groups. - Start to evacuate to evacuation site upon receipt the Alarm message.
5	River water level at AWLSs felled below Alert level.	- FMCR issues a message indicating that the water level has dropped below the Alert level.to the registered stakeholders via WhatsApp group.	- Receive the water level drop message from FMCR via WhatsApp. - Communicates with FMCR and Dzongkhags (Thromde) to monitor the situation.	- Receive the water level drop message from FMCR via WhatsApp. - Confirm the situation of the flooded facilities and communities.	- Registered stakeholders to receive the water level drop message from FMCR via WhatsApp. - Registered Chiwogs (Thromde and Demkhongs) transfer the received drop message to the evacuees via WeChat groups. - Once safety is assured, evacuees return from their evacuation sites.

**List of stakeholder mobile phone numbers to receive
WhatsApp flood early warning message for Thimchhu**

Organization	Name	Designation	Mobile Number
Thimphu Thromde			
Thimphu Thromde	Mr.Ugyen Dorji	Thrompon (Mayor)	17342344
Thimphu Thromde	Mr.Karma Namgyel	Executive Secretary	17633220
Thimphu Thromde	Mr.Karma	Engineer	17712998
Thimphu Thromde	Mr. Karma Dorji	Sr, Planning Officer	17700470
Thimphu Thromde	Mr. Tashi Dorji	Thromde disaster focal person	17172677
Taba-Dechencholing Demkhong	Mr.Ugyen	Thuemi	17674872
Norzin Demkhong	Mr.Phub Tshering	Thuemi	17849604
Cremation ground	Mr. Nima Gyeltshen	In charge	17489233
Lingkhana palace	Mr. Karma Tshering	Engineer	77894242
Centenary farmers market	Mr. Dawa Zangpo	Manager	17959414
Fire & rescue service division, Royal Bhutan Police	Mr. Tshering Penjor	OC	17602179
De-suung	Mr. Tanding Dorji	CPO	77606955
Thimphu Dzongkhag			
Thimphu Dzongkhag	Mr. Phub Dorji	Dzongdag	17810340
Thimphu Dzongkhag	Mr. Tashi Gyeltshen	Dzongrab	17160582
Thimphu Dzongkhag	Mr. Tshewang Dorji	Dzongkhag Disaster Management Officer (DDMO)	17752005
Thimphu Dzongkhag	Ms. Sonam Zam	Chang Gup	17633393
Thimphu Dzongkhag	Ms. Namgay Wangmo	Chang GAO	17663458
Terma Linka Resort	Mr. Tshewang	Manager	17747970
Penjor Yarrdak Fabrication	Mr. Penjor Yardak	Proprietor	17638371
DLGDM	Mr. Pasang Dorji	Director General/Offtg. Director	17998997
DLGDM	Mr. Yang Dorji	Chief Program Officer	17650223

**List of stakeholder mobile phone numbers to receive
WhatsApp flood early warning message for Thimchhu**

Organization	Name	Designation	Mobile Number
DLGDM	Mr. Thinley Norbu	Chief Program Officer	17333084
DLGDM	Mr. Choki Tashi	Deputy Chief Program Officer	17990537
NCHM	Mr. Jigme Wangdi	FMCR Operator	17628951
NCHM	Mr. Aita Singh Tamang	FMCR Operator	77396048
NCHM	Ms. Sangay Wangmo	FMCR Operator	17474707
NCHM	Mr. Pema Dorji	FMCR Operator	17980717
NCHM	Mr. Wangdi	FMCR Operator	17588639
NCHM	Ms. Yeshe Choki	FMCR, In-charge, Hydrology and Water Resources Services Division (HWRSD)	17282553
NCHM	Mr. Sangay Tenzin	Asst. Engineer, HWRSD	17711753
NCHM	Mr. Jamyang Phuntshok	Chief, HWRSD	17989976
NCHM	Mr. Tandin Wangchuk	Engineer, HWRSD	17563060
NCHM	Mr. Karma Dupchu	Director, NCHM	17629918
JICA	Mr. Tomoyuki Wada	JICA Expert	17454572
JICA	Mr. Yasuhiko Kato	JICA Expert	+81-9077304556

NOTE: This list has to be updated as regular as possible by Thimphu Thromde Disaster Focal Person, Thimphu DDMO, DLGDM and NCHM. Thimphu Thromde Disaster Focal Person, and Thimphu DDMO and DLDGM will inform the updated portion to FMCR, NCHM. FMCR, NCHM will prepare updated list.