



Tangail Pourashava

Scenario-based Earthquake Contingency Plan of Tangail Pourashava Area

November 2014



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Tangail Pourashava Area

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Abbreviations

ADPC	Asian Disaster Preparedness Center
AIT	Asian Institute of Technology
BBS	Bangladesh Bureau of Statistics
BDRCS	Bangladesh Red Crescent Societies
BGB	Border Guard Bangladesh
BIWTC	Bangladesh Inland Water Transport Corporation
BP	Bangladesh Police
BPDB	Bangladesh Power Development Board
BR	Bangladesh Railway
BRTC	Bangladesh Road Transport Corporation
BTCL	Bangladesh Telecommunication Company Ltd.
CBOs	Community Based Organizations
CDMP	Comprehensive Disaster Management Programme
CSO	Civil Surgeon Office
CSOs	Civil Society Organizations
DC	Deputy/ District Commissioner
DDM	Department of Disaster Management
DoF	Department of Food
DPHE	Department of Public Health Engineering
DRRO	District Relief and Rehabilitation Office
DSW	Department of Social Welfare
EOC	Emergency Operation Center
EU	European Union
FSCD	Fire Service and Civil Defence
HAZUS	Hazard of United States
ICS	Incident Command System
INGOs	International Non-Government Organizations
INSARAG	International Search and Rescue Advisory Group
LGED	Local Government Engineering Department
MoDMR	Ministry of Disaster Management And Relief
NGOs	Non-Government Organizations
NSET	National Society of Earthquake Technology

PDMC	Pourashava Disaster Management Committee
PWD	Public Works Department
RAB	Rapid Action Battalion
RHD	Roads and Highway Department
SOP	Standard Operation Procedure
UN	United Nations
UNDP	United Nations Development Programme
VDP	Village Defence Party

Section-01: Introduction

1.1 Background

Over the past decades, urbanization in Bangladesh has been rapidly taking place without proper planning and guidance. As a result many of the urban centers have developed haphazardly. These urban centers are fast growing and influence the economic developments of the country. A strong earthquake affecting a major urban center in Bangladesh may result in widespread damage; high numbers of fatalities; destroying buildings, other physical infrastructure and facilities; and may have disastrous consequences for the entire nation. In the aftermath of a catastrophic earthquake and subsequent aftershocks there will be a massive requirement of response efforts. The conventional response efforts and available capabilities will be quickly overwhelmed. For an effective response to a severely damaged area, immediate life-saving and life-sustaining measures entailing unique solutions will be required. In these circumstances, a city-level Contingency Plan is needed to ensure better response towards earthquake hazard. Contingency Planning is a management tool used to analyze the impact of potential crises so that adequate and appropriate arrangements are made in advance to respond in a timely, effective and appropriate way to the need of affected populations.

Realizing this, Comprehensive Disaster Management Programme (CDMP) under the Ministry of Disaster Management and Relief of the People's Republic of Bangladesh has taken initiative to reduce the ever increasing earthquake risk in the country and minimize the damages and loss of lives through proper preparedness and mitigation measures. Under CDMP Phase-I (2006-2010), earthquake risk assessment was carried out in three major cities- Dhaka, Chittagong and Sylhet. The corresponding preparedness activities mainly the scenario based earthquake Contingency Plans were also prepared (National, City-level for Dhaka, Chittagong and Sylhet, and Nine Agency-level) with the aim to create an efficient and effective collaborative approach to emergency response and management with the participation of all level stakeholders. After the successful completion of the first phase, CDMP has initiated its phase-II (CDMP-II) for carrying out similar earthquake risk and damage assessment and subsequent development of scenario based Contingency Plan for Rangpur, Dinajpur, Mymensingh, Tangail, Bogra and Rajshahi Municipalities/ City Corporations areas as well as to develop scenario based ward-level spatial Contingency Plan for Dhaka, Chittagong and Sylhet City Corporation areas. The programme is supported by the United Nations Development Programme (UNDP), UKaid from the Department for International Development (DFID), European Union (EU), Norwegian Embassy, Swedish Sida and Australian AID. Asian Disaster Preparedness Center (ADPC), Thailand in association with National Society for Earthquake Technology (NSET), Nepal; Asian Institute of Technology (AIT), Thailand; and OYO International Corporation, Japan have provided technical assistance to CDMP for carrying out the earthquake risk and damage assessment and subsequent development of scenario based Contingency Plans for these Municipalities/ City Corporations areas.

1.2 Need of Earthquake Contingency Plan for Tangail Town

Tangail Town is one of the districts headquarter of Dhaka division, located in the central region of Bangladesh (**Map-1**). It is the gateway to Dhaka City from North Bengal region of the country. Tangail Municipality was established in 1876. The municipality belongs to A-Category having an area of

35.22 sq. km. and divided into 18 wards. It has an estimated present population of 167,412 and growing at a rate of 0.90 percent (BBS, 2011). Tangail is one of the rapidly growing secondary towns of the country. Close proximity (150 km) and good transportation system, both road and rail connections with the capital city made Tangail Town important for economic development. As a result many industrial developments are taking place in and around the town.

Tangail Municipality is highly vulnerable to earthquake because of its close proximity to Madhupur Fault. In the generalized tectonic map of Bangladesh, Tangail is located in the medium risk zone. The earthquake risk of the Tangail Town is growing with every passing moment because of the unabated growth of human settlement and other administrative and economic activities. Major causes behind such ever increasing earthquake risk are the haphazard urbanization and sub-standard construction of buildings, residential houses and other infrastructures without any consideration of underlying earthquake risk. The geotechnical and geophysical investigation under CDMP- II shows that almost 100% of the soil in Tangail Municipality area is dense/ stiff soil which has high liquefaction susceptibility. The foundations and supports of structures built on this highly liquefiable sediment can fail, causing damage or destruction during major earthquakes in town. In these circumstances, a Contingency Plan is needed for ensuring better response towards earthquake hazard.

1.3 Purpose

The Tangail Municipality Earthquake Contingency Plan establishes a coordinated strategy to ensure that adequate decisions and preparations are made for an anticipated earthquake. The purpose of the plan is to increase the efficiency and effectiveness of disaster response management in Tangail Municipality through the clarification of goals, operational frameworks, coordination mechanisms, procedures, roles, responsibilities, and actions. It also aims to ensure the participation of all city-level stakeholders and maximum utilization of available resources, optimization of efforts by first responder agencies in order to save lives; provide humanitarian assistances; and restore the lifeline facilities to bring normalcy within fastest possible time.

While developed before an earthquake, the plan focuses on immediate emergency response activities typically taking place within the first 72 to 96 hours following a damaging earthquake.

The Plan describes the “who, what, where, when, and how” of a holistic response framework activated at the city-level. It also provides a structure for coordination and optimum utilization of national resources.

1.4 Goals and Objectives

The ultimate goal of this earthquake Contingency Plan is to minimize the adverse effects (e.g. loss of lives, damage of property, and the disruption of critical facilities and services) of potential earthquakes in the country or in the Tangail Municipality by establishing and implementing a holistic response framework.

The following objectives were set to achieve this goal:

Objective 1: Strengthen the ability of city-level first responder agencies involved in disaster management to effectively and efficiently prepare, respond, and recover from

disasters by clarifying roles and responsibilities, developing an organizational structure, and building capacity.

Objective 2: Establish effective vertical and horizontal coordination mechanisms that are functional both before and after a disaster.

Objective 3: Strengthen the city-level response framework including integral components such as the Emergency Operations Center, the cluster system, and urban community volunteers.

Objective 4: Use scenarios and spatial analysis during the Contingency Planning process to identify probable risk, forecast future need, and anticipate gaps in capacity.

Objective 5: Promote a culture of community readiness and preparedness through city-level plan advocacy and institutionalization.

Objective 6: Establish and maintain a fully operational Contingency Planning process including plan development, implementation, monitoring and evaluation, and maintenance.

1.5 Intended Users of the Plan

The primary users of this Contingency Plan will be the city-level agencies, departments and organizations these are responsible for saving human-lives, providing humanitarian assistance, and restoring the lifeline facilities and utility system, protecting properties and preserving the environment. These agencies can be grouped into First Responder, Second Responder, and Other Support agencies.

'First Responder' refers to those agencies and individuals who are responsible to save life, protect property and preserve environment in the early stages of an incident, including emergency service providers i.e. response management, search and rescue, fire safety, public health, clinical care, shelters, relief and supplies, and other skilled support personnel (such as equipment operators) that provide immediate support services during emergency operations. For this Contingency Plan, following agencies are identified as first responder agencies in Tangail Town:

- Tangail Municipality
- Fire Service & Civil Defence (including urban community volunteers), Tangail
- Bangladesh Army, Tangail Cantonment
- Civil Surgeon Office, Tangail and Tangail Sadar Hospital
- Department of Disaster Management (at DC Office), Tangail

'Second Responder' consists of utility and life line agencies/ departments (water supply, electricity, gas supply, telecommunications, waste disposal etc.), transportation systems agencies (road, rail and air), and security, law and order function agencies. These include,

- Water Supply and Sewerage Authority (Tangail Municipality)
- Bangladesh Power Development Board, Tangail
- Bangladesh Telecommunication Company Ltd., Tangail
- Titas Gas, Tangail
- Roads and Highway Department, Tangail

- Bangladesh Police, Tangail
- Ansar and VDP, Tangail

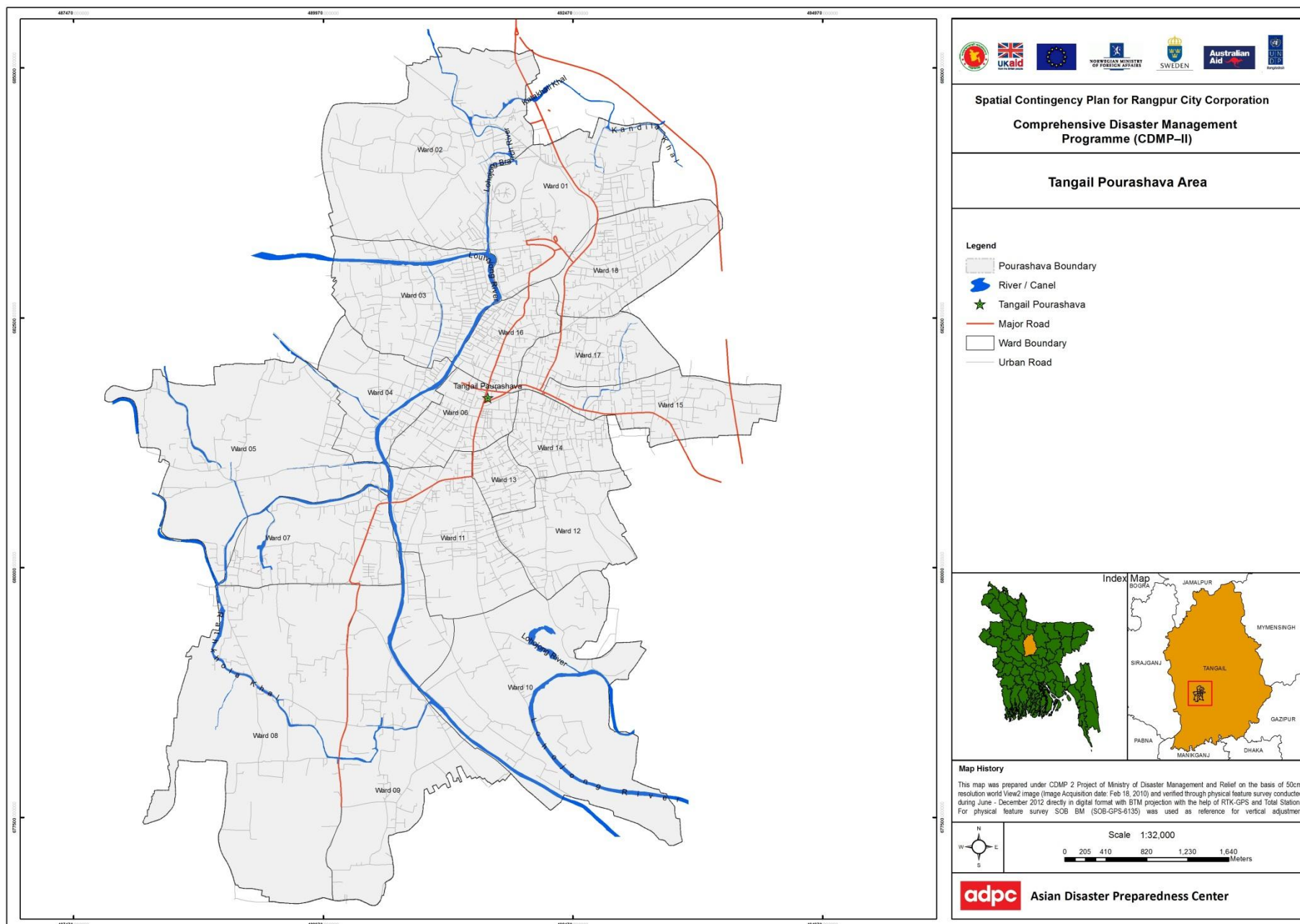
Other agencies such as Govt. Agencies and Departments, Public Works Departments, NGOs and INGOs working in the area, Electronic and Print Media, Community Based Organizations (CBOs), Civil Society Organizations (CSOs), Academia, Development Partners, Private sectors, etc. will provide support for plan implementation.

The ultimate beneficiaries of this plan would be the communities at risk in Tangail Municipality area.

1.6 Plan Limitations

The earthquake Contingency Plan has following limitations:

- The Tangail Municipality Earthquake Contingency Plan will not, and cannot, address all circumstances.
- The plan assumes that the involved agencies will have adequate authority and capacity to deal with assigned tasks as granted through appropriate policies and legal instruments.
- Agencies involved in Contingency Plan implementation process may need additional resources in terms of qualified manpower, technical as well as financial resources to undertake assigned tasks.
- The contingency management process in this plan is linked to a specified time lag to become fully functional as an integrated system.
- Capable and committed staff with appropriate financial resources, facilities, equipment and supplies is required to implement an effective, long-term program based on the Action Plan.



Map 1 : Tangail Pourashava Area

Section 02: Plan Development, Implementation and Maintenance

2.1 Legal Provisions, Authority and Planning Responsibility

The Disaster Management Act 2012 grants the Government of Bangladesh the authority to formulate the National Disaster Management Policy to elaborate the provisions of the Act. Within the National Disaster Management Policy, the Ministry of Disaster Management and Relief (MoDMR) is granted the overall responsibility for coordinating disaster management efforts across all agencies. One of the priority activities listed in the National Disaster Management Policy to establishing a Contingency Planning framework. With this authority, the MoDMR with the involvement of city-level stakeholders through CDMP has developed this Earthquake Contingency Plan for Tangail Municipality.

2.2 Plan Context

The Earthquake Contingency Plan for Tangail Municipality is developed under the Comprehensive Disaster Management Programme, Phase II, in 2014. The plan is developed to complement the existing national disaster management policies, plans including the National Disaster Management Policy; the Disaster Management Act 2012; the National Plan for Disaster Management 2010-2015; the Standing Orders on Disaster 2010; and National Earthquake Contingency Plan 2009 (revised in 2012). The National Earthquake Contingency Plan provides the broader framework to address the response activities during an earthquake emergency in the country, while the Earthquake Contingency Plan for Tangail Municipality aims to minimize the adverse effects of potential earthquakes by establishing and implementing a holistic response framework at town level.

2.3 Planning Assumptions

This Contingency Plan for Tangail Municipality has been developed with following assumptions in the background:

- Earthquakes are impact type events and provide no warning preventing any pre-event response activities.
- Earthquakes within the town will cause large numbers of deaths and injuries and extensive damage and destruction of buildings, emergency facilities and infrastructures.
- There is likelihood of secondary effects following an earthquake or aftershocks which may include fire, flood, liquefactions, subsidence, damming of rivers, and dam failure, release of hazardous and toxic chemicals, etc.
- Strong aftershocks will continue for several days resulting in further damages and losses
- Large numbers of displaced people will be in need of shelter, welfare, relief assistance, medical care, etc.
- Access to affected areas will be severely restricted due to debris, road damage, bridges and culverts collapse, etc.

- Many national and international response and humanitarian organizations other than the government institutions will also be involved during response and recovery to earthquake disaster.

2.4 Planning Process

The Earthquake Contingency Plan for Tangail Municipality is developed under CDMP-II through a collaborative effort among city-level disaster management and first responder agencies as well as other relevant agencies, departments and organizations. Several formal and informal meetings were held during which key stakeholders were identified and invited to participate in the Contingency Planning Process. Plan contributors include:

- Tangail Municipality
- Department of Disaster Management (at DC Office), Tangail
- Fire Service and Civil Defence, Tangail
- Civil Surgeon Office, Tangail
- Bangladesh Power Development Board, Tangail
- Bangladesh Telecommunication Company Ltd., Tangail
- Titas Gas, Tangail
- Bangladesh Police, Tangail
- Bangladesh Ansar and VDP, Tangail
- Public Works Department, Tangail

Early in the planning process an Orientation Meeting was organized under the leadership of the Municipality that plays key roles in earthquake disaster risk management. During the orientation meeting, a Working Group comprising technical experts and representatives from city-level main stakeholder agencies was formed to lead the Contingency Plan preparation process as well as plan updates and regular monitoring of its implementation.

In April 2014, the Municipality organized a Training Workshop on Preparation of Contingency Plan with regard to Earthquake for Tangail Municipality in participation of the Working Group members. On the first day of the training workshop, the group was trained about the step-by-step earthquake Contingency Plan preparation process, and on the second day, the group participated in a day-long workshop and drafted the Contingency Plan for Tangail Municipality. The results of the earthquake risk assessment and potential losses and damages for Tangail Municipality area conducted under CDMP-II and the city-level Contingency Planning template developed under CDMP-I in 2009 and revised under CDMP-II in 2012 were supplied to the group in the workshop.

A validation/sensitization workshop was organized under the leadership of the Municipality in participation of all city-level stakeholders to ensure that the plans addressed all emergency activities and issues concerns as well as to sensitize stakeholders about the Contingency Plan activities and facilitate their wider involvement and participation in emergency response. Then the draft plan was revised and finalized by incorporating the feedbacks from sensitization workshop.

2.5 Implementation Strategy

Responsibility

The Tangail Municipality shall undertake the leadership responsibility for implementation of the Earthquake Contingency Plan. The Municipality Disaster Management Committee and Municipality Disaster Response Coordination Group will be the operational arm of the Municipality tasked with coordinating operations for achieving the Plan's goal and objectives. The City-level Emergency Operation Center (EOC), first responder agencies, and clusters (as described in **Section 4**) will also play key roles in plan implementation.

Timeframe

Different portions of the Plan are meant to be implemented at different phases of the disaster management cycle:

Preparation Phase (before a disaster strikes): The Plan was developed during "blue skies" so that there was ample time to make sound decisions without the chaos of an emergency situation. Regular updates should take place cyclically according to the Periodic Review and Update Process as described in **Section 2.6**. Additionally, the action strategies included in **Section 5** and the actions to support the plan implementation as described in **Section 7** should be implemented before a disaster.

Immediate Response Phase (typically the initial 72 to 96 hours after a major earthquake event): The Plan will be activated when there is an earthquake emergency. At this time the Operational Framework will be activated and the City-level EOC will assume its Response Phase roles as described in **Section 4**. First responder agencies and cluster leads will be responsible for implementing the action strategies described in **Section 5**. Once the immediate response has stabilized and focus has shifted from the operational priorities as described in **Section 6**, the Municipality will deactivate the plan.

Later Response and Recovery Phases (after 72 hour of a major earthquake event): Although the Plan is no longer activated, it should be updated after a major earthquake event. Monitoring and evaluation of the plan may also continue into the Recovery Phase. Additionally, some city level advocacy and plan institutionalization should be implemented at this time.

2.6 Monitoring and Evaluation

Regular monitoring and evaluation enables changes in direction, refinement of approaches and elimination of unproductive activities. Monitoring and evaluation of the plan as a whole should be done annually under the leadership of the Municipality and following any earthquake events during which the plan is activated. Benchmarks and/or evaluation criteria developed during "blue skies" and then revised shortly after a declaration of a state of disaster would be useful tools for monitoring the progress and success of response activities.

2.7 Periodic Review, Update and Management

The Contingency Plan may need not to be activated, unless the anticipated situation does arise. However, the plan may become outdated due to social, economic, organizational and other changes. Contingency Plan is a living document and should be updated on a regular basis to ensure that the

information is current. During rapidly changing situations, plans will need to be updated more frequently; whereas under normal circumstances, less frequent updating will be sufficient. Keeping the Contingency Plan current and relevant is a challenging task, but can be achieved by scheduling regular reviews.

- The plan should be reviewed and revised, as necessary, on an annual basis to ensure that the information is current.
- Every 5 years the plan should receive a major revision based on earthquake risk assessment in which the risk scenarios, spatial analysis, and maps are revised to reflect the current local situation.
- Plan should receive a major update after an earthquake event during which the plan was activated.
- The Municipality should initiate the revision/ modification process and will engage Municipality Disaster Management Committee and other agencies/departments with relevant responsibilities.
- Each revision of the plan should be authorized by the Municipality and any change or revision to this plan should be shared with relevant responsible agencies/ departments.

Section 03: Earthquake Scenarios and Planning Assumption

3.1 Earthquake Threat in Bangladesh

Geographically Bangladesh is located close to the boundary of two active plates: the Indian plate in the west and the Eurasian plate in the east and north. Several major active faults, e.g. the Madhupur fault, the plate boundary fault (the northern extension of subduction fault) and the Dauki Fault, are also inferred in Bangladesh. These faults may generate large earthquakes over Ms 8. However, the nature, detailed location, and the faulting history on these faults are not well known yet (Morino, 2009). In the past, there were several earthquakes that caused severe damages to life and properties in this region. Some of the major earthquakes around the region includes the 1548 earthquake, the 1664 earthquake, the 1762 earthquake, the 1869 Cachin earthquake (Ms 7.5), the 1885 Bengal earthquake (Ms 7.0), the 1897 Great Indian earthquake (Ms 8.4), and the 1918 Srimangal earthquake (Ms 7.6) (Banglapedia; Oldham, 1883; Ambraseys, 2004; Bilham and Hough, 2006; etc.). Although, Bangladesh did not experience with any major earthquake since more than 100 years but the geological settings and the historical evidences of earthquake may mean that Bangladesh has a high risk of major earthquake occurrence in near future (CDMP, 2009).

3.2 Earthquake Risk Assessment and Developing the Scenarios

Under CDMP-II, probabilistic earthquake risk assessment was carried out for Tangail Municipality area using HAZUS model for analyzing potential damages and losses from different earthquake scenarios. HAZUS is a regional loss estimation model that was developed by the United States' Federal Emergency Management Agency (FEMA) and National Institute of Building Sciences (NIBS).

Considering the likely earthquake threat in Bangladesh, following three different scenarios (**Table-3.1**) have been developed based on different return periods(both short and longer) to identify the possible damage to buildings, infrastructures, utility services and facilities and casualties in Tangail Municipality area under CDMP-II.

Table 3.1: Selected earthquake scenarios

Scenario	Description
Scenario-1	An earthquake of 43 years return period originated from Dauki Fault with 7.9 Ms
Scenario-2	An earthquake of 475 years return period originated from Dauki Fault with 7.9 Ms
Scenario-3	An earthquake of 2475 years return period originated from Dauki Fault with 7.9 Ms

3.3 Impact of Probable Earthquakes and Loss Estimation

Building Damage

Table 3.2: Expected damage to buildings in Tangail Municipality due to three scenarios

Scenarios	Total Number of Buildings	Number of Building Damage		
		Moderate	Extensive	Complete
Scenario-1	62,448	526	4	0
Scenario-2	62,448	9,040	321	5
Scenario-3	62,448	22,482	2,251	66

It is estimated that none of the buildings of Tangail Municipality area will be completely damaged due to an earthquake of 43 years return period originated from Dauki Fault. During the event, about 4 buildings will likely be extensively damaged and 526 moderately damaged. About 5 buildings will likely be completely damaged due to an earthquake of 475 year return period originated from same fault. An earthquake of 2475 years return period originating from Dauki Fault will likely to damage about 66 buildings completely in the Municipality. The possible concrete and masonry building damage due to scenario-2 earthquake are shown in **Map B-1 & Map B-2** in the **Annex-B**.

Casualties and Injuries

The estimates of the number of people that will be injured and killed by the earthquake are broken down into four severity levels that describe the extent of the injuries. The levels are described as follows:

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated
- Severity Level 4: Victims are killed by the earthquake

The casualty estimates are provided for two times of day: 2:00 AM (night-time) and 2:00 PM (day-time). These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum and the 2:00 PM estimate considers that the educational, commercial, and industrial sector loads are maximum.

Table 3.3: Expected casualties and injuries in Tangail Municipality area due to three scenarios

Scenarios	Time	Level of Injuries			
		Level-1	Level-2	Level-3	Level-4
Scenario-1	2:00 AM	16	1	0	0
	2:00 PM	14	1	0	0
Scenario-2	2:00 AM	155	13	0	2
	2:00 PM	134	12	0	2
Scenario-3	2:00 AM	402	42	1	25
	2:00 PM	373	40	2	32

During scenario-1 earthquake at night-time, none of the population will likely be killed immediately in Tangail Municipality area as well as required hospitalization that can become life threatening if not promptly treated. About 1 people will likely be required hospitalization but are not considered life-threatening. Another 16 people will likely be required medical attention such as first aid or some kind of treatment. Similarly about 2 people will likely be killed, about 13 people will likely be needed to hospitalize on moderate injuries, and about 155 people will likely be required medical attention if the scenario-2 earthquake occurred during night-time. Scenario-3 at night-time will likely to kill 25, about 1 people will likely be needed to hospitalize on a critical condition, about 42 people will likely be required to admit in hospital with moderate injuries, and about 402 people will likely be required primary medical attention.

Essential Facilities Damage

During the scenario earthquakes, essential facilities such as major hospitals and clinics, educational institutions, fire service stations, police stations, and other government and communal structures located within the Municipality will likely be damaged ranging from at least slight to complete. The expected damage to the buildings of essential facilities due to three scenario earthquakes is given in **Table 3.4**.

Table 3.4 Expected damage to building of essential facilities due to three scenario earthquakes

Scenarios	Essential Facilities	Total Structure	At Least Moderate Damage	Complete Damage	With 50% functionality on day1
Scenario-1	School	570	0	0	570
	Hospital	60	0	0	60
	Fire Station	1	0	0	1
	Police Station	20	0	0	20
Scenario-2	School	570	3	0	405
	Hospital	60	5	0	16
	Fire Station	1	0	0	0
	Police Station	20	0	0	9
Scenario-3	School	570	200	0	0
	Hospital	60	37	0	0
	Fire Station	1	1	0	0
	Police Station	20	11	0	0

The estimation shows that in Tangail Municipality area, all buildings of essential facilities will likely be damaged with more than 50% functionality on day-1 in the aftermath of scenario-1 earthquake. Due to scenario-2 earthquake, about 3 educational and 5 hospital/clinic buildings will likely be moderate damaged. Similarly, about 200 educational, 37 hospital/clinic, 1 fire station and 11 police station buildings will likely be moderate damaged due to scenario-3 earthquake in the Municipality area. None of the buildings of essential facilities will likely be completely damaged due to all three

Scenarios. The probability of functionality of education, health and other critical facilities at day-1 due to scenario-2 earthquake are shown in **Map B-3, Map B-4 & Map B-5** in **Annex-B**.

Transportation and Utility System Damage

Transportation system and utility facilities such as highway, railway, bus terminal, ferry terminal, electrical power, communication, etc. located within Tangail Municipality will likely be damaged ranging from at least slight to complete due to all three scenario earthquake. The expected damage to transportation system and utility facilities within the Municipality due to three scenario earthquakes is given in **Table 3.5**. The probability of functionality of road network and transportation facilities at day-1 due to scenario-2 earthquake is shown in **Map B-6 & Map B-7** in **Annex-B**.

Table 3.5 Expected damage to transportation and utility system due to three scenario earthquakes

Scenarios	System	Component	Total	Moderate Damage	Complete Damage	At least 50% Functional	
						Day 1	Day 7
Scenario-1	Highway	Segments	2,510	0	0	2,510	2,510
		Bridges	48	0	0	48	48
	Railway	Segments	0	0	0	0	0
		Facilities	0	0	0	0	0
	Bus Terminal	Facilities	11	0	0	11	11
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		6	0	0	6	6
	Electrical Power		145	0	0	0	0
Communication		44	0	0	44	44	
Scenario-2	Highway	Segments	2,510	0	0	2,510	2,510
		Bridges	48	0	0	48	48
	Railway	Segments	0	0	0	0	0
		Facilities	0	0	0	0	0
	Bus Terminal	Facilities	11	0	0	11	11
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		6	0	0	6	6
	Electrical Power		145	0	0	0	0
Communication		44	0	0	44	44	
Scenario-3	Highway	Segments	2,510	0	0	2,510	2,510
		Bridges	48	0	0	48	48
	Railway	Segments	0	0	0	0	0
		Facilities	0	0	0	0	0
	Bus Terminal	Facilities	11	7	0	10	11
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		6	6	0	0	6
	Electrical Power		145	0	0	0	0
Communication		44	22	0	44	44	

Table 3.6: Expected earthquake-induced fires and probable damage

Scenarios	Probable Impacts		
	No. of Ignition	Population to be Displaced	Economic Damage (thousand USD)
Scenario-1	0	19	0
Scenario-2	0	19	0
Scenario-3	1	24	0

In Tangail Municipality, it is estimated that scenario-1 and scenario-2 will likely to cause small ignition and scenario-3 will likely to cause 1 ignitions. It is also estimated that about 19, 19 and 24 people will likely be displaced due to scenario-1, scenario-2 and scenario-3 respectively. The probable economic damage due these earthquake-induced fires is very little that could not be estimated here.

Debris Generation

In the aftermath of the scenario earthquakes, huge volume of debris will likely be generated due to damage of buildings and infrastructures. **Table-3.8** shows the expected debris generation in Tangail Municipality due to three scenario earthquakes.

Table 3.7: Expected debris generation in the Municipality area due to scenario earthquakes

Scenarios	Debris Generation		
	Total (Thousand Ton)	% Concrete and Steel	% of Brick, Wood and Others
Scenario-1	15	13	87
Scenario-2	40	33	67
Scenario-3	130	51	49

In Tangail Municipality area, around 860 thousand tons of debris will likely be generated due to Scenario-1 earthquake. In case of Scenario-2 and Scenario-3 earthquakes, there will likely to generate about 40 thousand tons and about 130 thousand tons of debris respectively.

3.4 Estimation of Resource Needs and Analysis of Resources Availability

As an earthquake of 475-years return period represents the parameters of design-based earthquake, **Scenarios-2** at 2:00 AM (night-time) has been taken as the basis for estimating the resource needs, spatial analysis of available resources and capacities, and preparing the Contingency Plan.

Search and Rescue

Approximately, 53 people will likely be trapped (both in injured and dead condition) inside the collapsed buildings out of which some will come out by themselves, some will be assisted by community volunteers, and some may require medium to highly specialized search and rescue. As per the INSARAG Guidelines, approximately 26 victims (50%) can be extricated by the community themselves or with the light search and rescue teams, whereas another 50% (approximately 27) victims will likely to require assistance of specialized search and rescue teams.

The specialized search and rescue capacity mainly exists with the Bangladesh Army, Fire Services and Civil Defense (FSCD) and Bangladesh Red Crescent Societies (BDRCS). Currently, there is only one FSCD stations within Tangail Municipality area which will primarily be responsible for conducting specialized search and rescue operation and BDRCS during an earthquake emergency in the town. The available resources and capacities of FSCD Tangail are given in **Table A-1** and **Table A-2** in **Annex-A**. The Urban Community Volunteer trained by FSCD for Tangail Town will provide all support to the specialized team for search and rescue operation. List of these volunteers with detailed information is given in **Table A-3** in **Annex-A**. The location of FSCD and other key emergency agencies in Tangail Town is shown in **Map C-1** in **Annex-C**.

Immediate Evacuation Spaces

It is estimated that about 370 populations will likely be displaced due to building collapse. These populations will need to be evacuated immediately to the nearest open spaces. Total 370 sq. m. spaces will be required (considering @ 1 sq. m. /person as standard) to accommodate the displaced people for immediate evacuation purpose (assembly after the scenario earthquake).

The open spaces available in Tangail Municipality include smaller areas ranging from hundreds to thousands sq. m. The smaller spaces are appropriate only for immediate evacuation purposes, whereas only bigger ones (larger than 5,000 sq. m. which can accommodate more than 100 families) are considered as appropriate for temporary shelter purpose. Currently, there is about 137,064 sq. m. of open spaces within Tangail Municipality area that can be used for immediate evacuation purpose. The lists of these open spaces that can be used for immediate evacuation purposes and their population holding capacities are given in **Table A-4** in **Annex-A** and their locations are shown in **Map C-2** in **Annex-C**. The smaller open spaces/ playgrounds available within the compound of educational institutions and other institutional areas are not included in the list.

The available open spaces within the Municipality area are sufficient for immediate evacuation for the required number of displaced population. About 136,694 additional people can be accommodated in these spaces for immediate evacuation purpose from surrounding areas of the Municipality.

Evacuation Routes

The list of proposed evacuation routes that can be used for safe evacuation of the population from different areas are given in **Table A-5** in **Annex-A** and shown in **Map C-3** in **Annex-C**. Only the roads of 6m and above width are usually considered as safe evacuation, because other smaller urban roads inside the municipality will likely to have higher possibilities of blockage due to road damage itself or due to falling debris from damaged buildings. However, the existing road network of 6m and above width within Tangail Municipality area is not evenly distributed and not well connected. Therefore, the existing roads of 4m to 6m width are also considered as evacuation routes that can be used for operating small vehicles, ambulance and small equipment to ensure the search, rescue and evacuation operation at every corner of the municipality.

Fire Control

The analysis shows that that Senario-2 earthquake will result in multiple conflagrations immediately. There will likely be occurred a small ignition that can burn out of control due to insufficient capacity of FSCD, delay of fire-fighting agency and/or limited access to the affected areas, and lack of water sources. The locations of water supply sources within the Municipality are shown in **Map C-4** in **Annex-C**.

In the aftermath of the earthquake and subsequent aftershocks there will be a massive requirement of response efforts from FSCD for both fire-fighting and search and rescue operation. The conventional response efforts and capabilities of only one FSCD station within Tangail Municipality will likely to be overwhelmed.

Health Facilities

Currently, there are 30 major hospitals and clinics within Tangail Municipality area with total 726 hospital beds available for use. The list of hospitals, clinics and other medical facilities and their capacities are given in **Table A-6** in **Annex-A** and locations are shown in **Map C-5** in **Annex-C**. Scenario-2 earthquake will likely to cause moderate to severe damage to many hospital buildings that would result in only 370 hospital beds (51%) being available on the first day of the earthquake. However, this total will not actually be available for earthquake victims, because some of these will be pre-occupied by regular patients. Assuming 50% will be already occupied by regular patients; actual available number of beds for earthquake victims will be 165.

The estimation shows that approximately only 13 people will require hospitalization immediately after the Scenario-2 earthquake. Hence, a total of 157 more beds will be available for the treatment of other regular patients and other injured.

Emergency Shelters

It is estimated that approximately 370 populations of Tangail Municipality will likely to be displaced due the Scenario-2 earthquake. However, all these displaced population may not require shelters to be provided by government and relief organizations. Part of them will take shelter at their relatives' and friends' houses, or may rent out spaces in remaining buildings (undamaged for partially damaged). It is assumed that approximately 50% of the displaced population will manage their shelters by their own. Remaining 50% population will require shelters provided by government and relief organizations.

According to SPHERE standard for emergencies (2011), 45 sq. m. per person surface area is required for emergency shelter purpose. However, realizing the scarcity of open spaces in cities and towns of Bangladesh, 45 sq. m. per household is used as the required minimum standard to calculate the space need for shelter. Using the average household size in the country is 4.8 persons (BBS, 2008,) the possible shelter requirement is calculated for the displaced population. Hence, total 1,710 sq. m. shelter spaces for approximately 39 households will need to be provided by government and relief organizations.

After an earthquake, open spaces such as parks, playgrounds, recreational centers etc. are potential shelter areas for the homeless population. Available open spaces (bigger than 5000 sq. m. which can accommodate more than 100 families) are proposed for emergency temporary shelter purpose. The list of these proposed shelter sites and their capacities are given in **Table A-7** in **Annex-A** and locations are shown in **Map C-6** in **Annex-C**.

Existing educational buildings (e.g. school, college, universities, etc.) and communal buildings (e.g. community centers, auditorium, etc.) can also be used as temporary sheltering purpose depending on the season as well as their level of functionality after the earthquake. The locations of educational and communal buildings available within Tangail Municipality are shown in **Map C-7** in **Annex-C**.

Relief Services (food, nutrition and other relief)

The requirements of food and other relief items for the people living in shelter camps in different locations of Tangail Municipality have been calculated for daily and monthly requirement using the SPHERE standards for emergencies (2011) and given in **Table A-8** in **Annex-A**. Based on current production in Bangladesh, four types of food items such as wheat flour, rice, lentil and vegetable oil are taken as the most common foods. These are also appropriate food for storage and distribution during earthquake disasters.

Water Supply, Sanitation and Hygiene

Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day. Likewise, for excreta disposal purpose, one toilet is required for a maximum of 20 people. Assuming this as a minimum requirement, the total quantity of water and total number of toilets required in different shelter camps is calculated and given in **Table A-9** in **Annex-A**.

Transportation

One of the immediate actions related to road transportation network, after an earthquake, is to open some key roads facilitating urban search and rescue. Search and rescue equipment are needed to be transported to different locations for the effective rescue of the trapped people. The direct damage to the road network and the heavy damage to the buildings indicate that most of the roads get either directly damaged or get blocked due to debris.

In Tangail Municipality area, around 40 thousand tons of debris will likely be generated from Scenario-2 earthquake. If the debris tonnage is converted into an estimated number of truckloads, it will require about 1600 truckloads (@25 tons per truck) to remove the debris. The location of fuel re-filling stations within the Municipality that can be used for vehicle re-fueling purpose are shown in **Map C-8** in **Annex-C**.

Security and Welfare

General security to the affected area as well as emergency shelter camps is also needed to be provided according to the national standards and the capacity of the police, RAB and Ansar in the town.

The estimation shows that during Scenario-2 earthquake at night-time, about 2 people will likely be killed immediately in Tangail Municipality area. These dead bodies need to be managed properly at proper locations and as per the proper cultural and religious norms.

Section 04: Operational Framework

4.1 Overview of Operational Framework

The earthquake response operation in the town will be carried out through a Town-level response framework to standardize the activities of first responder agencies. The basis of this response framework will be the establishment of a multi-tiered Town-level Emergency Operation Center (EOC) and functional response cluster system.

Establishment and Activation of EOC:

A Town-level Emergency Operation Center (EOC) will be established and activated to support and coordinate the emergency response activities.

Box 4.1: Requirements for establishment of a Town-level EOC

- An EOC is a physical location where disaster response and recovery activities are authorized, coordinated, and monitored during and after a disaster event.
- A dedicated office space in the Municipality building is the best suitable place for EOC.
- The EOC should be equipped with uninterrupted communication facilities, including VHF, HF, mobile telephone, satellite telephone, landline telephone, fax facilities, internet connection, computers, and GIS capability as well as response kits and personal protective equipment.
- It will function for 24 hours a day and establish a staff roster system to ensure adequate personnel are available at all times.

The major functions of the EOC are:

- Ensure effective management and coordination of all elements involved in emergency response operation.
- Establish communications with National EOC, first responder agencies, other government agencies, hospitals and clinics, private sector agencies, national and international NGOs, and donor agencies to support response operations with required physical and financial resources.
- Act as a focal point for the receipt, timely collection, analysis and dissemination of vital information concerning the event.
- Monitor and assess the progress of on-going response and recovery activities to provide a more complete operational picture to National EOC, concerned government agencies, and media.

Functional Response Cluster System:

In the immediate aftermath of a major earthquake and its impact in the town, there will be huge tasks related to emergency response, such as damage and need assessment, control of fire, search and rescue of trapped population, treatment of injured, providing shelters and relief supplies to displaced people, restoration of critical facilities, public security and welfare, etc. Experience shows that many of these response activities are complex and need to be implemented by a number of

different agencies. All these stakeholders need to work together in a systematic and coordinated manner so that their capacities and resources are best utilized for optimum and efficient response.

Because of this, the earthquake response and recovery activities that are being implemented at EOC will be organized in accordance to the functional cluster system which has been used by the United Nations since the early 2000s. This system is used to assign leadership, strengthen partnerships, and ensure more predictability and accountability in disaster response by clarifying the division of labour among agencies and better defining their roles and responsibilities within the key sectors of the response. During the Contingency Planning Process, several formal and informal small consultative meetings were held with key stakeholders to discuss modifying the standard UN clusters to suit Bangladesh's unique disaster management framework. The modified clusters include:

- Command and Coordination
- Search, Rescue and Evacuation
- Healthcare Services
- Logistics Support and Relief Services (Food, Nutrition and Other Relief)
- Shelter (Including camp management)
- Water Supply, Sanitation and Hygiene
- Transportation (Road, Rail, Air and Sea)
- Security and Welfare
- Immediate Recovery - Restoration of Urban Services

4.2 Phases of EOC Operations

The capacity of the Town-level EOC will fluctuate throughout the different disaster phases. During the non-emergency phase (preparation phase) the EOC will have limited permanent staff who will be responsible for maintaining the physical EOC space and equipment. The permanent staff will also be responsible for organizing drills and simulations for first responder agencies so that they are familiar with the EOC structure and prepared to relocate operations there at the on-set of a disaster. Once there is an emergency, the capacity of the EOC will expand and representatives from first responder agencies will move to the EOC to manage their agencies' and relevant cluster's response activities. During the recovery phase as response activities taper off, the EOC will again resize and different personnel may be stationed there to lead recovery activities.

The priorities of the EOC personnel during the different disaster phases include:

Disaster Phases	Priority Activities
Pre-disaster Phase	<ul style="list-style-type: none"> • Maintaining the physical EOC space and equipment • Monitoring and evaluation for ensuring readiness among first responder agencies through a readiness reporting system • Capacity building of agencies/individuals • Resource mobilization and distribution to cope up with the resource constraints of first responder agencies • Managing the plan for EOC expansion in a disaster situation • Maintaining a database of manpower, resources, equipment, etc. for use in emergency situations • Maintenance of web-based emergency response plan updating system

During Phase	Disaster	<ul style="list-style-type: none"> • Emergency coordination, command, and response management • Providing technical assistance to first responder agencies and cluster leads to ensure an efficient recovery mechanism • Conducting damage assessment and need analyses • Keeping records (on damages, losses, and response needs) in order to meet the needs of the affected and provide necessary information for assistance (including cash appeals) to external agencies • Implementing disaster response activities • Reviewing and monitoring of progress of disaster response activities and reporting to Government authorities
Post-disaster Phase		<ul style="list-style-type: none"> • Developing a plan for phasing out response activities when no longer necessary and then phasing out response activities when appropriate • Implementing a plan for phasing out response activities undertaken by first responder agencies • Undertaking priority actions in partnership with service agencies (such as gas, electricity, water, telecom, etc.) for the restoration of critical facilities and urban services • Preparing to hand over functional responsibilities in relation to coordination, command, and management to agencies responsible for recovery activities • Developing a structure for handing over management to permanent recovery planning agencies • Reviewing and monitoring the progress of response activities • Carrying out an evaluation of response management so that shortcomings can be integrated in the review process of the National Earthquake Contingency Plan

4.3 Leadership and Operational Structure of Town-level EOC

The Town-level EOC will be operated under the leadership of the Municipality with the full support and active participation of Municipality Disaster Management Committee (PDMC) and the Municipality Disaster Response Coordination Group as stated in the Standing Order on Disaster.

The EOC will be led by the Municipality Mayor as the EOC Chief/Commander and assisted by the Coordinator, Operation Officer, Panel of Technical Experts and Administrative System.

The operational function of the EOC will be organized under the responsibility of following desks:

Desk	Responsibilities
Planning	<ul style="list-style-type: none"> • The Planning Desk is primarily involved in evaluating the disaster situation, determining objectives, providing overall strategic and policy directions, establishing unified actions across the town, deciding which resources should be used to achieve disaster response in the most efficient and cost-effective manner, and liaison with PDMC, Municipality, National EOC and international agencies (if necessary).
Coordination	<ul style="list-style-type: none"> • The Coordination Desk is responsible for acting as a focal point for receiving all incoming information, including reports of damages, casualties, and

	requirements from the affected areas, processing and analyzing the information, and disseminating to the public and media.
Operation	<ul style="list-style-type: none"> The Operation Desk is responsible for conducting tactical field operation to carry out response activities as per the plan, including the overall coordination among field-level technical response clusters, and ensuring operational continuity.
Logistic	<ul style="list-style-type: none"> The Logistic Desk provides support to supply resources and all other logistic services needed to meet the incident needs. It is also responsible for coordinating and making request for additional support from National Authorities, first responder agencies, other government agencies, and private sector agencies as needed from field-level technical response teams.
Finance and Administration	<ul style="list-style-type: none"> This desk monitors costs related to incident management. It provides accounting, procurement, time recording, and cost analyses.

These desks and the EOC administrative system are responsible for maintaining the operations of the EOC and sustaining an environment which enables the clusters to implement the response and recovery activities. The EOC will provide situational information to the clusters as it becomes available. It will also exchange information with National EOC on a regular basis.

During emergency, the EOC will house a number of technical team as per the functional response clusters. Each team will lead by a first responder agency with relevant mandates, and consisting of selected members (trained and experienced in respective fields of response or support activities) from support agencies/departments as well as urban community volunteers. Cluster leadership and membership has been designated and actions are outlined in **Section 5**.

4.4 Role and Organization of Urban Volunteers

Fire Service and Civil Defence (FSCD) is one of the lead government agencies which remain alert for 24 hours a day to manage any disaster in Bangladesh. However, the total manpower of FSCD is not adequate in respect of necessity. Considering the earthquake risk in the country, FSCD with the support of CDMP has initiated to train the community volunteers on disaster management especially on earthquake so that they can serve the people in case of any disaster before the arrival of professionals even they can assist the professionals after their arrival. Tangail Town has a trained volunteer group of about 150 persons to provide immediate assistance to carry out light search and rescue operation and fast aid support to injured persons. As a local resource, this volunteer group will be used in a number of support roles to augment emergency operations. Detailed information of urban community volunteers to work for response activities in Tangail Town is given in the **Table A-3** in **Annex-A**.

4.5 Coordination with Internal Agencies

During an emergency, in the interest of speed and simplicity in disaster response management, coordination should be carried out at the lowest possible level of the government organization, with minimum reorganization of local disaster management committees. Hence, to decentralize the

responsibilities during an earthquake emergency, coordination among town-level government organizations will be carried out as per the structure of Local Disaster Coordination Group (Municipality and District) as placed in the Standing Order on Disaster (SOD).

While not physically present at the EOC, supporting agencies play a critical role in disaster management at the Town-level. They are cluster members and work with the first responder agencies who serve as cluster leaders to implement response and recovery activities. Close coordination within the clusters (vertically among leadership and members and horizontally among members) is imperative to prevent both gaps in service and redundancy. Relationships between cluster members should be fostered during the preparation phase and continued throughout response and recovery phases. Each cluster should form its own system of communication and meeting structure which should be tailored to the level of coordination needed. Some supporting agencies may be responsible for a variety of tasks which necessitate membership in more than one cluster. These agencies will be obligated to meet the requirements of cluster membership for each and should designate staff to participate accordingly.

In addition to activities undertaken by cluster-specific lead and support agencies, private sector plays a critical role in emergency management. These roles may include being an impacted organization, a response resource, a partner in preparedness, and/or a component of the economy. There should be communication and coordination with the private sector to provide support through public-private partnerships, associations, and contractual agreements in responding to and recovering from a major earthquake

4.6 Coordination with External Agencies

The Town-level EOC will notify the National EOC of any shortfall of resources and support needed. The National EOC will direct resources available at national, divisional and other Town-level to assist the affected town.

Section 05: Action Strategies

Cluster-wise action strategies comprising detailed activities before, during and after a major earthquake in Tangail Municipality area and responsible lead and support agencies are described below:

CLUSTER 1: COMMAND AND COORDINATION

Lead Agency	Tangail Municipality	
Support Agencies	DC Office, Army, FSCD, DDM, BP, RAB, Ansar & VDP, BGB, Media, CSO, PDB, BTCL, Titas Gas, PWD, RHD, BR	
Primary Objectives	<ul style="list-style-type: none"> To prepare a framework for integrated response efforts by formulating a well-coordinated system for reduction of impacts of potential earthquake events 	
Activities		Support Agencies
Pre-Disaster Phase	Development of Standard Operation Procedure (SOP)	FSCD, Army, BP, Ansar & VDP, RAB, BGB
	Establishment of City level 24/7 Emergency Operation Centre and participate in EOC operations and reporting of readiness	FSCD, Army
	Setting up earthquake Incident Command Systems (ICS) in place (establishment, training and capacity building) where appropriate	FSCD, BP, Ansar & VDP, RAB, BGB
	Organizing ICS training and nominate representatives to participate in ICS established at various levels	FSCD, BP, Ansar & VDP, BGB
	Development of a disaster event response reporting system by stakeholder agencies (impacts, resource needs, actions by them for reducing the impact, difficulties, opportunities etc.) during earthquake	DC Office, BP, Ansar & VDP, RAB, BGB
	Promotion of informal education on earthquake Contingency Plan operations at all levels and conduct simulations	NGO's
	Development of guidelines for media agencies on reporting disaster events, procedures for public information dissemination related to emergency declaration, announcements and warnings on aftershocks, and disseminate public awareness and advocacy material to support Contingency Planning and implementation	DC Office, National and Local Electronic and Print Media
Emergency Response Phase	Facilitating mobilization of earthquake incident command system where necessary under the command of Army and networking with organizations under ICS	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas
	Executing operation surveillance continuously covering all the earthquake affected areas	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas
	Mobilization of ICS teams at lower level command structure	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas, Local Newspapers
	Facilitating coordination of logistic supply management	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL,

		TitasGas
	Assisting authorities for communications with media in relation to information dissemination on welfare of victims, missing and found, results on damage assessment surveys, results on need assessment surveys and facilitate media coverage by media agencies on reporting earthquake event	DC Office, DDM, National and Local Electronic and Print Media
	Facilitating public information dissemination related to emergency declaration, announcements and warnings on aftershocks and repeat of occurrences of other collateral hazards due to aftershocks	DC Office, DDM, National and Local Electronic and Print Media
Early Recovery Phase	Coordinating Operation Surveillance to reduce impacts due to aftershocks	AFD, FSCD, DRR, Office of Civil Surgeon, BPDB, Office of Deputy Commissioner
	Facilitating coordination of logistic supply management and deployment of resources to affected areas, IDP camps etc.	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas
	Conducting Post disaster Evaluation of performance of <ul style="list-style-type: none"> • earthquake incident command system and recommend improvements • performance of National EOC and improvement where necessary 	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas
	Facilitating continuation of EOC operations and periodic reporting during early recovery period to EOC on involvement of all first responder organizations in earthquake event management and for necessary assistance	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas
	Facilitating media coverage by media agencies on reporting of post-earthquake disaster event situation analysis and facilitate public information dissemination related to emergency declaration, announcements and warnings on aftershocks and possible impacts due to collateral hazards	Local electronic and print media
	Assisting authorities for communications with media in relation to information dissemination on welfare of victims, Missing and found, results on damage assessment surveys, results on need assessment surveys	DC Office, DDM, Local Electronic and Print media
	Review of the Contingency Plans under the Cluster - Emergency Operations- Overall Command and Coordination and revise the same to include suitable modifications to improve the performance	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, Titas Gas

CLUSTER 2: SEARCH, RESCUE AND EVACUATION

Lead Agency	Fire Service and Civil Defence (FSCD), Tangail	
Support Agencies	DC Office, Army, FSCD, DRRO, BP, RAB, Ansar & VDP, BGB, Media, CSO, PDB, BTCL, Titas Gas, PWD, RHD, BR, BDRCS	
Primary Objectives	<ul style="list-style-type: none"> To prepare effective plan for emergency services (search, rescue, evacuation, first aid, fire safety etc.) by ensuring inter-agency coordination at city level To build capacity of concerned agencies and develop guidelines in the light of national and international practice 	
	Activities	Support Agencies
Pre-disaster Phase	Developing guidelines for urban search and rescue	Army, FSCD, BP, DC Office
	Cataloguing/procurement of equipment for special search & rescue, and develop procedure for ensuring access	FSCD, Army, Office of Civil Surgeon, BDRCS
	Capacity building for creating special units for urban search and rescue from collapsed buildings, infrastructure, medical first response	FSCD, Army, Office of Civil Surgeon, BDRCS
	Capacity building of community first responder groups in search and rescue operations, medical first response	FSCD, Army, Office of Civil Surgeon, BDRCS
	Developing medico-legal procedure for identification and tagging of dead bodies with health group	FSCD, Army, Office of Civil Surgeon, BDRCS, NGOs
	Ensuring fire safety preparations (through pre-positioning of fire hydrants, fire stations, developing data base of sources of water, storage of material etc.)	FSCD, DC Office, BPDB, BTCL, Titas Gas
	Pre-positioning of tools , equipment and accessories, get the civil authorities to develop inventories of such equipment available for use during earthquakes	Army, FSCD, DC Office, RHD, BR, BPDB, BTCL, Titas Gas
	Preparing resource inventory (equipment, tools, accessories and manpower etc.) and Procurement of necessary tools and equipment for urban search and rescue operations to fill the agency level gaps	FSCD, Army, Office of Civil Surgeon, DDM, BP, Ansar & VDP, BR, BPDB, BTCL, Titas Gas
	Preparing guidelines for logistic supply management and deployment of resources	FSCD, Army, Office of Civil Surgeon, DDM, BP, Ansar & VDP, BR, BPDB, BTCL, Titas Gas
	Capability assessment of agencies who could be involved in search and rescue operations	Army, FSCD, Office of Civil Surgeon, BDRCS, BP

Emergency Response Phase	Carry out the inter-agency coordination to optimize the efforts of search and rescue teams by providing necessary guidance and inputs.	FSCD, Army, BP, Ansar & VDP, BDRCS
	Coordination with national and international teams engaged in search and rescue and coordination of information supply and feedback	FSCD, Army, Office of Civil Surgeon, BDRCS, DC Office
	Mobilizing special teams of search and rescue from collapsed buildings and infrastructure	FSCD, Army, Office of Civil Surgeon, BDRCS, DC Office
	Mobilizing necessary additional manpower, tools and equipment for search and rescue operation from other stations located outside the affected area	FSCD, Army, Office of Civil Surgeon, BDRCS, BP
	Mobilizing community based social volunteer networks and trained first responders from unaffected areas to support the search and rescue parties	FSCD, Ansar & VDP
	Make arrangements to obtain resource inventory and data base for search and rescue operations and provide information based on the spatial data on rapid loss estimation	FSCD, Army, Office of Civil Surgeon, BP, DDM
Early Recovery Phase	Networking with organizations and mobilize support for search and rescue operations in areas which are difficult to reach	FSCD, Army, Office of Civil Surgeon, BP, DDM, NGOs
	Mobilizing community based social volunteer networks and trained community first responder groups to assist special units mobilized for search and rescue from collapsed buildings and infrastructure	FSCD, BP, BDRCS, Ansar & VDP, Office of Civil Surgeon
	Make arrangements to access resource inventory items for search and rescue operations and mobilize support of external groups for search and rescue operations	Army, DDM, NGOs, Office of Civil Surgeon
	Monitoring and evaluation of <ul style="list-style-type: none"> Post disaster performance evaluation of special units mobilized for search and rescue from collapsed buildings and infrastructure Inter-agency coordination functions All relevant emergency services in operation in earthquake affected areas aiming at reducing the human casualties 	FSCD, AFD, Office of Civil Surgeon, DDM, BP, Ansar & VDP
	Review of the Contingency Plan under the Cluster - Search Rescue and Evacuation and revise the same to include suitable modifications to improve the performance	FSCD, AFD, Office of Civil Surgeon, DDM, BP, Ansar & VDP

CLUSTER 3: HEALTH SERVICES

Lead Agency	Office of Civil Surgeon, Tangail	
Support Agencies	Municipality, Army, FSCD, DDM, BP, BDRCS, Hospital and Clinic Authorities, Medical College, Civil Societies, Media, NGOs	
Primary Objectives	<ul style="list-style-type: none"> To minimize human casualties by establishing an efficient medical first response system in areas with high seismic risk To enhance the hospital emergency medical care through development of hospital preparedness plans To build capacity for setting up a well-organized mass casualty treatment system To develop epidemic surveillance system to prevent outbreak of epidemics during post-earthquake period 	
	Activities	Support Agencies
Pre-disaster Phase	Hospital preparedness planning and training on Hospital Preparedness for emergency operations	Municipality, BDRCS, NGOs
	Methodology development for handling of dead and missing during earthquakes and emergencies	Army, BDRCS, Municipality
	Developing networks with private & government hospitals within the area and in the neighborhood for support during emergencies like earthquakes	Army, Municipality, Hospitals and Clinics
	Developing alert system for hospital staff including doctors to report for work during emergencies such as earthquakes	Army, Municipality, Hospitals and Clinics
	Setting up of 24/7 State of the art ambulance services	Army, FSCD, Municipality, Hospitals and Clinics
	Identifying needs for pre-positioning of medicine, temporary hospitals etc. and obtain the necessary resources	Army, FSCD, Municipality, NGOs
	Methodology development for epidemic surveillance and control	Army, FSCD, BDRCS
	Conduct operation surveillance training for all First Responder Organization for quick mobilization in earthquake events	
	Impart training to community medical first responders within the city and develop a database	Army, FSCD, BDRCS
	Methodology development for estimation of casualty and human injury	Army, FSCD, Municipality
Emergency Response Phase	Methodology development for estimation of livestock, number of injured people and casualty	Army, FSCD, Municipality
	Mobilizing health teams for providing emergency medical care to displaced persons.	Army, FSCD, DDM, NGOs
	Activating the alert system for hospital staff and voluntary groups to report to hospitals and medical centers as planned	Hospital and Clinic authorities, Medical Colleges
	Mobilizing health teams to provide first aid to displaced and injured when and where necessary	FSCD, NGOs, BDRCS
	Mobilizing health teams for setting up of temporary hospitals in suitable locations, when and where necessary to treat injured and sick after the earthquake	Army, Municipality
	Mobilizing pre-positioned medical facilities , Mobile Hospitals etc. to treat injured and sick	Army, FSCD, Municipality

	Mobilizing support from other hospitals (Private hospitals, hospitals located elsewhere etc) when and as needed and coordinate with private and International Medical Teams to optimize their contributions to national efforts in saving lives and treatment of critically injured.	Hospital and Clinic authorities, FSCD, NGOs
	Mobilizing medical first responders within the city to assist field medical teams, Hospitals and Medical Clinic authorities	Hospital and Clinic authorities, Army, FSCD, SCC
	Mobilizing trained Triage teams to affected city wards and control points, transportation of injured to hospitals	Hospital and Clinic Authorities, Municipality
	Mobilizing ambulance services to transport sick and injured	Hospital and Clinic authorities, Army, FSCD, Municipality
	Mobilize health teams for tagging of dead bodies and locating missing during the earthquake	Army, BP, FSCD
	Get assistance from qualified professionals to conduct rapid damage assessment of all health infrastructure within the city and identify suitability for usage for treatment of injured and sick	Army, FSCD, Municipality
	Establishing counseling centers	Municipality, NGOs
Early Recovery Phase	Continue providing emergency medical care to displaced persons.	Army, DDM, Municipality
	Conduct the M&E and performance evaluation of Health cluster activities and introduce necessary modifications to improve the performance	Army, FSCD, DDM, BDRCS, NGOs
	Conducting evaluation of performance of medical first responder groups and improve the methodology for training and simulations	NGOs, Medias
	Conducting the evaluation of ambulance services to transport sick and injured during emergencies and introduce modifications to improve the services	NGOs, Hospital and clinic authorities
	Continue assistance to authorities in mortuary services(such as identifying dead & missing, issue of death certificates for disposed and inventorying and maintenance of records etc)	Army, FSCD, DDM, NGOs, BDRCS
	Follow medico-legal procedure for identification and tagging of bodies, disposal of dead bodies	BP, Army, FSCD, Municipality, NGOs
	Conducting evaluations of the level of preparedness & performance during emergency by all hospital and medical institutions	Army, Medias, Civil Society
	Conducting review of the Contingency Plan for the Health Cluster agencies and revise to integrate the improvements	Army, FSCD, DDM, Municipality

CLUSTER 4: LOGISTICS SUPPORT AND RELIEF SERVICES (FOOD, NUTRITION AND OTHER RELIEF)

Lead Agency	Tangail Municipality	
Support Agencies	DC Office, Army, DDM, DoF, District Food Office, BP, Ansar and VDP, BGB, BDRCS, FSCD, NGOs, INGOs	
Primary Objectives	<ul style="list-style-type: none"> To conduct survey for assessing and analyzing damages and estimating needs To ensure provision of necessary essential facilities for displaced population after emergencies To ensure provision of food and nutrition, logistic supply to displaced population based on need assessment To coordinate with international and local NGOs, donor agencies to supplement the government welfare assistance to IDPs 	
	Activities	Support Agencies
Pre-disaster Phase	Networking with various stakeholders and development of system for reporting the stocks of supplies and resources (funding agencies, NGOs & INGOs for identification of resources, improved coordination relief material distribution) and maintain a database	DDM, DoF, BDRCS
	Developing guidelines, data formats and carry out capacity building for damage analysis and need assessment	DC Office, Army
	Developing guidelines and disseminate information on <ul style="list-style-type: none"> Logistic supply management and deployment of resources Maintaining of temporary or permanent emergency shelters Distribution of welfare items and food Quality assurance for food and nutrition Setting up welfare camps by all agencies 	Army, BDRCS
	Developing guidelines for community mobilization to increase the community participation in relief distribution and camp management	DDM, FSCD, Army, BDRCS, Ansar & VDP
	Establishing warehouses for store of government supplies of welfare items food and supplementary items	DC Office, Army, DDM
	Ensuring government resources for buying additional welfare items food and supplementary items	DC Office, DDM
	Developing guidelines for rehabilitation of physically handicapped disabled and vulnerable groups	DDM, NGOs
	Developing inventory of agencies within the city who possess stocks of welfare items, food and nutrition, temporary shelter and camps, water purification plants, generators, cooking facilities etc. to be used in case of emergencies	DC Office, DDM, Army, BDRCS
Emergency	Preparation of necessary documentation for preparation of flash appeals in collaboration with NEOC	Army, DDM, BDRCS
	Conducting damage analysis and need assessment survey in affected areas and preparation of estimates of items and other urgent needs for obtaining donor support for external contributions. Networking with various stakeholders (funding agencies, NGOs & INGOs for mobilization of contributions, improved	DC Office, DDM, Army, FSCD, NGOs

	coordination of relief material distribution)	
	Setting up temporary camps to house IDPs and provide other essential items (such as Food, Nutrition and other Relief), Mobilize support from NGOs, INGOs for providing assistance to IDPs	DC Office, DDM, Army, BDRCS, NGOs
	Mobilization of community social volunteer groups through Local Governments, CBOs and NGOs to assist setting up of camps for IDPs ,maintenance of camps etc.	Army, DDM, Ansar & VDP, BDRCS
	Networking with ministries, departments, district authorities, donor agencies, NGOs and INGOs for mobilization of support for supply and distribution of relief material and welfare items. Supply of food and supplementary items through DC, government departments, other district authorities for distribution to victims. Conduct surveys for quality assurance for food and distribution	DC Office, Army, DDM, Ansar & VDP, BGB
	Liaise with relevant govt. agencies, line departments, district authorities, civil society agencies to ensure welfare of other victims(those who are living in their own, those who are with friends and relatives etc.) and food supply	DC Office, Army, Ansar & VDP
	Assisting other stakeholder agencies such as NGOs and INGOs for supply of food and supplementary items to displaced when and where necessary through assistance in national level procurement, import of items, custom clearance, transportation to affected areas etc.	Army, DC Office
Early Recovery Phase	Evaluating of overall performance of Cluster - Relief Services (Food, Nutrition and other Relief)	Army, DDM, BP
	Networking with ministries, departments, district authorities, donor agencies ,NGOs & INGOs and assistance for efficient coordination for distribution of relief material welfare items	DDM, DC Office
	Conducting routine surveys for quality assurance for food and nutrition distributions carried out by government and non-government agencies	DDM, DC Office, Army
	Periodic Stock taking of central Godowns to carry out qualitative and quantitative assessment of food items and facilitate efficient distribution	DC Office, DDM, District Food Office, NGOs, INGOs
	Periodic visits to welfare camps and monitoring and evaluation of compliance of guidelines for maintenance of welfare camps by all agencies	DDM, DC Office, Army
	Providing necessary assistance in documentation, tax payment if applicable and custom clearance etc. to other stakeholder agencies such as NGOs and INGOs for continues supply of food and supplementary items to displaced located in camps for IDPs	DDM, DC Office, Army
	Assisting all agencies providing welfare , food and nutrition support for transportation and distribution of supplies to victims when and where necessary	DDM, Army, INGOs
	Reviewing Contingency Plan for the Cluster - Relief Services (Food, Nutrition and other Relief) and revise if necessary to introduce measures to improve performance	DDM, Army, NGOs, INGOs, BDRCS

CLUSTER 5: SHELTER

Lead Agency	Tangail Municipality	
Support Agencies	DC Office, Army, DDM, DoF, District Food Office, BP, Ansar and VDP, RAB, BGB, PWD, Department of Social Welfare (DSW), NGOs	
Primary Objectives	<ul style="list-style-type: none"> To ensure temporary shelter for displaced after disaster events such as Earthquakes and provision of basic facilities to the same 	
	Activities	Support Agencies
Pre-disaster Phase	Preparing plan for temporary shelter provision and management	DDM, Army, DC Office, BP
	Identification of potential open air sites appropriate for temporary shelters for displaced population and conduct capacity assessment of these open air sites	DDM, Army, DC Office, BP
	Identification of earthquake-resistant educational buildings (school, college, universities, etc.) and communal buildings (community centers, auditorium) that can be used as temporary shelters, and conducting capacity assessment of these buildings	PWD, DDM, Army, DC Office
	Determining the ownership of these sites and buildings and enter into pre-agreements if relevant	PWD, DDM, Army, DC Office
	Assessing the need for pre-positioned family tents, communal kitchen materials and utility services (water supply, electricity, toilet facilities, etc.) for identified temporary shelters, and maintain stocks of standby emergency shelter items/equipment for quick mobilization during establishment of temporary shelter	DDM, Army, DC Office, BP
	Determination of special need and maintain the provision for most vulnerable group (gender, children, disable and elderly people).	DDM, Army, DC Office, BP, DSW
	Preparing security plan for temporary shelter camps	BP, DDM, Army, DC Office
Emergency Response Phase	Activating the plan for temporary shelter provision and management	BP, DDM, Army, DC Office
	Estimating the number of homeless due to earthquake, according to all available sources who need temporary shelters.	DDM, Army, DC Office, BP
	Determining immediate needs in terms of shelters to include: open air sites, educational and communal buildings and other specific needs according to season.	DDM, Army, DC Office, BP
	Assessing the condition of identified shelter sites and buildings after earthquake that can be used for temporary shelters.	PWD, DDM, Army, DC Office, BP
	Setting up and manage tented camps / community shelters and ensure the distribution of temporary shelter stock to the people of greatest need.	DDM, Army, DC Office, BP, NGOs
	Estimating the needs in terms of essential household items, fuel for cooking, relief items, water supply, sanitation and hygiene and ensure the supply according to the need	DDM, Army, DC Office, BP, NGOs
	Ensuring the special needs for most vulnerable group (gender, children, disable and elderly people).	DDM, Army, DC Office, BP, DSW
	Implementing the shelter security plan	BP, RAB, Ansar and VDP, BDB

	Liaise with camp management team, to meet the needs on an on-going basis and obtain periodic situation reports and review the progress on shelter management	DDM, Army, DC Office, BP
Early Recovery Phase	Conducting survey of temporary shelter set up for IDPs for qualitative improvement	DDM, Army, DC Office, BP
	Review of on-going shelter requirements for medium and long term (number of homeless, state of buildings, coping strategies of beneficiaries, specific needs according to time of the year, etc.)	DDM, Army, DC Office, BP
	Establishing plan for medium/ long term needs including time frame and transition strategy	DDM, Army, DC Office, BP
	Developing early recovery Plans for setting up new Settlement programs and rehabilitation of partially damage settlement and housing for supply of permanent shelter for affected.	DDM, Army, DC Office, BP
	Reviewing performance of Cluster - Shelter and introduce modifications to the Contingency Plan for better performance in future.	DDM, Army, DC Office, BP

CLUSTER 6: WATER SUPPLY, SANITATION AND HYGIENE

Lead Agency	Tangail Municipality	
Support Agencies	DPHE, Army, FSCD, DDM, DC Office, Office of Civil Surgeon, NGOs, INGOs	
Primary Objectives	<ul style="list-style-type: none"> To provide safe drinking water, sanitation facilities and hygiene services during earthquake disaster. To restore the water supply system immediately after earthquake disaster. To control epidemics and provide immunization 	
	Activities	Support Agencies
Pre-disaster Phase	Developing procedure for vulnerability assessment of water supply system and other infrastructure facilities, sewerage & drainage systems by respective managers	DPHE
	Developing Contingency Plans for water and sanitation sector, waste management systems at all levels covering earthquake prone agencies by respective managers	DPHE
	Identification of water sources and other infrastructure elements most likely to survive earthquake	DPHE
	Pre-positioning of water supply deep wells to be used during emergencies	DPHE
	Developing minimum standards for drinking water supply and issue guidelines to public, NGOs, INGOs and other civil society organizations	DPHE
	Developing guidelines for close surveillance in epidemic outbreak and conduct of preparedness measures such as immunization programs, awareness programs to prevent epidemic outbreaks	Office of Civil Surgeon, Army, FSCD
	Developing guidelines with water and sanitation group for minimum sanitation levels to be maintained in temporary shelter set up for IDPs	DPHE
	Facilitating alternate systems for emergency water supplies such as transportation by container trucks, bowsers etc.	DPHE, FSCD
	Promoting household level long term water conservation methods such as rain water harvesting, water softening and SODIS techniques for water purification	DPHE
Emergency Response Phase	Activating the Contingency Plans for water and sanitation sector at all levels covering earthquake affected areas	DPHE, Army, FSCD
	Observe the emergency water supply needs and communicate to relevant stakeholders	DPHE, Army, FSCD
	Conducting close surveillance in epidemic outbreak in affected areas due to problems connected with water and sanitation and make remedial actions	DDM, Army, FSCD, Civil Surgeon Office
	Conducting rapid damage assessment of water supply, sewerage & drainage system and initiate actions for restoration	DPHE, DDM, Army, FSCD
	Assisting authorities to maintain water supply and sanitation facilities within welfare camps set up for	DPHE, DDM, Army, FSCD

Early Recovery Phase	victims	
	Implementing sanitation management system in the temporary shelter for the benefit of victims in affected areas	DPHE, DDM, Army, FSCD
	Arrangements for quality check of water sources, bottled water and disposable water containers	Army, DPHE, NGOs, INGOs
	Carrying out performance evaluation of response actions under Cluster -Water Supply, Sanitation and Hygiene and introduce suitable modifications to Contingency Plan to improve the performance	Office of Civil Surgeon, DDM, DPHE
	Observing and facilitating the emergency water supply needs and communicate to relevant stakeholders	DPHE, DC Office
	Conducting close surveillance in epidemic outbreak in affected areas due to problems connected with water and sanitation and make remedial actions	Office of Civil Surgeon, DPHE
	Conducting Damage Assessment survey for water supply facilities and develop plans to restore and rehabilitate the facilities at all levels covering earthquake affected areas	DPHE
	Conduct periodic quality check of water sources, portable water containers and disposal of waste	DPHE

CLUSTER 7: RESTORATION OF CRITICAL FACILITIES AND UTILITY SERVICES

Lead Agency	Tangail Municipality	
Support Agencies	PWD, BPDB, BTCL, Titas Gas, DPHE, DC Office, DDM, Army, FSCD, Office Civil Surgeon, Universities, NGOs, Private Sectors	
Primary Objectives	<ul style="list-style-type: none"> • To identify the critical urban services and facilities vulnerable to earthquakes and strengthening the same to a higher safety level • To ensure efficient restoration of utilities and services after earthquakes such as supply of water, telecommunication facilities, electricity, gas and, waste disposal etc. • To ensure provision of basic facilities to the temporary shelters for displaced population after earthquake events • To prevent outbreak of fire due to malfunctioning of utilities such as gas, electricity supply etc. • To ensure prevention of environmental disorder due to release of hazardous waste and material 	
	Activities	Support Agencies
Pre-disaster Phase	Conducting scenario based need assessment survey for emergency services in earthquake prone urban areas and report to authorities	DDM, PWD, Office of Civil Surgeon, BPDB, BTCL, Titas Gas, DPHE
	Developing methodology for vulnerability assessment of buildings and infrastructures and loss estimation to identify high risk areas	DDM, PWD, Office of Civil Surgeon, BPDB, BTCL, Titas Gas, DPHE
	Developing procedure for restricting or preventing entry into damaged buildings	BP, Ansar & VDP, RAB, BGB
	Conducting vulnerability assessment of important government buildings , critical facilities, infrastructures and utility systems	DDM, PWD, Office of Civil Surgeon, BPDB, BTCL, Titas Gas, DPHE
	Preparing location maps and collect other information related to pre-positioned essential facilities to be used during earthquakes	DDM, PWD, Office of Civil Surgeon, BPDB, BTCL, Titas Gas, DPHE
	Developing guidelines for spatial planning & land use control (for emergency evacuation and provision of temporary shelters both in developed & undeveloped areas) and revise land use Plans to create/preserve open spaces within urban areas, create more parks, recreational areas , green areas suitable for emergency evacuations, create essential facilities such as water , electricity, telecommunication, gas, etc.	PWD, LGED, DC Office, DDM
	Developing guidelines for recovery planning at various levels based on sector needs and special vulnerable groups (gender, elder persons, children, etc.) through integration of earthquake risk management principles	DDM, PWD, Office of Civil Surgeon, BPDB, BTCL, Titas Gas, DPHE, NGOs
	Identification of evacuation routes in high risk areas and take actions to improve access to inaccessible areas for S&R actions	FSCD, Army, BP
	Conducting meetings with utilities sub-committee for enhanced preparedness measures to be undertaken by utility agencies to minimize impacts and to prevent malfunctioning of services during emergencies	BPDB, BTCL, Titas Gas, DPHE
	Maintenance of stocks of most essential spare parts and service personnel for attending to large scale emergencies such as earthquakes	BPDB, BTCL, Titas Gas, DPHE

	Developing guidelines for vulnerability assessment of utilities and conduct training for utility sector staff for undertaking vulnerability assessments	BPDB, BTCL, Titas Gas, DPHE
	Capacity building of utility sector for Contingency Planning and planning for restoration of facilities and implement Response Capacity Assessment programs for reduction of impacts on utility sector and develop efficient response capacity	BPDB, BTCL, Titas Gas, DPHE
	Designing and implementing projects for pre-positioning of emergency water, electricity, gas supply, and telecommunication services for critical areas	BPDB, BTCL, Titas Gas, DPHE
	Developing procedure for post-earthquake damage assessment of all essential utilities within the city	BPDB, BTCL, Titas Gas, DPHE
	Provisions of utility services for buildings identified as temporary shelters, and maintain stocks of standby emergency shelter items/equipment for quick mobilization during establishment of temporary shelter(stand-by generators, temporary camps etc.)	BPDB, BTCL, Titas Gas, DPHE
	Identification of all possible sources of hazardous waste/hazardous material release during emergencies and conduct awareness programs to prevent environmental and societal impacts due to release of hazardous substance during emergencies such as earthquakes	Relevant Industries, Business enterprises
	Holding discussion with Private institutions(Business sector, Industries etc.) to create awareness on Contingency Planning to reduce losses and casualties in work places and provide necessary technical assistance and conducting mock drill etc. for Contingency Planning	Relevant Industries, Business enterprises
	Immediately activating the plan for shut off of all supplies of gas, electricity, waste disposal etc. at all shut off points.	BPDB, BTCL, Titas Gas, DPHE
Emergency Response Phase	Mobilizing pre-positioned/stand by essential emergency support units and facilities (boreholes for emergency water supply, search and rescue stores at community level, stand-by generators, mobile kitchens, water supply and purification units, mobile hospitals, etc.)	BPDB, BTCL, Titas Gas, DPHE, Office of Civil Surgeon, Army, FSCD, BP, Ansar & VDP
	Carrying out rapid damage assessment of critical facilities like city buildings and suitability check for using as temporary offices	PWD, Army, FSCD
	Facilitating provision of basic facilities to temporary camps set up for IDPs	BPDB, BTCL, Titas Gas, DPHE
	Mobilizing teams for rapid damage assessment of housing units and dwellings and issue certificate for occupation after earthquake event	PWD, DC Office, DDM
	Providing assistance for rapid damage assessment of buildings belong to first responder agencies such as Army, FSCD, Hospitals, Critical Government Buildings to prevent occupation of unsafe buildings	PWD, DC Office, DDM
	Liaise with private institutions (Business sector, Industries etc.) for activating the Contingency Plans to conduct rapid damage assessments to work places and provide necessary technical assistance	Relevant Industries, Business enterprises

	Undertaking restoration work and actions by utility agencies to re-establish supply of power, gas, etc. to critical agencies(hospitals, AFD, Police, evacuation camps so on)	BPDB, BTCL, Titas Gas, DPHE, Army, FSCD, School, College, Universities, DDM
	Conducting rapid damage assessment survey of utility supply systems and restoration of supply to critical facilities (such as hospitals, police, Army, Fire Service, etc.) Organize project teams to conduct rapid damage assessment of all essential utilities within the city by utility managers	BPDB, BTCL, Titas Gas, DPHE, Army, FSCD, Universities, DDM
	Mobilizing pre-positioned emergency utility supply services for critical areas	BPDB, BTCL, Titas Gas, DPHE, Army, FSCD, DDM, NGOs
	Obtaining periodic situation reports and review the progress on activation of Contingency Plans and restoration of services by utility agencies	BPDB, BTCL, Titas Gas, DPHE
Early Recovery Phase	Conducting survey of temporary shelter set up for IDPs for qualitative improvement of shelter for IDPs	DDM, Army
	Developing early recovery Plans for setting up new settlement programs and rehabilitation of partially damaged settlement and housing for supply of permanent shelter for affected.	DDM, PWD, DC Office
	Conducting damage assessment survey of all utilities and prepare plans to restore and rehabilitate supply of power, water, gas, to affected areas	BPDB, BTCL, Titas Gas, DPHE, Universities
	Integrating mitigation and preparedness programs in recovery planning by utility agencies for reduction of future earthquake impacts during restoration of facilities	BPDB, BTCL, Titas Gas, DPHE
	Assisting restoration of all essential utilities and services within the city by utility managers	BPDB, BTCL, Titas Gas, DPHE
	Providing periodic situation reports on the status of restoration of services and review the progress	BPDB, BTCL, Titas Gas, DPHE
	Reviewing of the Performance of Cluster – Restoration of critical facilities and utility services and introduce modifications to the Contingency Plan for better performance in future.	DDM, PWD, BPDB, BTCL, Titas Gas, DPHE
	Phase by phase restoration of disrupted electricity, gas, water supply and telecommunication through assessment of degree of damage	BPDB, BTCL, Titas Gas, DPHE
	Conducting rapid damage assessment survey and issue of certificates to house owners and owners of other buildings (business enterprises, shops, commercial centers, inductees, garment factories, hotels, etc.) for ensuring suitability for occupation after the earthquake	PWD, DC Office
	Carrying out planning operations for systematic cleaning, removal and transportation of debris, identify dump sites	Private Sectors
	Conducting a review of performance of the Cluster - Restoration of critical facilities and utility service and revise the Contingency Plan accordingly	Universities

CLUSTER 8: TRANSPORTATION

Lead Agency	Tangail Municipality	
Support Agencies	RHD, LGED, BRTC, BIWTC, BR, DDM, FSCD, Army, BP, Office of Civil Surgeon	
Primary Objectives	<ul style="list-style-type: none"> To identify vulnerabilities of transportation infrastructures to earthquakes and strengthening the same to a higher safety level To restore the transport system immediately after earthquake events for mobilization of resources to the affected areas 	
	Activities	Support Agencies
Pre-disaster Phase	Developing guidelines for vulnerability assessment of transport systems and conduct vulnerability assessment and strengthen transportation system and transport infrastructure	RHD, LGED, BRTC, BIWTC, BR
	Developing emergency teams for restoration of facilities	RHD, LGED, BRTC, BIWTC, BR
	Studying alternate transport arrangements in case of earthquakes and develop route map	RHD, LGED, BRTC, BIWTC, BR
	Developing coordination arrangements between different transport authorities(road, air, sea) to function during emergencies	RHD, LGED, BRTC, BIWTC, BR
	Developing Contingency Plans for city level transportation systems to avoid high risk areas	RHD, LGED, BRTC, BIWTC, BR, BP
	Making arrangements for storage of essential spare parts	RHD, LGED, BRTC, BIWTC, BR
	Making arrangements to fabricate temporary bridges	Army, RHD, LGED
Emergency Response Phase	Taking action by transport authorities to restore the transportation systems to reach critical areas for search and rescue teams and supply of relief	RHD, LGED, BRTC, BIWTC, BR, DDM, FSCD, Army, BP, Office of Civil Surgeon
	Conducting rapid damage assessment survey and reporting by transport authorities for obtaining cooperation of other agencies for restoration of transportation systems.	RHD, LGED, BRTC, BIWTC, BR, DDM
	Mobilization of resources for activation of alternate transport arrangements	RHD, LGED, BRTC, BIWTC, BR, DDM, BP, Ansar & VDP
	Notification of accessible routes after the earthquake event based on the rapid assessment and issue of updates regularly after restoration of additional routes	RHD, LGED, BRTC, BIWTC, BR, DDM, BP, Ansar & VDP
Early Recovery Phase	Conducting damage assessment survey of transport systems due to impact of occurrence of earthquake and collateral hazards and develop Plans for restoration of transport systems to higher seismic safety.	RHD, LGED, BRTC, BIWTC, BR, DDM
	Assisting actions by transport authorities to identify alternate routes for transportation of essential relief supplies, food stocks, welfare items etc.	RHD, LGED, BRTC, BIWTC, BR, DDM, Army
	Commencing rehabilitation of damaged transport infrastructure and facilities, rail roads, main roads, river ports	RHD, LGED, BRTC, BIWTC, BR
	Reviewing of the performance of Cluster - Transportation during the emergency response period and revise the Contingency Plan to improve the performance	RHD, LGED, BRTC, BIWTC, BR, DDM

CLUSTER 9: SECURITY AND WELFARE

Lead Agency	Bangladesh Police, Tangail	
Support Agencies	DC Office, DSW Army, FSCD, Ansar& VDP, RAB, BGB, Municipality	
Primary Objectives	<ul style="list-style-type: none"> • To maintain the law and order situation during earthquake emergencies • To arrange security during emergencies to ensure safety of citizens and protection of properties • To control the movement of population and traffic during emergencies 	
	Activities	Support Agencies
Pre-disaster Phase	Developing a comprehensive plan for security arrangements for citizens and protection of properties, business and industries as well as for maintenance of law and order to be adopted during earthquake emergencies	Army, Ansar & VDP, RAB, BGB, Municipality
	Developing a comprehensive plan for traffic control during emergencies	Ansar & VDP, RAB, BGB, Municipality
	Developing guidelines for control of entrance into damaged buildings, and restrict access to affected areas by unauthorized persons	FSCD, Ansar & VDP, RAB, BGB, Municipality
	Developing guidelines for evaluation of security planning and operations for maintenance of law and order during emergencies	DC Office, FSCD, Ansar & VDP, RAB, BGB, Municipality
	Assisting development of procedures for handling of destitute and orphans	DC Office, Municipality, NGOs, DSW
	Assisting in promotion of social security systems (insurance Schemes, micro credit, etc.)	DC Office, DSW, NGOs, Life Insurance companies
	Developing guidelines for integrating fire hazard management as a component of earthquake response and early recovery actions especially concerning temporary shelter, government buildings, private buildings, business enterprises, and utilities services	Municipality, Army, DDM, NGOs
	Developing procedures for management and maintenance of information on dead and missing	Municipality, DC Office, DSW, Army, FSCD, Office of Civil Surgeon
	Developing procedures for burial of dead, funeral rights, mortuary services etc.	Municipality, DC Office, DSW, Army, FSCD, Office of Civil Surgeon, Ansar& VDP, RAB, BGB
Emergency Response	Activating the security plan for citizens and protection of properties, business and industries as well as for maintenance of law and order	Army, Ansar & VDP, RAB, BGB, Municipality
	Activating the Plan for traffic control during emergencies	Ansar & VDP, RAB, BGB, Municipality
	Exercise control of entrance into damaged buildings, and restrict access to affected areas by unauthorized persons	FSCD, Ansar & VDP, RAB, BGB, Municipality

	Conducting periodic monitoring and evaluation of security operations for maintenance of law and order during emergencies	DC Office, Army, FSCD, Ansar & VDP, RAB, BGB, Municipality
	Activating the Plan for handling of destitute and orphans	DC Office, Municipality, DSW, NGOs
	Assisting in documentation and fulfillment of other needs to benefit the beneficiaries of social security systems such as insurance Schemes, micro credit, etc.	DC Office, DSW, NGOs, Life Insurance companies
	Carrying out the Plans for prevention and control of fire hazard due to main shock and aftershocks in temporary shelters, government buildings, private buildings, business enterprises, utilities & Services	Municipality, Army, DDM, NGOs
	Carrying out the plan for management and maintenance of information on dead and missing	Municipality, DC Office, Army, FSCD, Office of Civil Surgeon
	Carrying out the procedures for burial of dead, funeral rights, mortuary services etc.	Municipality, DC Office, Army, FSCD, Office of Civil Surgeon, Ansar & VDP, RAB, BGB
Early Recovery Phase	Reviewing the performance of implementation of Security Plan and arrangements during earthquake emergency for safety of citizens and protection of Government & Private Property, Business and Industries as well as for maintenance of law and order to be adopted during emergencies such as earthquakes	Army, Ansar & VDP, RAB, BGB, Municipality
	Reviewing the performance of implementation of plan for traffic control during emergencies	Ansar & VDP, RAB, BGB, Municipality
	Carrying out evaluation of security planning and operations for maintenance of law and order during Earthquake emergency	DC Office, Army, FSCD, Ansar & VDP, RAB, BGB, Municipality
	Conducting review of the Contingency Plan under Cluster – Security and Welfare and introduce suitable modifications in revising the Plan to improve the performance	DC Office, DSW, Army, FSCD, Ansar & VDP, RAB, BGB, Municipality

Section 06: Operational Priorities

6.1 Initial Response Goals and Objectives (First 72 hours)

The primary response goal is to save maximum number of lives in case of an earthquake and stabilize the event within first 72 hours. The priority objectives are,

- Delivering immediate search and rescue services and evacuate people to safe locations.
- Providing immediate medical assistance and life-saving and life-sustaining medical services to the victims.
- Providing fatality management services and returning deceased to their loved ones.
- Stabilizing or eliminating damaged buildings and infrastructures to minimize health and safety threats and stabilizing and restoring the essential infrastructures to functional condition.
- Ensuring temporary shelters, including provision of adequate food, water and sanitation facilities to the displaced population.
- Providing overall safety and security and maintaining law and order.

6.2 Priority Actions by Timeframe

a. Priority actions at the Initial Response Phase (First 4 and 8 hours)

First 4 hours	Respond to the immediate known effects of the earthquake
Responsible Clusters	Priority Actions
Command and Coordination	<ul style="list-style-type: none"> • Activate Emergency Operation center (EOC)
	<ul style="list-style-type: none"> • Identify potential sites for evacuation centers to accommodate displaced population while emergency shelters are being opened.
	<ul style="list-style-type: none"> • Identify at-risk populations, notify them and begin to evacuate if warranted.
	<ul style="list-style-type: none"> • Assess the condition and status of critical facilities such as municipality office, DC office, fire service offices, hospitals and clinics, police stations, etc.
	<ul style="list-style-type: none"> • Identify vulnerable buildings or infrastructures that are threatening to impacted area and nearby community that may be affected by cascading effects and secondary hazard and take initiative to stabilize or eliminate immediately.
	<ul style="list-style-type: none"> • Assess the condition of emergency communication system.
	<ul style="list-style-type: none"> • Begin public information dissemination regarding personal protection actions, safe congregation points, and community assistance needed.
	<ul style="list-style-type: none"> • Complete an initial damage assessment of the municipality, identifying areas affected, major incidents, and operational status of critical services.
	<ul style="list-style-type: none"> • Create consolidated situation assessment and declare a state of emergency.

Search Rescue and Evacuation	<ul style="list-style-type: none"> • Mobilize specialized search and rescue team including urban community volunteer and assist immediate life-saving rescue operations.
	<ul style="list-style-type: none"> • Direct and suppression of existing fires and anticipated fire spread based on conditions.
Health Services	<ul style="list-style-type: none"> • Deploy emergency medical services to major incidents.
	<ul style="list-style-type: none"> • Establish casualty collection points and field medical camps for on-scene treatment
	<ul style="list-style-type: none"> • Identify and triage people who have critical injury that require acute medical care and limit the on-scene treatment to non-acute care.
Security and Welfare	<ul style="list-style-type: none"> • Deploy law enforcement resources to support response and maintain law and order.
	<ul style="list-style-type: none"> • Provide overall security and access control for the affected area and security for search and rescue operation.

First 12 hours		Assemble resources for sustained response and for providing basic services to the community
Responsible Clusters		Priority Actions
Command and Coordination		<ul style="list-style-type: none"> • Assess critical resource shortfalls and begin requesting support through National EOC.
		<ul style="list-style-type: none"> • Open evacuation centers/ spaces.
		<ul style="list-style-type: none"> • Initiate a regular status reporting and resource requesting process between local EOC, major incident commands, and National EOC.
		<ul style="list-style-type: none"> • Monitor and address challenges regarding patient load balancing between hospitals and the related patient transport system.
Shelter		<ul style="list-style-type: none"> • Assess conditions at designated emergency shelter sites and estimate the number of displaced population who need emergency shelters.
		<ul style="list-style-type: none"> • Set up tented camps and ensure the distribution of emergency shelter stock to the people of greatest need.
		<ul style="list-style-type: none"> • Assess conditions of educational and communal buildings that can be used for emergency shelter purpose based on the requirements and season.
Relief, Food and Nutrition, Water Supply and Sanitation, Restoration of Utility Services		<ul style="list-style-type: none"> • Begin to supply beds, food, water and sanitation, medical support, cooking facilities, electricity and telecommunication facilities in emergency shelters.
Transportation		<ul style="list-style-type: none"> • Assess condition of transportation system and identify alternatives for moving critical resources into the municipality.
		<ul style="list-style-type: none"> • Designate primary evacuation routes, implement debris clearance and recover routes.
Security and Welfare		<ul style="list-style-type: none"> • Establish perimeter control around unsafe areas and security at critical facilities.

	<ul style="list-style-type: none"> Implement an access permit system to prioritize and the limit the access and traffic control system.
	<ul style="list-style-type: none"> Identify people with special support requirements (people with disability, children, aged people, female, etc.) and ensure that their needs are met.
	<ul style="list-style-type: none"> Determine if a curfew should be established.

b. Priority actions at the Intermediate Response Phase (Through 24, 48 and 72 hours)

Through 24 hours		Consolidate system for sustaining emergency response operations
Responsible Clusters	Priority Actions	
Command and Coordination	<ul style="list-style-type: none"> Commit resources to support public safety by assisting incoming employees and gathering/distributing convergent resources from less-affected parts and national resources. Conduct outreach for situation status and resource needs for affected facilities needing support including ancillary medical institutions, educational institutes, commercial buildings, and sites of historic/cultural significance. Initiate regular news briefings to inform residents on response operations, steps that can be taken, services available to them, ongoing rumor control efforts, and ways in which the community can help. 	
Shelter	<ul style="list-style-type: none"> Designate staging areas and begin planning to accommodate support personnel. 	
Transport	<ul style="list-style-type: none"> Ensure that an adequate system is in place to fuel and maintain generators for providing power to critical facilities. 	
Security and Welfare	<ul style="list-style-type: none"> Establish temporary morgues and begin process of collecting remains. Establish Family Assistant Centers and provide guidance and public messaging about the Family Assistance Centers and dead body collection points. 	

Through 48 hours		Stabilize support for affected areas and secure unaffected areas for resumption of services
Responsible Clusters	Priority Actions	
Command and Coordination	<ul style="list-style-type: none"> Process ongoing logistical resource requests for emergency services needs to support incident management. Make arrangements for the EOC to assume responsibility for supporting incoming aid and convergent resources, relieving field-level public safety workers to focus on providing sustained rescue, firefighting, paramedic, and law enforcement services. Anticipate and support initial damage assessment visits by National officials wanting to confirm the immediate and long-term recovery needs of the municipality for their out-of-area resources. 	

Relief, Food and Nutrition, Water Supply, Sanitation and Hygiene	<ul style="list-style-type: none"> Establish a distribution network for drinking water and food for persons who are not residing in mass care facilities but are without basic services.
Water Supply, Sanitation and Hygiene	<ul style="list-style-type: none"> Implement the emergency drinking water plan.

Through 72 hours	Begin transition from immediate emergency response efforts to sustained operations.
Responsible Clusters	Priority Actions
Command and Coordination	<ul style="list-style-type: none"> Re-evaluate mass care needs in light of any ongoing aftershocks and subsequent damage. Establish the Donations Management Branch and the Human Resources Branch in the logistics section of the EOC to facilitate the handling of volunteers and donations. Participate in discussions with Department of Disaster Management and MoDMR on assessing services that residents will require to recover from the disaster. Review incident status reports to prioritize incident commands that can begin suspending emergency response operations and transition to sustained response and recovery operations.
Health Services	<ul style="list-style-type: none"> Support hospital and other medical facility re-supply efforts.
Shelter	<ul style="list-style-type: none"> Establish shelter support coordinator teams and evaluate the shelter sites to identify site damage, site security, critical support requirements including shelter management personnel, adequacy of feeding and medical care arrangements, shelter demographics (gender, children, medical needs, language barriers, disability needs).
Security and Welfare	<ul style="list-style-type: none"> Establish plans for how to provide care for people with special support requirements that cannot be met in congregate care shelters. Review and enhance security plans to maintain public order.

c. Priorities actions at the Initial Recovery Phase (After 72 hours but before end of first week)

Days 3 through 7 at the initial recover phase, EOC will perform following activities outlined below. Some of these actions may occur immediately or in phases; actions must be identified and prioritized based on overall need and resources available to respond.

- Establish plan and begin widespread safety/damage assessment of public infrastructure, such as roads and sidewalks, bridges, tunnels and retaining walls.
- Establish teams to visit shelters to identify people that require special support that need to be relocated into other types of care facilities and to identify site modifications that should be made to better accommodate residents with sight, hearing, mobility or other limitations.
- Begin locating and opening relief supply and food distribution points other than the evacuation centers/shelters.

- Establish and implement mental health counseling for people whose relatives have been killed and homes have been damaged.
- Establish portable toilet sanitation stations around the municipality and related cleaning and pumping program.
- Coordinate with the business community regarding the time of their business resumption activities.
- Begin widespread safety/damage inspections of homes and businesses.
- Produce, regularly update, and distribute a disaster “Fact Sheet” to the media, people in shelters, field response personnel, and residents.
- Ensure that air quality, hazardous materials spills, and other environmental situations are monitored and risks are addressed.
- Evaluate the need to designate specific routes into the municipality for critical relief supplies.
- Ensure that all the food at emergency shelter/evacuation centers, feeding sites, and disaster kitchens are safe and hygienic.
- Begin planning for the relocation of displaced population.
- Implement a process to allow limited entry (where safe) for recovery of personal items.

6.3 Sustained Operations

As the third 24-hour period concludes, the EOC should be supporting three primary areas of operation:

- Ongoing rescue operations and other emergency measures.
- Transitioning near-complete response efforts to sustained emergency operations, typically addressing remaining earthquake effects that do not require public safety technical skills.
- Preparing for ongoing major recovery efforts focusing on restoration of services.

Section 07: Actions to Support Plan Implementation

Preparing Contingency Plans should not be viewed as a static activity with a defined start and finish. It should be an on-going process integrated into the agencies' daily strategies and tasks. To ensure the Contingency Plan as a useful tool that enables quick and appropriate decision-making during disasters, capacity building and public awareness should be continued in order to:

- i) Familiarize the people with the plans;
- ii) Inspire acceptance of in the documents; and
- iii) Prepare agencies and population to implement the plans in response to a major earthquake.

7.1 Capacity Building/ Training

In reference to this Contingency Plan, capacity building refers to increasing the ability of responsible agencies, departments, organizations, and individuals to successfully implement the plan and respond to a major earthquake in timely manner. It also includes ensuring that there is adequate and capable manpower that considers maintaining the plan a priority. **Table-7.1** includes a number of training and education programs aimed at a variety of audience who play a critical role in earthquake response. These audiences include administration and technical personnel, field officers, NGOs, business community, selected community leaders and volunteers. Introducing and continuing to engage these parties in earthquake management concepts can help ensuring that this Contingency Plan will be successfully implemented in the event of a major earthquake.

Table-7.1: List of training and education programs for building capacity to implement the plan

Activity	Target Group	Delivery Method	Responsible Departments/ Agencies/ Ministries
Contingency Plan Development	First Responder Agencies	Training Workshops	Respective Departments/ Agencies and Ministries
	Utility services agencies and lifeline agencies	Training workshop/Guidelines	Respective Departments/ Agencies and Ministries
	Other agencies	Issue Guideline for Contingency Planning	DDM, Respective Departments/ Agencies and Ministries
	Ward/Community level	Issue Guideline for Contingency Planning and training to undertake planning at ward level	Municipality, DDM

Activity	Target Group	Delivery Method	Responsible Departments/ Agencies/ Ministries
	Private sector institutions, banks, industries, factories	Issue Guideline for Contingency Planning	DDM
Training in EOC functions	DDB, Other government agencies	Issue SOPs	DDM
Training on Incident Command System (ICS)	Army, Stakeholders within Municipality area	Town level Training workshops	Municipality, DDM
Training on Damage assessment and need analysis(DANA)	Municipality, DRRO, other town level relevant stakeholders	Town level Training workshops	DDM
Earthquake Response simulations/table top exercises	Health Service, FSCD, Army, DRRO, Municipality	Town level Training workshops	Municipality, DDM, Respective Departments/ Agencies
Professional First responder courses (Collapse Building Search & Rescue, Medical First Responder training)	Army, FSCD, Auxiliary forces	Training	DDM, Respective Departments and Ministries
Hospital Preparedness for emergencies	Health services and town level hospitals	Training	Civil Surgeon Office, DG Health Services, Respective Ministry
Community level first responders	Community Volunteer groups in the town	FSCD training course on community first responders	FSCD
Restoration of Utility services	Field teams attached to utility agencies	Training programs designed by utility agencies	Respective Departments/ Agencies and Ministries
Restoration of life line facilities	Field teams attached to lifeline agencies	Training Workshops	Respective Departments/ Agencies and Ministries

7.2 Exercises and Simulations

It is important that the Earthquake Contingency Plan is exercised prior to a disaster event so that first responder agencies are familiar with their roles and responsibilities and are comfortable coordinating with one another. Exercise and simulations are useful tools that can provide an example of working in a stressful post-disaster environment with time constraints. The after-action reviews of exercises and simulations provide an excellent opportunity to evaluate both the strengths and weaknesses of a plan. The lessons learned from exercise and simulations can be incorporated

into the Contingency Plan with necessary updates and modifications for improvement of the plan. It is also a useful way of keeping plans fresh, especially during extended disaster-free periods. Exercise and simulations of the Earthquake Contingency Plan could also be helpful in the development of agency level plans because they would inspire agencies to think further about their own individual actions.

7.3 Public Awareness and Education

Family members, neighbours and community people are always the first to arrive on the scene when a disaster occurs. Lack of awareness or low understanding of risk can be the result of inadequate capacity of local community to understand the risk environment and inefficient response. Educating those whose lives or homes might be at risk during a disaster is a critical component of Contingency Planning. Public awareness campaigns generate community support for the implementation of earthquake Contingency Plans, and encourage those who are engaged in response activities at community level and to mobilize community support.

Through a variety of public education programs, those threatened by a potential disaster will learn about what to expect and what they will be asked to do, or how they may participate during an earthquake emergency. An effective public awareness and education campaign requires the coordinated efforts of all the stakeholders such as the government officials and community members, media, scientific and technical experts, business leaders and development workers, civil society groups etc.

A wide array of channels of communication is available for public awareness campaigns with different target groups:

- Face-to-face: meeting, seminar, workshop, conference, march, exhibition, demonstration, training, exchange visit, planning
- Mass media: television, radio, newspaper, cinema
- Distributed print material: leaflet, pamphlet, brochure, booklet, guideline, case study, newsletter, journal, research paper, report
- Folk media: story, drama, dance, song, puppet, music, street entertainment
- Audio-visual: video, audio, multi-media, artwork, photograph, slide show, model, map
- Stand-alone print: billboard, poster, banner, warning sign, flood water level marker
- Postal: direct mailing
- People: community leader, volunteer, project worker, head of women's group
- Electronic media: website, e-mail, e-mail discussion lists, electronic conferencing, distance learning platform, SMS etc.
- Exercises and simulations
- School awareness programs

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Annex-A: Available Resources and Capacities

Table A-1: Available and required manpower of FSCD, Tangail

Sl. No.	Staff Designation	No. available	Additional need
1	Assistant Director	1	
2	Deputy Assistant Director	1	
3	Senior stationer officer	1	
4	Ware house inspector	1	
5	Staff officer	1	
6	Station officer	1	
7	Leader	4	
	Driver	5	
	Fire Man	21	1
	Baburchi	2	
	Sweeper	1	
Total		39	

Table A-2: Available and required vehicles, tools and equipment of FSCD, Tangail

Vehicles/Tools	Purpose	Available Number	Additional Need
Water Tender	All	0	2
Tana Gari	All	0	2
Ambulance	All	1	1
Two wheeler	All	0	2
Hosepipe pipe	Fire	27	60
Succession Hosepipe	Fire	6	
Succession range/key	Fire	4	4
Portable Generator	All	0	2
Smoke ejector	All	1	
Breathing apparatus	All	0	1
Face mask	All	4	4
Lock cutter	Rescue	1	1
Brunch pipe	Fire	2	2
Foam making brunch pipe	Fire	1	1
Spreader	Rescue	1	
Ram jack	Rescue	1	
Air lifting bag	Rescue	0	1

Vehicles/Tools	Purpose	Available Number	Additional Need
Rotary rescue saw	Rescue	1	
Rotary hammer drill	Rescue	1	
Ladder	Rescue	1	1
Portable Pump	All	2	
Foam trolley	Fire	0	1
Strainer	fire	4	
Fireman exe	All	0	2
Fireman suit	Fire	7 set	32 set
Hit protective suit	Fire	2 set	2 set
Gum boot	All	10 set	10 set
Helmet	All	10 set	10 set
Extinguisher	Fire	3	8
Search light	All	2	2
TTL	Fire	0	1

Table A-3: List of urban community volunteer in Tangail City

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
1	Md. Younus Ali		01833094178		Tangail Fire Station
2	Mahmuda Parvin		01767367409	01671937222	Tangail Fire Station
3	Shampa Das		01712706331		Tangail Fire Station
4	Mithila		01931502082	01770444185	Tangail Fire Station
5	Nur Ahamad		01917142682		Tangail Fire Station
6	HafsaAkter		01710512083		Tangail Fire Station
7	Md. Ashiqur Rahman		01766419505		Tangail Fire Station
8	SarminAkter		01742639598		Tangail Fire Station
9	Md. Hazrat Ali		01928838910	01743102613	Tangail Fire Station
10	MoriomAkter		01925381530		Tangail Fire Station
11	Atoar Rahman		01728176318		Tangail Fire Station
12	Aminur Rahman		01735369459		Tangail Fire Station
13	Abdus Salam Khan		01920883688		Tangail Fire Station
14	Md. Mannan		01773328556		Tangail Fire Station
15	Md. Mozzammel Hossin (Obi)		01684365663		Tangail Fire Station
16	Md. Mahbubul Islam		01746954717		Tangail Fire Station
17	Md. Mehedi Rubel		01725416585		Tangail Fire Station
18	Khadiza Khatun		01756347004		Tangail Fire Station
19	Sajal Chandra Shil		01712461665		Tangail Fire Station
20	Taslima Akter		01731972587		Tangail Fire Station
21	Md. Mynul Hasan		01917837002		Tangail Fire Station
22	Rozina Akter		01710403269		Tangail Fire Station
23	Rockybul Islam Khan		01715014358	01199158967	Tangail Fire Station
24	Md. Al-Amin Bhuiya		01932212606		Tangail Fire Station
25	Khoshe Chandra		01682030871		Tangail Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
26	Md. Alfaz Ahmed		01744654640		Tangail Fire Station
27	Toma Akter		01672552780	01729787991	Tangail Fire Station
28	Shuvo Ahmed		01685298597		Tangail Fire Station
29	Md. Zahangir Alam		01916307549	01736439497	Tangail Fire Station
30	Susme Akter		01750872383		Tangail Fire Station
31	Miss. Salma Akter		01764153595		Tangail Fire Station
32	Md. Saddam Hossain		01676924430		Tangail Fire Station
33	Md. Saiful Islam		01714714294		Tangail Fire Station
34	Fatema Akter		01717837767		Tangail Fire Station
35	Ezma Akter		01676924430	0168643939	Tangail Fire Station
36	Dil Afrose		01722880614		Tangail Fire Station
37	Md. Shah-Alam		01943140753	01922546290	Tangail Fire Station
38	Mis. Salma		01732516173		Tangail Fire Station
39	SarminKhandakar		01914479437		Tangail Fire Station
40	Md. Jasim Uddin		01710885180		Tangail Fire Station
41	Abdullah Aal-Amin		01557837837		Tangail Fire Station
42	Md. Toukir Hossain		01724687349		Tangail Fire Station
43	Nur Mohammad		01745190636		Tangail Fire Station
44	Md. Abul Kalam		01196088385		Tangail Fire Station
45	Md. Sharif Ahmed		01839771439		Tangail Fire Station
46	Antora Neogi		01732047211		Tangail Fire Station
47	Runa Akter		01727740751		Tangail Fire Station
48	Shahin Alam		01776484100	01716207325	Tangail Fire Station
49	Bithy Akter		01710857589		Tangail Fire Station
50	SharminAkter		01714555952		Tangail Fire Station
51	Habiba Sultana		01190-841255		Tangail Fire Station
52	Moniruzzaman		01724-260252		Tangail Fire Station
53	Easmin Ara Sume		01967-291429		Tangail Fire Station
54	K.H. Habibur Rahman		01683-003585	01755-177565	Tangail Fire Station
55	Md. Shahadat Hosen		01738-299803		Tangail Fire Station
56	Harun-Ar-Rashid		01915-724401		Tangail Fire Station
57	Lucky Aktar		01913-218161		Tangail Fire Station
58	Md. Ruhul Islam Rony		01760-848596		Tangail Fire Station
59	Fazlul Haque		01918-731344		Tangail Fire Station
60	Talash Moullah		01736-418582		Tangail Fire Station
61	Md. Tajibur Rahman		01712-570738		Tangail Fire Station
62	Kamrul Hassan Hridoy		01684-701506		Tangail Fire Station
63	Md. Sathil Hasan		01925-303885		Tangail Fire Station
64	Md. Wali Ullah		01721-905804		Tangail Fire Station
65	Md. Sharif Hossain		01682-958661		Tangail Fire Station
66	Rashidul Islam Mollah		01724-960635		Tangail Fire Station
67	Md. Monir Hossen		01912-456481		Tangail Fire Station
68	Md. Manir Hossain		01750-540613		Tangail Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
69	Sonya Akter		01684-739589		Tangail Fire Station
70	Jewel Ahmed		01923-564186		Tangail Fire Station
71	Momota Akter		01721-992711		Tangail Fire Station
72	Sonya Akhter		01726-576800		Tangail Fire Station
73	Mir Sathikur Rahaman		01671-437969		Tangail Fire Station
74	Marjana Akter		01772-603875		Tangail Fire Station
75	Sharmin akter		01754-048915		Tangail Fire Station
76	Md. Firoz Mahmud		01768-268813		Tangail Fire Station
77	Shuborna Akter		01683-002795		Tangail Fire Station
78	Md. Al-amin		01734-238212		Tangail Fire Station
79	Md. Sultan Nasir Uddin		01748-965594		Tangail Fire Station
80	Md. Firoz ahmed		01765-459730		Tangail Fire Station
81	Shahriar		01767-618181		Tangail Fire Station
82	Labony Akter		01775-505568		Tangail Fire Station
83	Md. Muzahidul Islam		01711-268723	01190-752061	Tangail Fire Station
84	Ashis Saha		01680-444763		Tangail Fire Station
85	Ahashan Uddin Ahammad		01824-023712		Tangail Fire Station
86	Md. Mizanur Rahman		01833-401911		Tangail Fire Station
87	Shuhanur Rahman		01726-062235		Tangail Fire Station
88	Abdur Rahim		01710-379336		Tangail Fire Station
89	Habibur Rahman		01916-169276		Tangail Fire Station
90	Fatema Aktar		01676981994		Tangail Fire Station
91	Md. Mizanur Rahman		01745-744701		Tangail Fire Station
92	Md. Asaduzzaman		01725-554031		Tangail Fire Station
93	Md. Kowsar Ahmed		01710-679916		Tangail Fire Station
94	Tumpa Chowhan		01686-864405		Tangail Fire Station
95	Suma Akter		01777-983766		Tangail Fire Station
96	Md. Atiqur Rahman Arju		01744-870596	01727-275317	Tangail Fire Station
97	Md. Sourov Siddique Sun		01762-892482		Tangail Fire Station
98	Md. Razaul Karim		01734-238369		Tangail Fire Station
99	Md. Mominul Islam		01736-317588		Tangail Fire Station
100	Ariful Islam		01738-232250		Tangail Fire Station
101	Poly		01924034523		Tangail Fire Station
102	Md. Rony Ahamed		01723451763		Tangail Fire Station
103	Mis Moriom Akter		01763955696		Tangail Fire Station
104	Md. Atiqur Rahman		01734932236		Tangail Fire Station
105	Farhana Haque Trisha		01920573908		Tangail Fire Station
106	Shirin Aktar Setu		01712720584		Tangail Fire Station
107	Shampa		01746064155		Tangail Fire Station
108	Nasir Uddin		01710511476		Tangail Fire Station
109	Jharna Sarker		01745033901		Tangail Fire Station
110	Tonni Akter		01714580529		Tangail Fire Station
111	Md. Abdul Hadi		01777097192		Tangail Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
112	Chandon Kumar Dhar		01713791849		Tangail Fire Station
113	Md. Lutfor Rahman		01736877969		Tangail Fire Station
114	Moklasur Rahaman		01735291617		Tangail Fire Station
115	Lilufa Yeasmin Lili		01927155925		Tangail Fire Station
116	Moklasur Rahaman		01735291617		Tangail Fire Station
117	Md. Abu Saim Khan		01738813860		Tangail Fire Station
118	Marufa		01673076442		Tangail Fire Station
119	Md. Abdullah Al Mamun		01756930678		Tangail Fire Station
120	Aminul Islam		01761633053		Tangail Fire Station
121	Md. Ariful Islam		01845640446		Tangail Fire Station
122	Md. Mizanur Rahman		01729184802		Tangail Fire Station
123	Md. Rasel Sarker		01820894200		Tangail Fire Station
124	Lipi Chowhan		01754049378		Tangail Fire Station
125	Md. Sarowar Hossain		01723449486		Tangail Fire Station
126	Rojina Akter		01740821648		Tangail Fire Station
127	Md. Atiqur Rahman		01722817930		Tangail Fire Station
128	Md. Jamil Talukder		01721991502		Tangail Fire Station
138	Afia Akter		01934046091		Tangail Fire Station
129	Md. Najmul Islam		01770269826		Tangail Fire Station
130	Ashik Akando		01759356493		Tangail Fire Station
131	Md. Aminur Rahman		01746945937		Tangail Fire Station
132	Burhan Uddin		01926460422		Tangail Fire Station
133	Md. Suzan		01685844560		Tangail Fire Station
134	Gopal Chandra Paul		01729693292		Tangail Fire Station
135	Samina Akter		01765460546		Tangail Fire Station
136	Md. Sajib Bhuyin		01832374377		Tangail Fire Station
137	Md. Shazib Khan		01727621111		Tangail Fire Station
138	Md. Sabbir Hossen		01911682174		Tangail Fire Station
139	S.M. Rashedul Islam		01822764098		Tangail Fire Station
140	Md. Zayedul Islam		01719645067		Tangail Fire Station
141	Md. Shahin Ahamed		01757768868		Tangail Fire Station
142	Aklima Aktar		01682812314		Tangail Fire Station
143	Afroza Akter		01716545666		Tangail Fire Station
144	Hena Akter		01686391461		Tangail Fire Station
145	Pabitra Chandra Das		01726901109		Tangail Fire Station
146	Rabiul Islam		01765471360		Tangail Fire Station
147	Ubaidul Islam		01727938775		Tangail Fire Station
148	Md. Shofikul Islam		01684699790		Tangail Fire Station
149	Rezaul Karim Rasel		01670251407		Tangail Fire Station
150	Tariqul Islam		01671711985		Tangail Fire Station

Table A-4: List of available open spaces within the Municipality to be used for immediate evacuation

Sl.	Name of the open space	Location (Ward no.)	Area (sq. m.)	Population holding capacity (@1 sq. m./ person)	Total displaced population	Additional population that can be accommodate from surrounding areas
1	Near Gala Road Park	Ward 01	9,762	9,762	370	136,694
2	Tangail Police Line Field	Ward 01	8,590	8,590		
3	Zilla Sadar Girls' High School Field	Ward 01	3,388	3,388		
4	Tangail Polytechnic Institute Playground	Ward 01	7,672	7,672		
5	Police Line Parade Ground	Ward 01	15,095	15,095		
6	Playground	Ward 05	10,546	10,546		
7	Playground	Ward 05	5,114	5,114		
8	Baitul Quran Etimkhana Eidgah	Ward 05	1,281	1,281		
9	Shahariar Hasan Shishu Park	Ward 07	1,223	1,223		
10	Pir Shah Jaman High School Field	Ward 07	4,806	4,806		
11	Haji Abul Hossain Adarsha High School Playground	Ward 09	1,932	1,932		
12	KazipurEidgah	Ward 10	1,238	1,238		
13	Tangail Baptist and Gorosthan Madrasa Field	Ward 11	3,531	3,531		
14	Govt. Shishu Poribar Play-Field	Ward 11	7,192	7,192		
15	Beparypara Eidgha	Ward 11	1,076	1,076		
16	Tangail Shibnath High School Playground	Ward 15	4,049	4,049		
17	Jobaida High School Playground	Ward 15	2,082	2,082		
18	ShahidS reeti PauroUddan	Ward 16	4,249	4,249		
19	Tangail Stadium	Ward 16	22,941	22,941		
20	Near Tangail General Hospital Playground	Ward 18	14,036	14,036		
21	PTI Primary School Ground	Ward 18	1,847	1,847		
22	Kodalía Govt. Primary School Playground	Ward 18	5,414	5,414		
Total			137,064	137,064	370	136,694

Table A-5: The list of proposed evacuation routes that can be used for safe evacuation

Road name	Road type	Road width (m)
Police Line Road	Pucca	6-16
Dhaka-Tangail Highway	Pucca	6-10
ZilaShadar Road	Pucca	7
Victoria Road	Pucca	8
Club Road	Pucca	7
Mymensingh Road	Pucca	9-11
Tangail Road	Pucca	7-11
Barangail Daluatpur Ghior Tangail Road	Pucca	6-10
Joydebpur–Tangail-Jamalpur Highway	Pucca	7-10

Table A-6: List of major hospitals/clinics within Tangail Municipality and their capacities

Sl. No.	Name of Hospital	Location	Capacity						Availability of Contingency Plan	Emergency contact number
			No. of Beds	Doctors	Nurses	Paramedics Staff	Other Staff	Other Available Facilities		
1	Mother and Child welfare center	Thanapara, Tangail	20	3	2	0	14	OT, Ambulance, Generator.	No	01715-332958
2	Tangail General Hospital	Mymensingh Road, Tangail	250	57	105	11	75	OT (3), X-ray(2), Ambulance(2), ICU, Pathological lab, Blood bank, Generator	No	01730-324792
3	Care Clinic and Nursing Home	New Bus Terminal, Tangail	10	2	5	0	20	OT, X-ray, Pathological lab, Generator	No	01721- 646384
4	Pilot Hospital	New Bus Terminal, Tangail	10	3	3	3	41	OT, X-ray, Pathological lab, Generator	No	01752-192110
5	Amena Clinic and Hospital	New Bus Terminal, Tangail	20	6	20	0	30	OT, X-ray, Pathological lab, Generator	No	01711-935290
6	Sonia Nursing Home	New Bus Terminal, Tangail	40	12	24	4	52	OT (2), X-ray, CT Scan, Ambulance(4), Pathological Lab, Generator	No	01716-443592
7	Rajdhani Nursing Home	Shabalia, Tangail	10	3	6	2	30	OT, X-ray, Pathological lab, Generator	No	01711-780348
8	Police Line Hospital	Tangail Police Line	30	1	3	0	15	OT, X-ray, Pathological lab, Generator	No	01199-089146
9	S SS Hospital	Diabetic Hospital Road, Tangail	50	9	12	5	0	OT (2), X-ray, CT Scan, Ambulance, Pathological Lab, Generator	No	01716-366820
10	Desbondhu Hospital and Diagnostic Center	Mymensingh Road, Tangail	10	3	6	0	15	OT, X-ray, Pathological lab, Generator	No	01758-822190
11	Asia Hospital	Sabalia Tangail	10	3	6	0	30	OT, X-ray, Pathological lab, Generator	No	01740-614450

Sl. No.	Name of Hospital	Location	Capacity						Availability of Contingency Plan	Emergency contact number
			No. of Beds	Doctors	Nurses	Paramedics Staff	Other Staff	Other Available Facilities		
12	Tangail Eye Hospital	District Gate, Tangail	10	1	3	0	10	OT, Generator	No	01712-898489
13	Dhanshiri Hospital.	SabaliaTangail	10	3	6	0	12	(OT, X-ray, Pathological lab, Generator	No	01738-082457
14	Tangail Clinic and Hospital	Kumudini College Mor, Tangail	10	0	0	0	35	OT, X-ray, Pathological lab, Generator	No	01718-914242
15	Dristidan Eye Hospital	Registry para, Tangail	10	3	3	2	4	OT, Generator	No	01728-113561
16	Sheba Clinic and Hospital	Mymensingh Road, Tangail	30	10	3	0	7	OT, Generator	No	1716-514858
17	Vasani Hospital	Baby stand, Tangail	10	2	3	2	15	OT, X-ray, Pathological lab, Generator	No	01765-040282
18	Joy Clinic and Hospital	Thana Para, Tangail	10	2	4	0	12	OT, X-ray, Pathological lab, Generator	No	01713-562648
19	Shamsul Haque Memorial Hospital	Santikunjo More, Tangail	22	3	6	0	12	OT, X-ray, Pathological lab, Generator	No	01819-132643
20	Janata Clinic and Nursing Home	Main Road , Tangail	10	2	4	0	20	OT, X-ray, Pathological lab, Generator	No	01712-029160
21	Fatema Modern Hospital	Main Road, Tangail	10	2	5	2	20	OT, X-ray, Pathological lab, Generator	No	01917-020000
22	Doyel Diagnostic Center And Hospital	Mymhensingh Road, Tangail	10	2	5	0	15	OT, X-ray, Pathological lab, Generator	No	01711-737361
23	Momtaz Central Hospital	Mymhensingh Road, Tangail	10	3	6	0	10	OT, X-ray, Pathological lab, Generator	No	01711-485979
24	Dhaleswari Hospital Pvt. Ltd	ZilaSadar Road, Tangail	20	2	6	2	27	OT, X-ray, Pathological lab, Generator	No	01716-905693
25	F. P. A. B	Sadar Road, Tangail	4	1	2	3	20	OT, X-ray, Pathological lab, Generator	No	01745-190619

Sl. No.	Name of Hospital	Location	Capacity						Availability of ContingencyPlan	Emergency contact number
			No. of Beds	Doctors	Nurses	Paramedics Staff	Other Staff	Other Available Facilities		
26	Karnafuli, Hospital, Tangail	Zila Sadar Road, Tangail	10	3	6	0	6	OT, Generator	No	01918-237457
27	Medi Quest Hospital	Akur Dhakur	10	1	4	2	29	OT, X-ray, Pathological lab, Generator	No	01755-552777
28	Doctors clinic private limited	Girls School Road, Tangail	20	1	6	2	30	OT, X-ray, Pathological lab, Generator	No	01711-945549
29	Al Shefa Clinic and Nursing Home	Old bus stand, Tangail.	20	2	4	0	34	OT (3), X-ray, Pathological lab, Generator	No	01816-081048
30	Medico Hospital Pvt. Ltd	Registry para, Tangail	30	6	12	6	40	OT (2), X-ray, Pathological lab, Generator	No	01712-701570

Table A-7: List of proposed shelter sites and their capacities

Sl.	Name of the open spaces	Location	Area (sq. m.)	Population holding capacity (@45 sq. m./ family)
1	Near Gala Road Park	Ward 01	9,762	216
2	Tangail Police Line Field	Ward 01	8,590	190
3	Tangail Polytechnic Institute Playground	Ward 01	7,672	170
4	Police Line Parade Ground	Ward 01	15,095	335
5	Playground	Ward 05	10,546	234
6	Playground	Ward 05	5,114	113
7	Govt. Shishu Poribar Play-Field	Ward 11	7,192	159
8	Tangail Stadium	Ward 16	22,941	509
9	Near Tangail General Hospital Playground	Ward 18	14,036	311
10	Kodialia Govt. Primary School Playground	Ward 18	5,414	120
Total			106,362	2,357

Table A-8: Food Requirements in Different Shelter Camps

Name of shelter sites	Population holding capacity	Tentative Daily Food Requirement (most common food items) in Metric Tons				Tentative Monthly Food Requirement (most common food items) in Metric Tons			
		Wheat Flour (@100gms)	Rice (@250gms)	Lentils (@150ms)	Vegetable Oil (@35gms)	Wheat Flour	Rice	Lentils	Vegetable Oil
Near Gala Road Park	1037	0.10	0.26	0.16	0.04	3.11	7.78	4.67	1.09
Tangail Police Line Field	912	0.09	0.23	0.14	0.03	2.74	6.84	4.10	0.96
Tangail Polytechnic Institute Playground	816	0.08	0.20	0.12	0.03	2.45	6.12	3.67	0.86
Police Line Parade Ground	1608	0.16	0.40	0.24	0.06	4.82	12.06	7.24	1.69
Playground	1123	0.11	0.28	0.17	0.04	3.37	8.42	5.05	1.18
Playground	543	0.05	0.14	0.08	0.02	1.63	4.07	2.44	0.57
Govt. Shishu Poribar Play-Field	763	0.08	0.19	0.11	0.03	2.29	5.72	3.43	0.80
Tangail Stadium	2443	0.24	0.61	0.37	0.09	7.33	18.32	10.99	2.57
Near Tangail General Hospital Playground	1493	0.15	0.37	0.22	0.05	4.48	11.20	6.72	1.57
Kotalia Govt. Primary School Playground	576	0.06	0.14	0.09	0.02	1.73	4.32	2.59	0.60
Total	11314	1.13	2.83	1.70	0.40	33.94	84.86	50.91	11.88

Table A-9: Water and Toilet Requirements in Different Shelter Camps

Name of Shelter Sites	Population holding capacity	Water Requirement in the Shelter Camp in Cubic Meters (@15 Lt. per capita per day)		No. of Toilets (max 20 person per toilet)
		Daily	For 3 days	
Near Gala Road Park	1,037	15.55	46.66	52
Tangail Police Line Field	912	13.68	41.04	46
Tangail Polytechnic Institute Playground	816	12.24	36.72	41
Police Line Parade Ground	1,608	24.12	72.36	81
Playground	1,123	16.84	50.53	57
Playground	543	8.14	24.43	28
Govt. Shishu Poribar Play-Field	763	11.44	34.33	39
Tangail Stadium	2,443	36.64	109.93	123
Near Tangail General Hospital Playground	1,493	22.39	67.18	75
Kotalia Govt. Primary School Playground	576	8.64	25.92	29
Total	11,314	169.71	509.13	571

Annex-B: Earthquake Hazard and Risk Maps

Map B-1: Possible concrete building damage map due to scenario-2 earthquake

Map B-2: Possible masonry building damage map due to scenario-2 earthquake

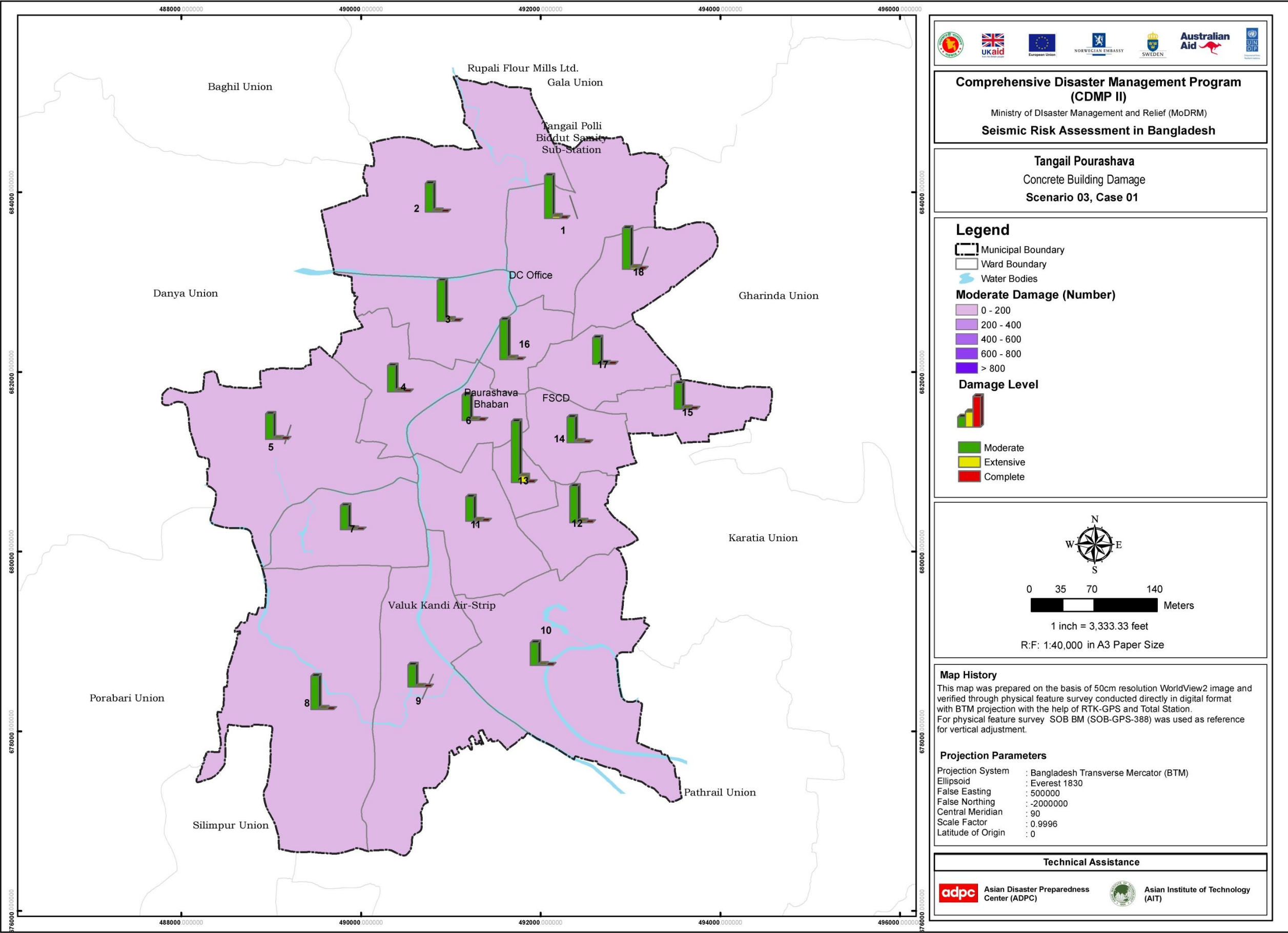
Map B-3: Probability of functionality of education facilities at day-1 due to scenario-2 earthquake

Map B-4: Probability of functionality of health facilities at day-1 due to scenario-2 earthquake

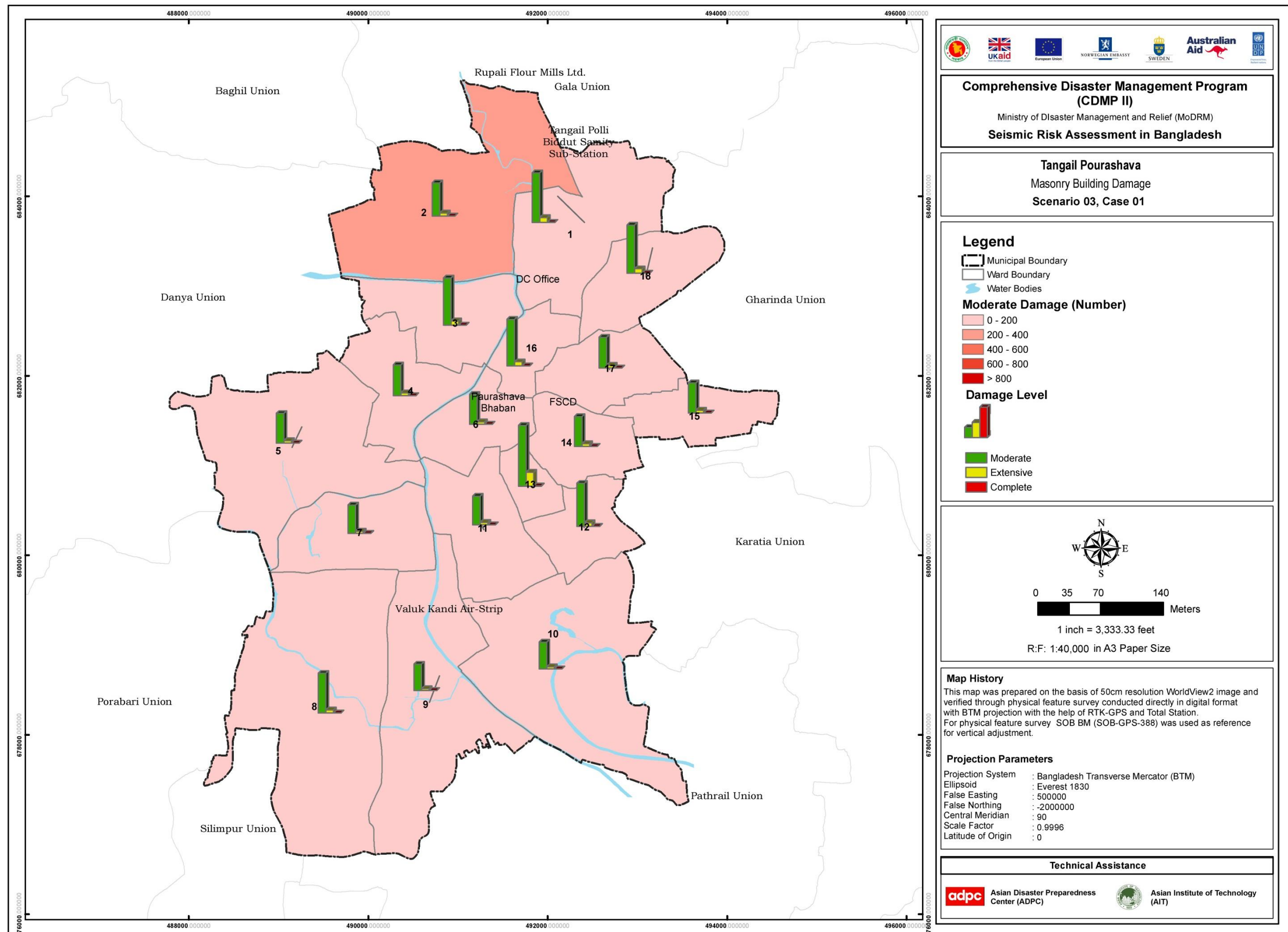
Map B-5: Probability of functionality of critical facilities at day-1 due to scenario-2 earthquake

Map B-6: Probability of functionality of road network at day-1 due to scenario-2 earthquake

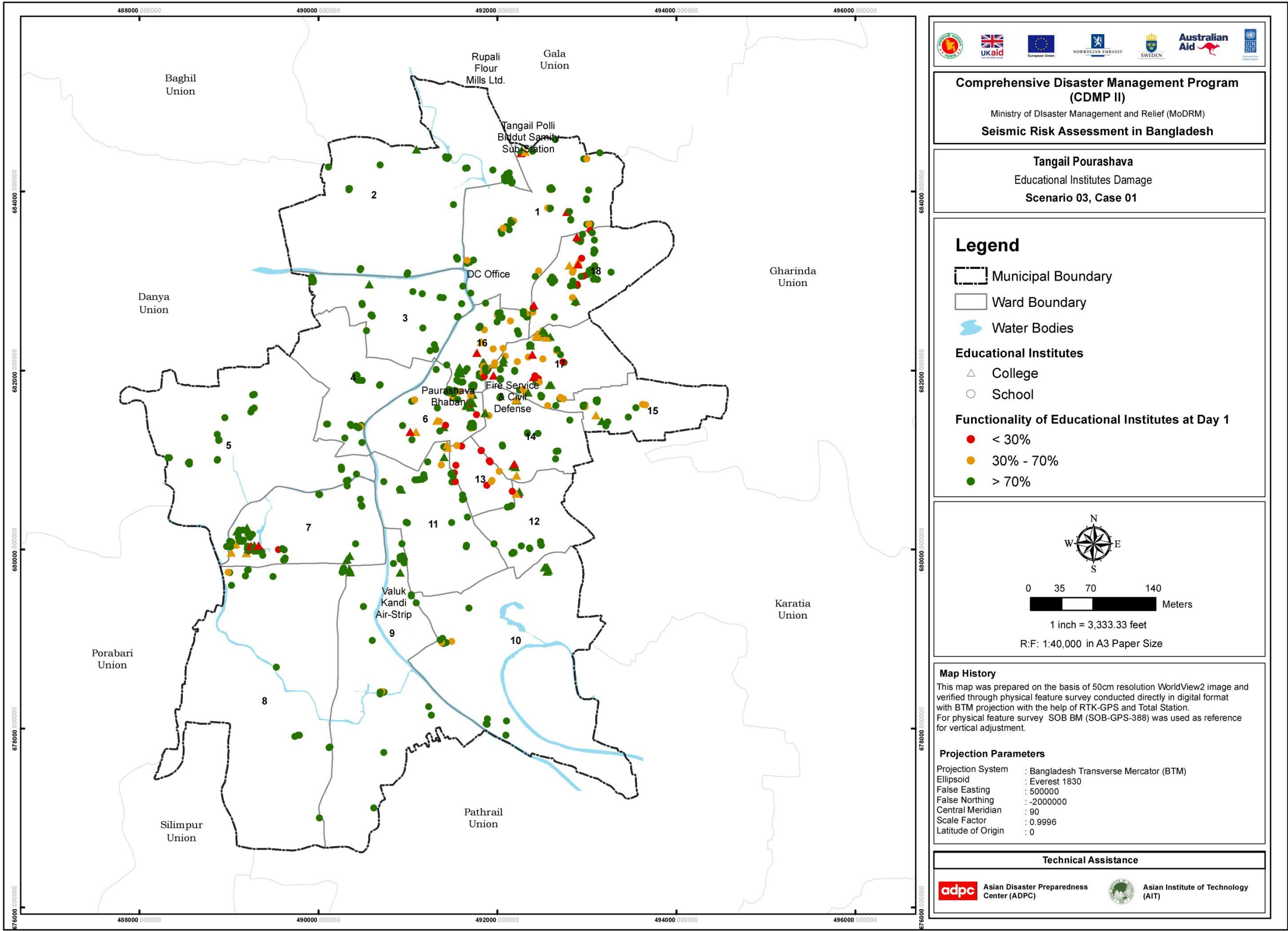
Map B-7: Probability of functionality of transportation facilities at day-1 due to scenario-2 earthquake



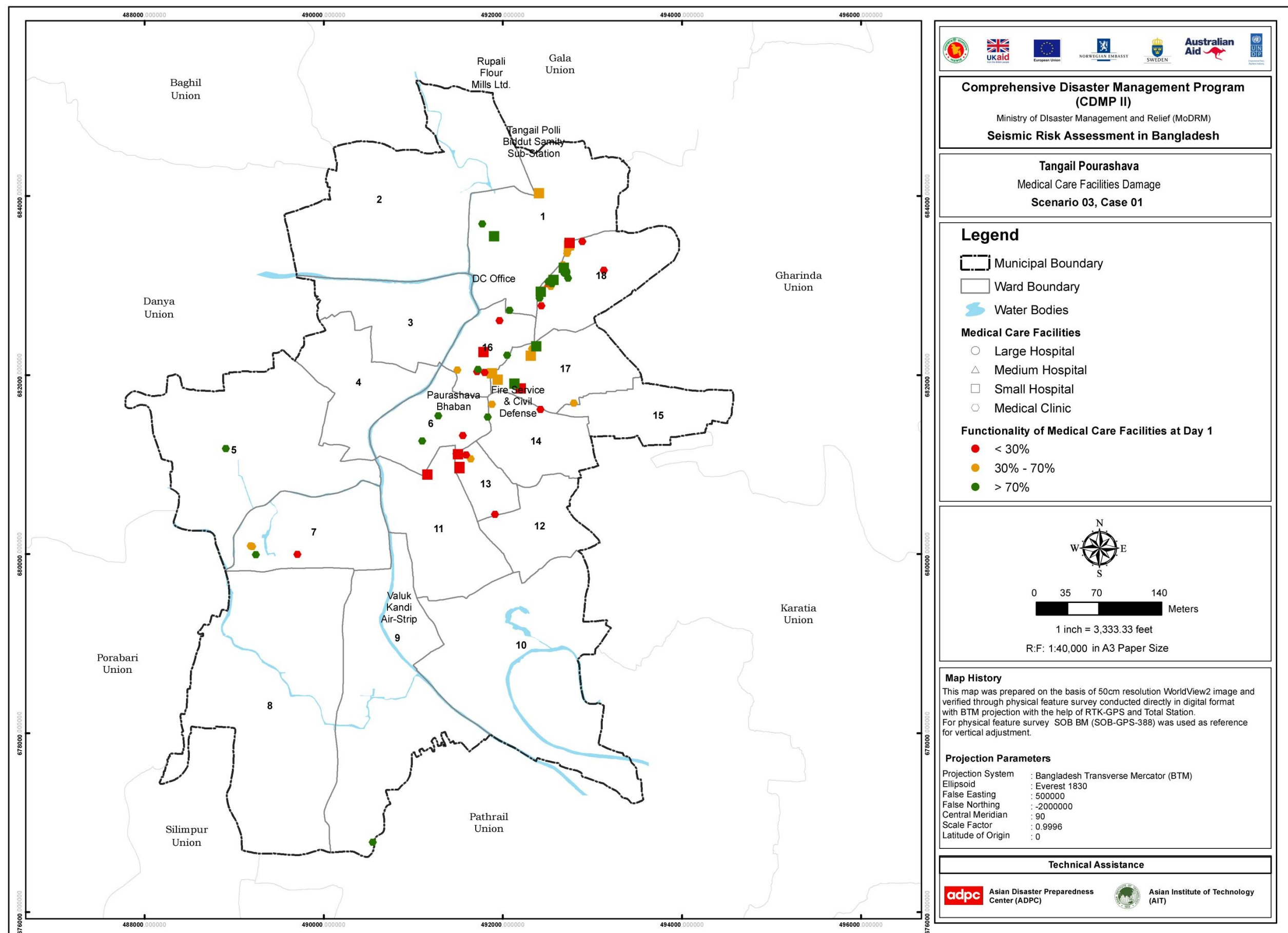
Map B-1: Possible concrete building damage map due to scenario-2 earthquake



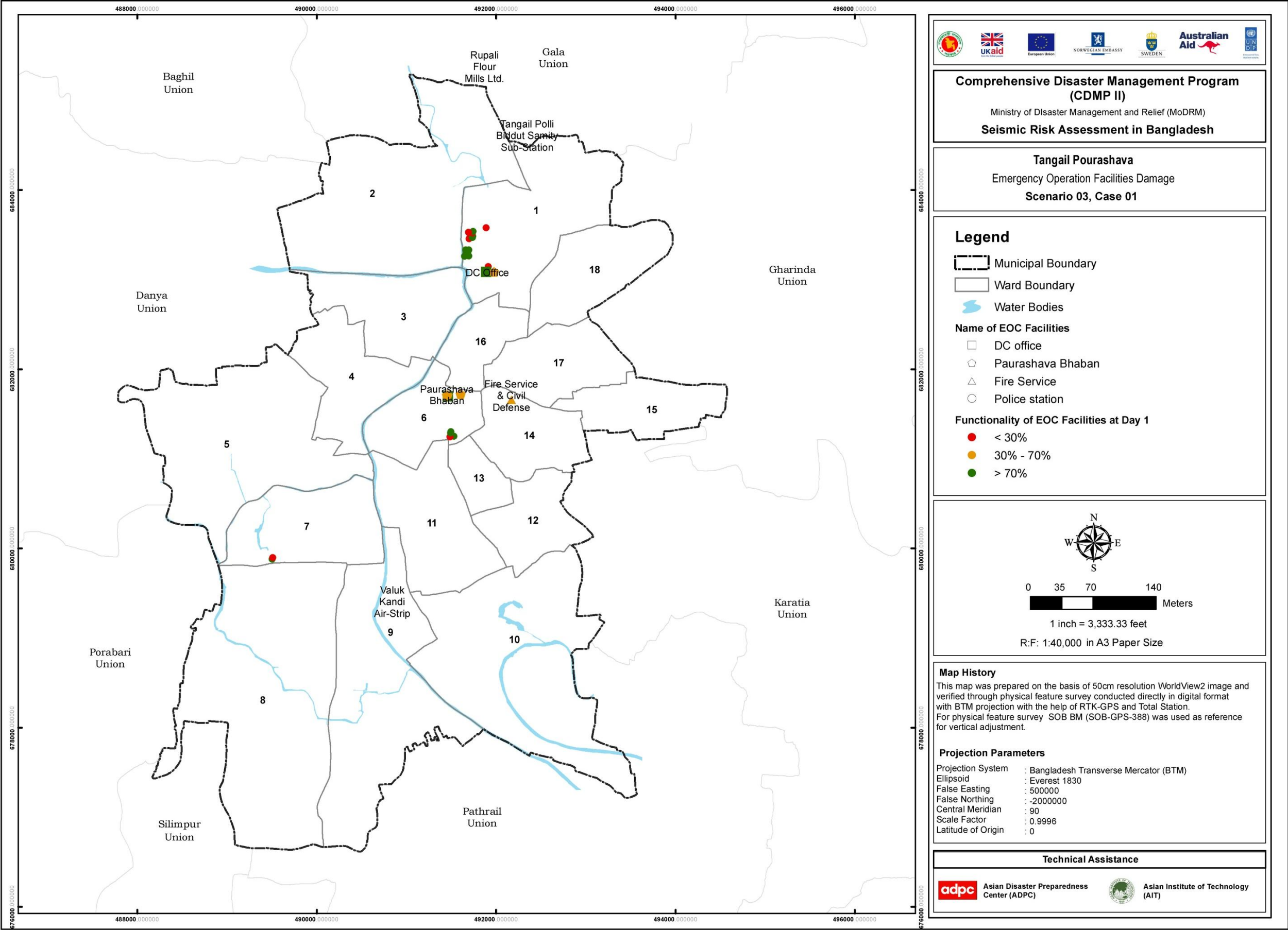
Map B-2: Possible masonry building damage map due to scenario-2 earthquake



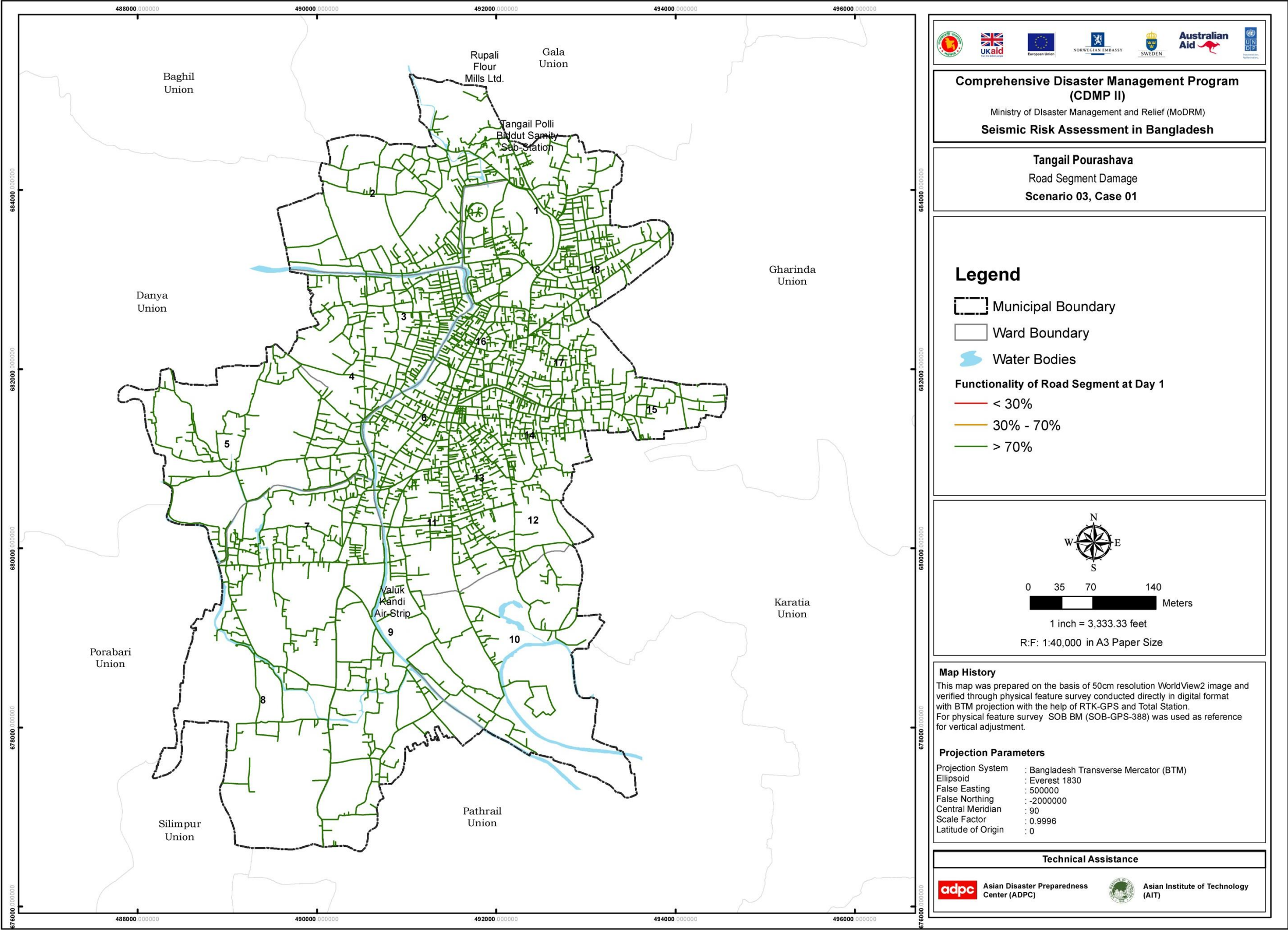
Map B-3: Probability of functionality of education facilities at day-1 due to scenario-2 earthquake



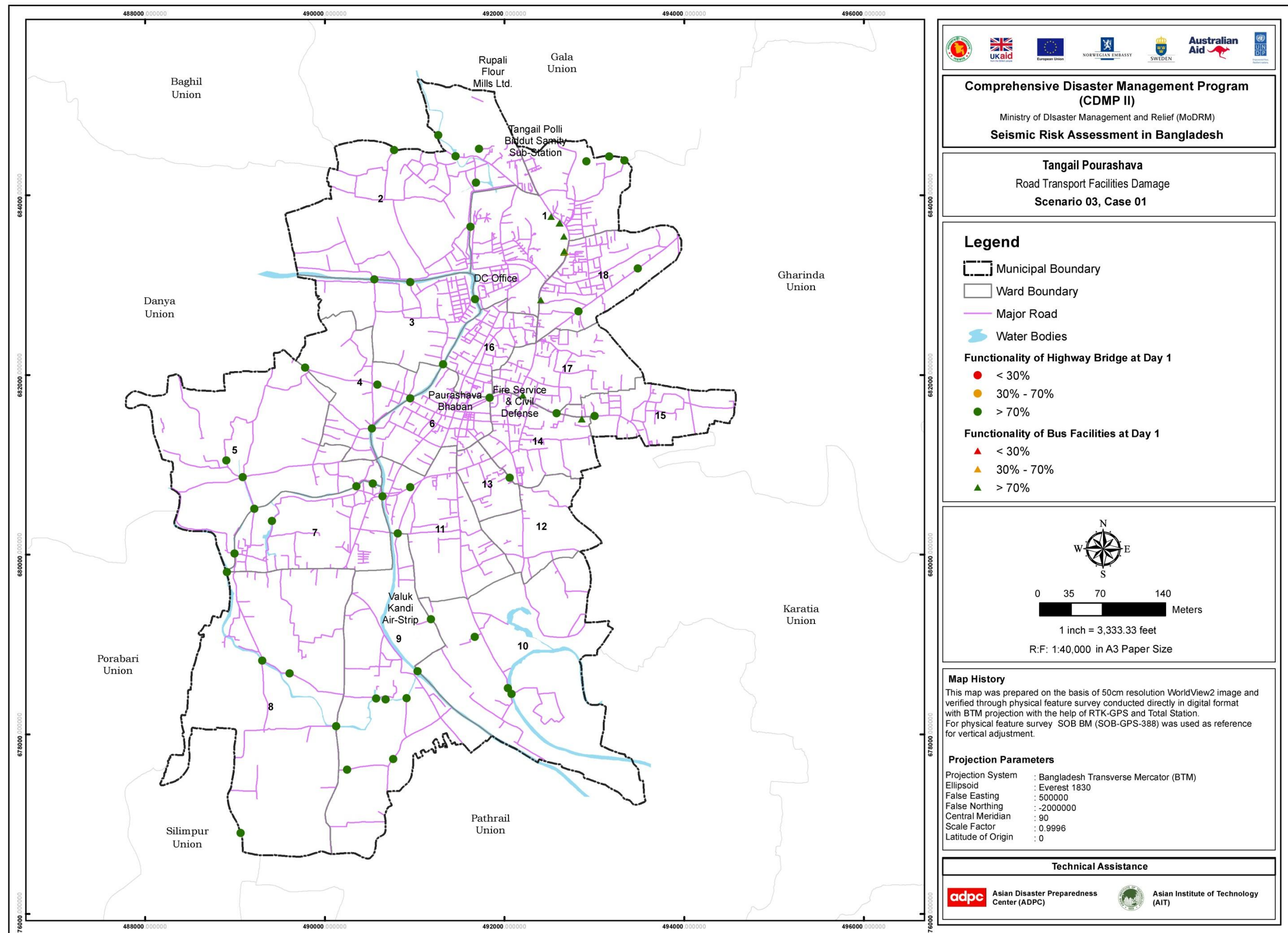
Map B-4: Probability of functionality of health facilities at day-1 due to scenario-2 earthquake



Map B-5: Probability of functionality of critical facilities at day-1 due to scenario-2 earthquake



Map B-6: Probability of functionality of road network at day-1 due to scenario-2 earthquake



Map B-7: Probability of functionality of transportation facilities at day-1 due to scenario-2 earthquake

Annex-C: Contingency Planning Maps

Map C-1: Location of key emergency agencies in Tangail Town

Map C-2: Location of proposed immediate evacuation spaces

Map C-3 Proposed evacuation routes

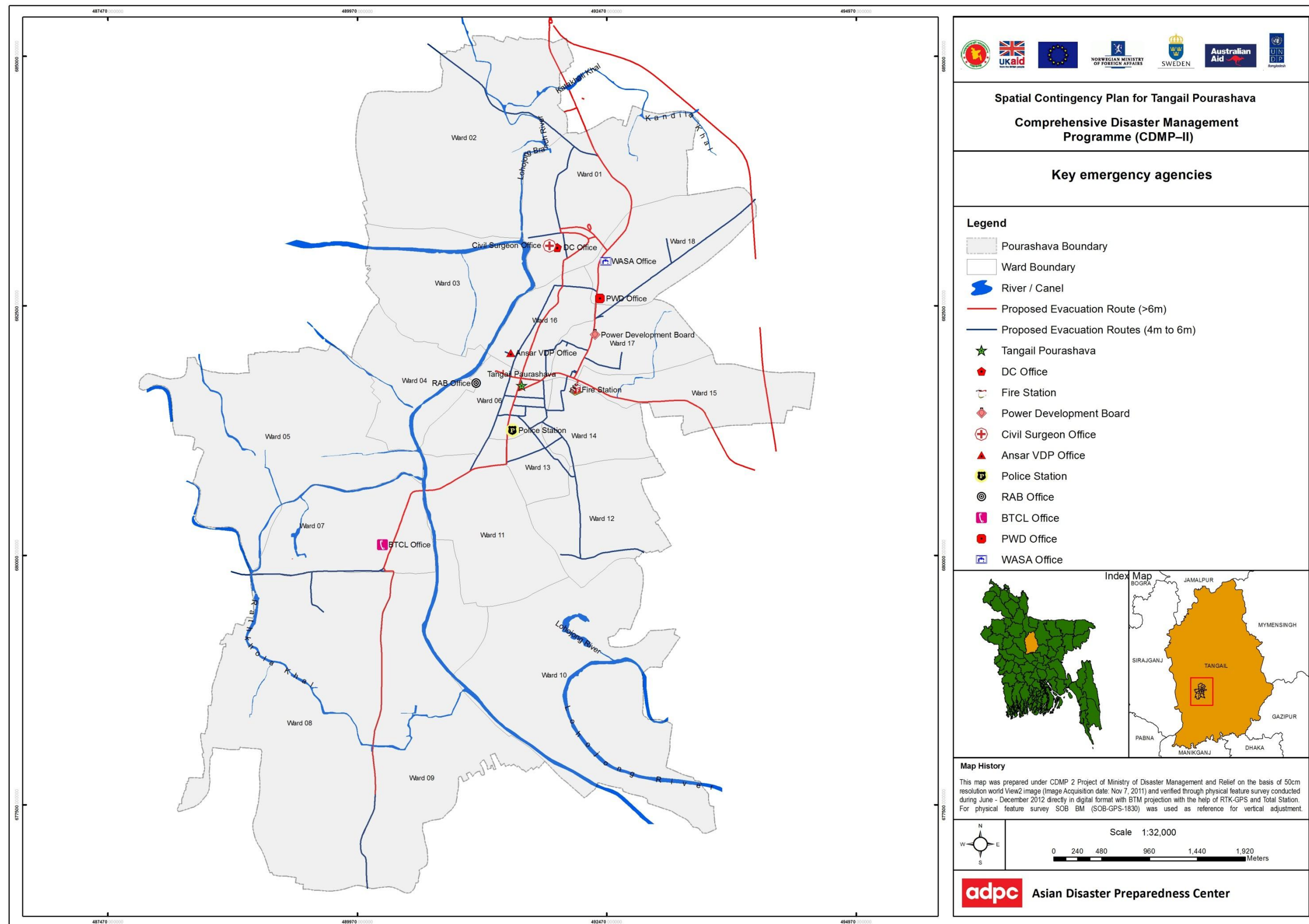
Map C-4: Location of water supply sources

Map C-5: Location of major hospitals and clinics

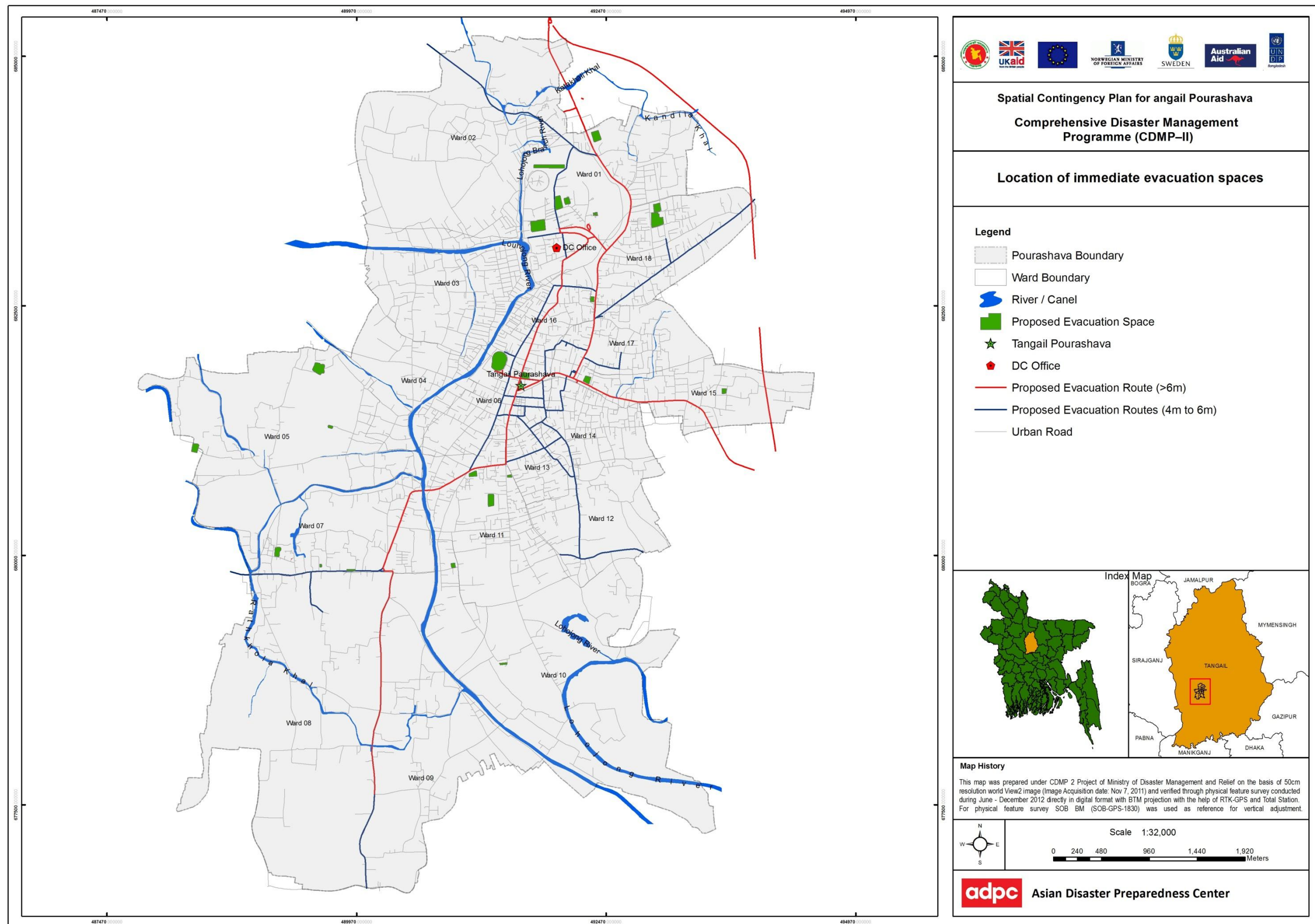
Map C-6: Location of proposed shelter sites (open spaces)

Map C-7: Locations of educational and communal buildings available

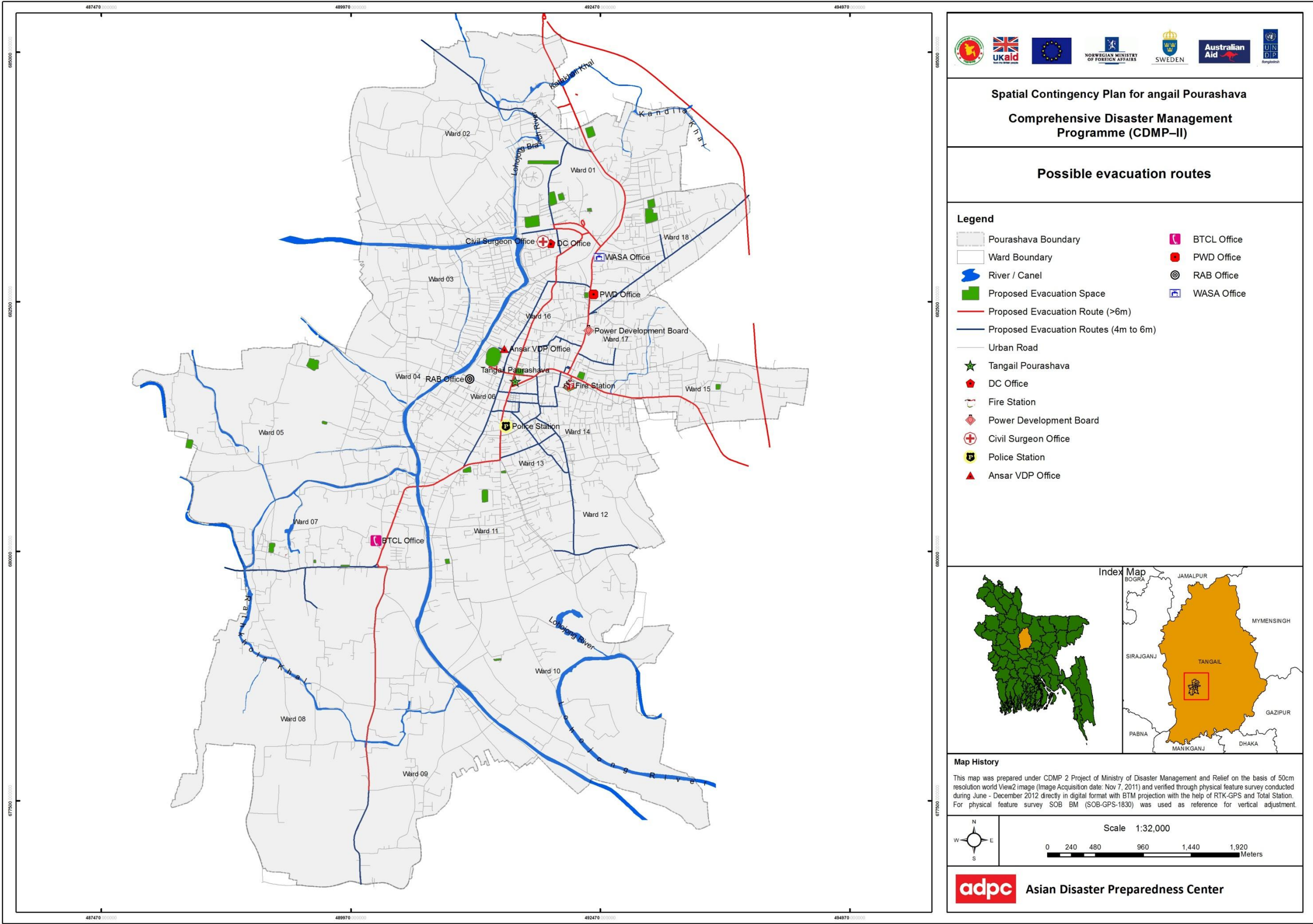
Map C-8: Location of fuel re-filling stations



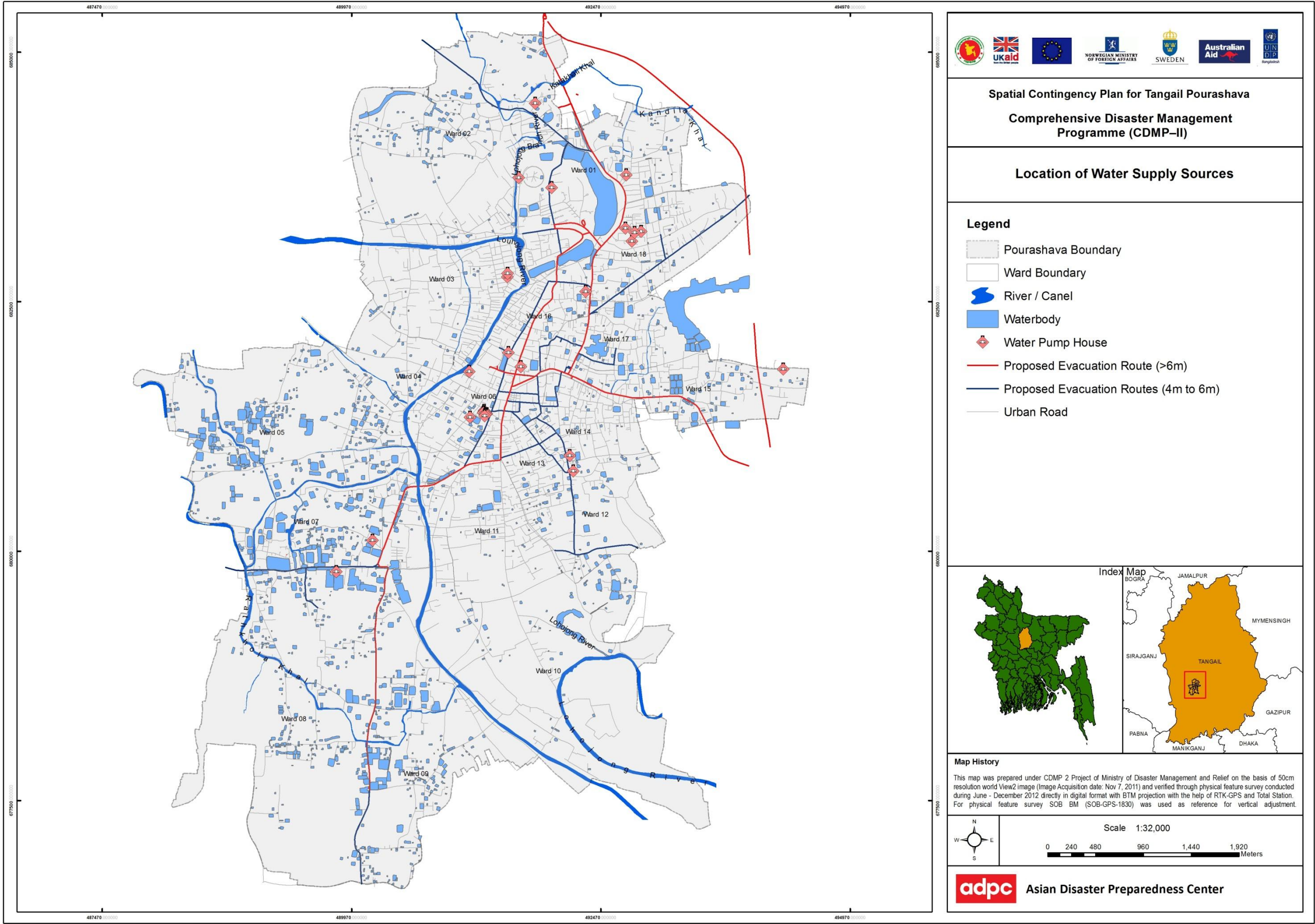
Map C-1: Location of key emergency agencies in Tangail Town



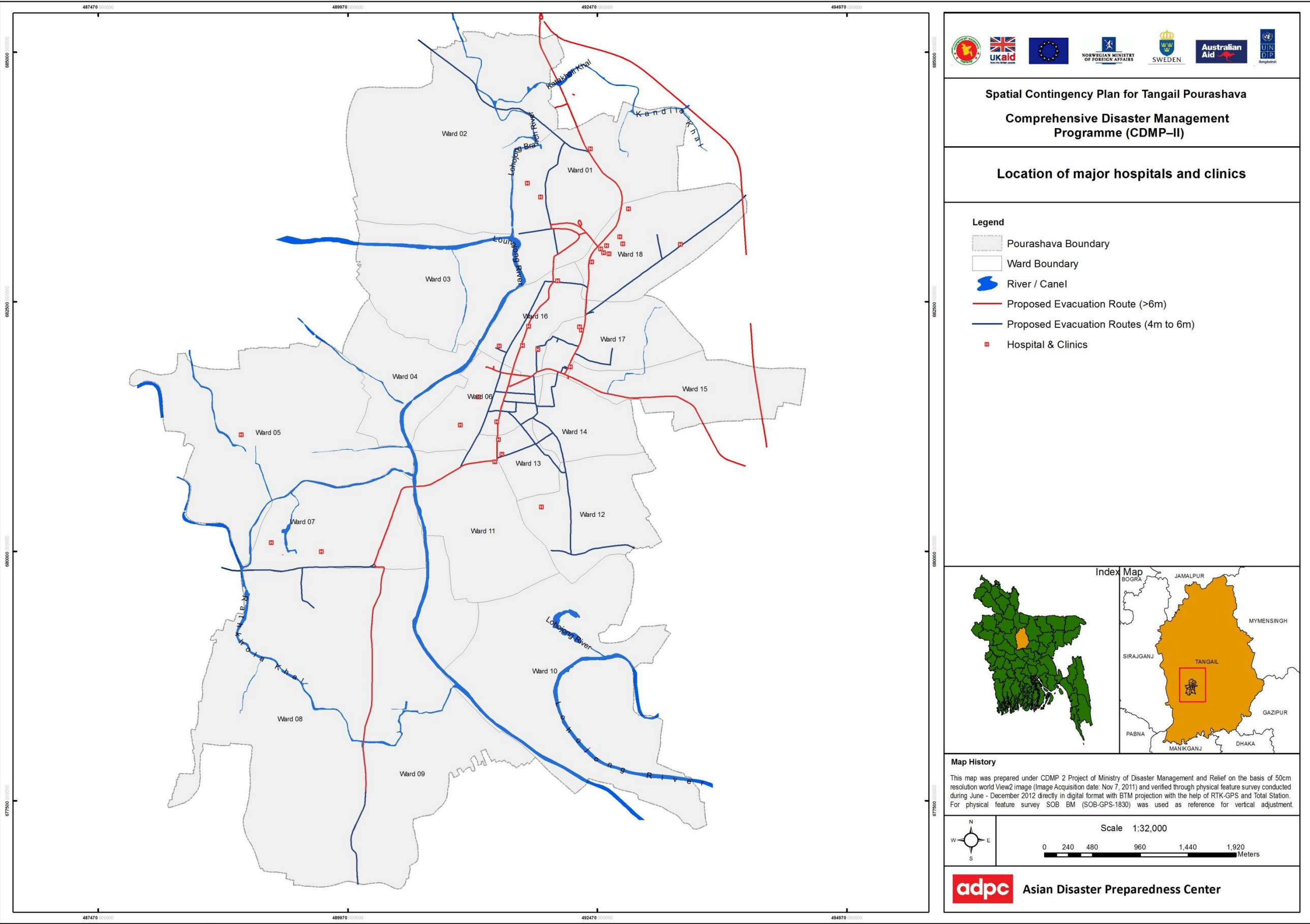
Map C-2: Location of proposed immediate evacuation spaces



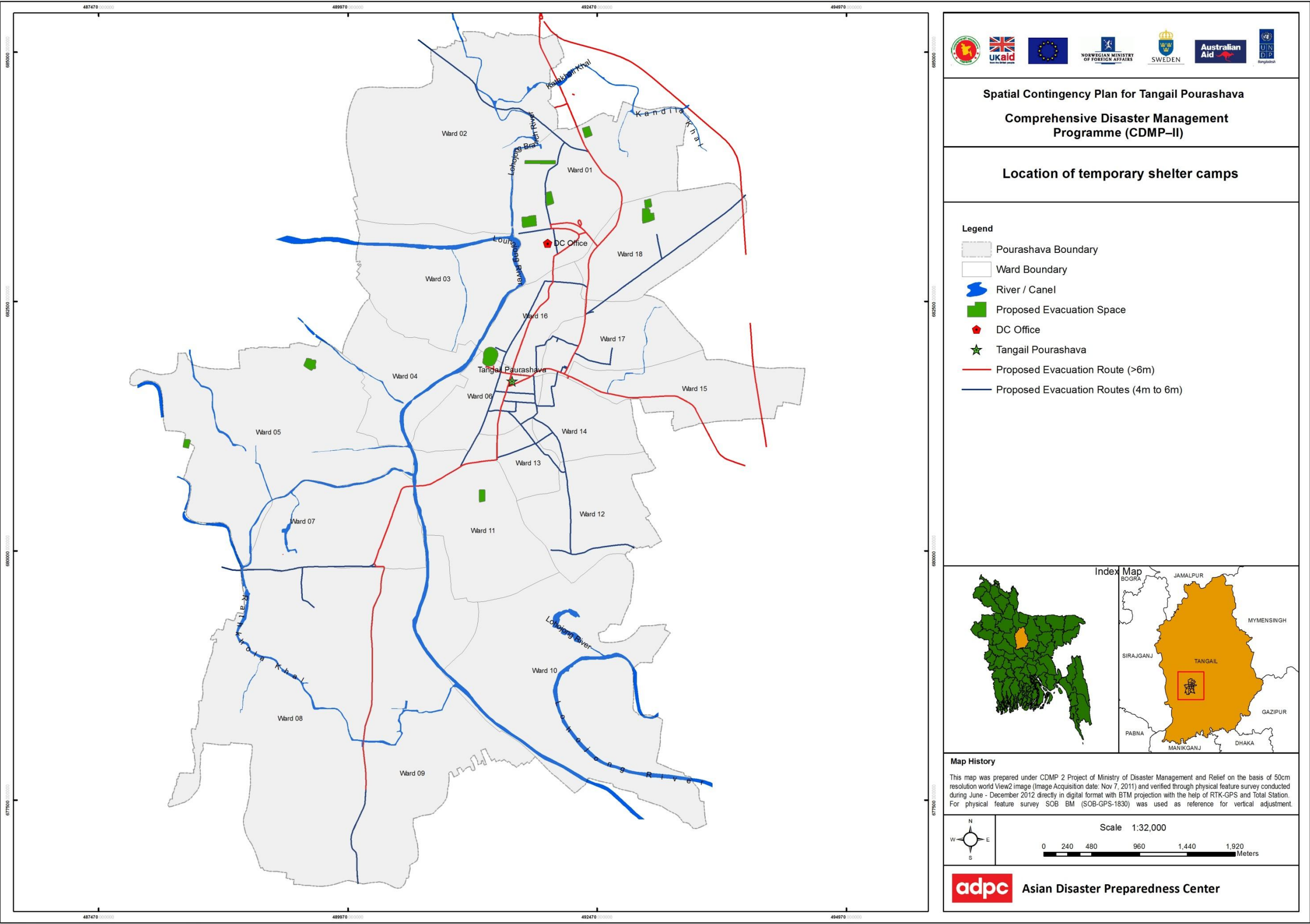
Map C-3 Proposed evacuation routes



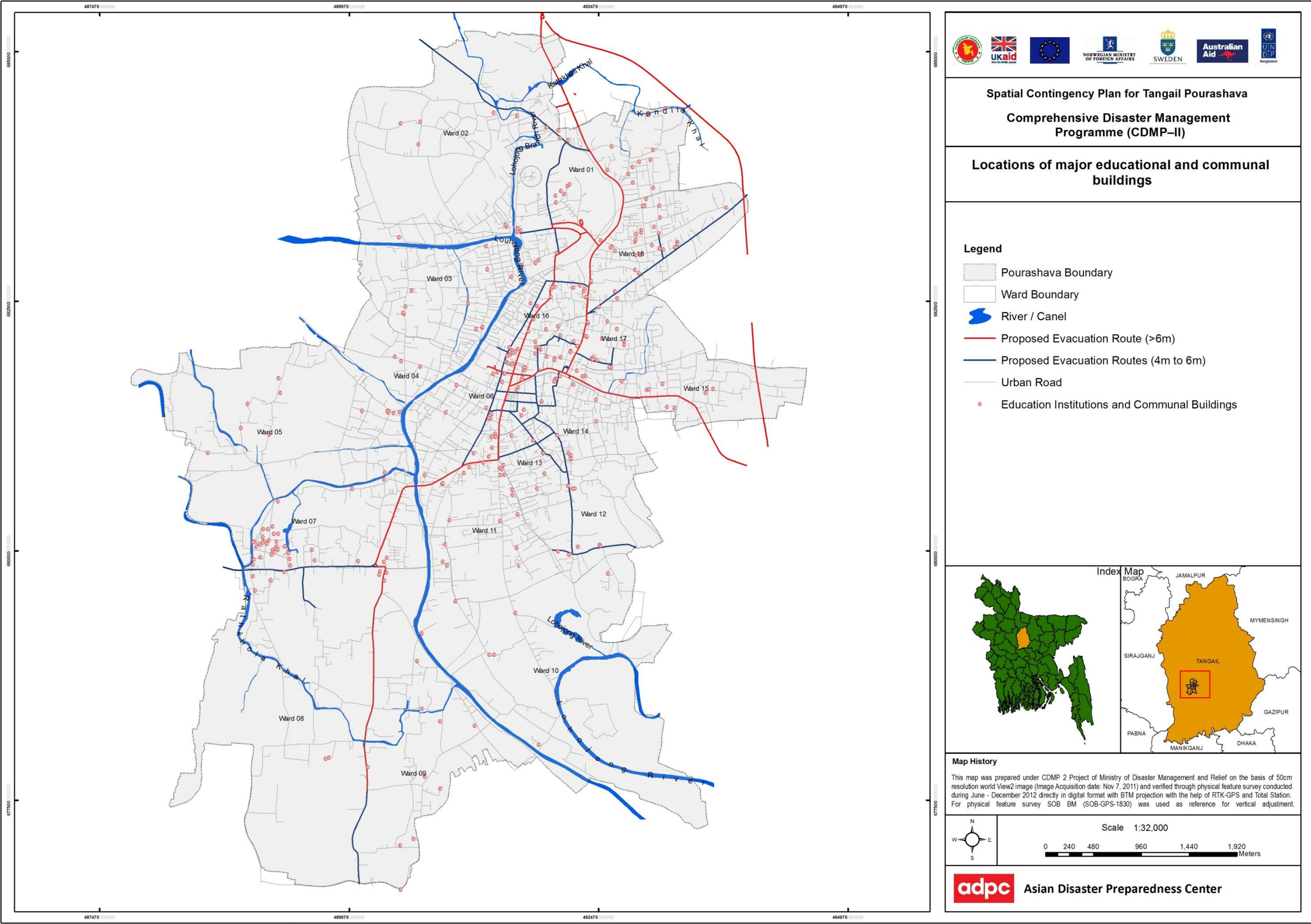
Map C-4: Location of water supply sources



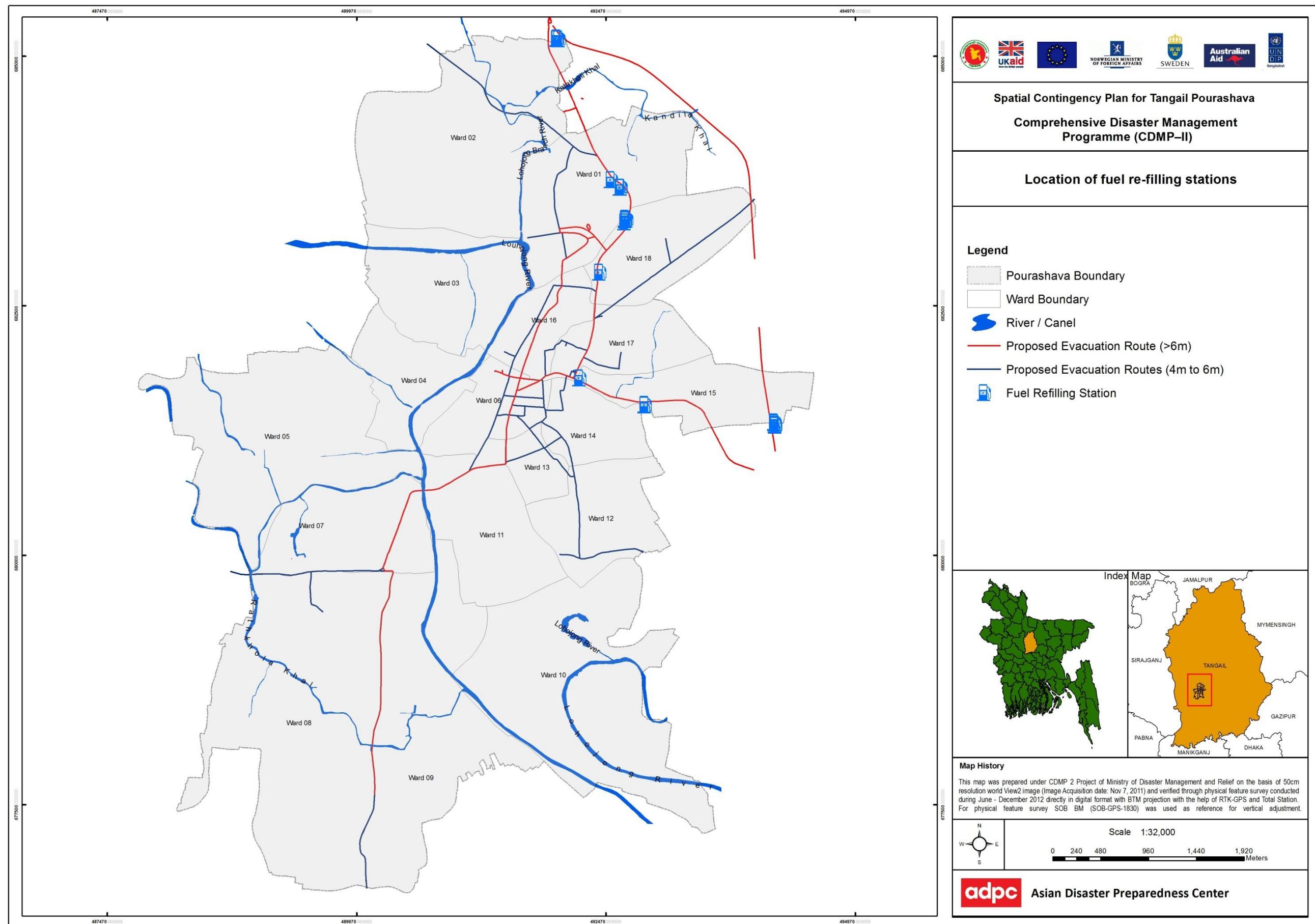
Map C-5: Location of major hospitals and clinics



Map C-6: Location of proposed shelter sites (open spaces)



Map C-7: Locations of educational and communal buildings available



Map C-8: Location of fuel re-filling stations



Comprehensive Disaster Management Programme (CDMP II)

Ministry of Disaster Management and Relief
Government of the People's Republic of Bangladesh

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