Rajshahi City Corporation

Scenario-based Earthquake Contingency Plan of Rajshahi City Corporation Area

November 2014

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Rajshahi City Corporation 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
CCDMC	City Corporation 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 Rajshahi City

Rajshahi City is the divisional headquarter of Rajshahi division as well as the administrative district and is one of the four metropolitan cities of Bangladesh. Often referred to as Silk City and Education City, Rajshahi is located on the bank of the Padma River in the west boundary of the country (**Map-**

1). Rajshahi Municipality was one of the first municipalities in Bangladesh, established in 1876. In 1991, the Municipality has upgraded to Rajshahi City Corporation. The City Corporation consists of 30 wards and has an area of 96.69 sq. km. Currently, it has an estimated population of around 449,657 people and growing at the rate of 1.25% annually (BBS, 2011).

The city has established itself as a significant market town and already turned into a trade center feeding the locality as well as Dhaka City. Because of good communication network with Dhaka after constructions of the Jamuna Multipurpose Bridge, commercial and business activities are rapidly growing in this town because of additional improvement of various sectors. A considerable number of important institutions are situated in and around Rajshahi City. These are Rajshahi University, Rajshahi University of Engineering and Technology, Rajshahi Medical College and numbers of private universities and other govt. & non-govt. institutions etc. In addition, some medium and small size industries have been established within and around the town area. It is also famous for its socio-economic and cultural heritage. Rajshahi is famous for its silk industries. Fine and cheap silk products of Rajshahi have earned it the nickname Silk City. Rajshahi is also well known for its fruits, especially for Mango and Lichee. Besides the beautiful Mango Orchards and river beaches, it is home to renowned educational institutions covering almost all of professional and cultural fields available within the country. This is why Rajshahi is sometimes referred to as Education City in Bangladesh. Rajshahi is an important tourist destination because of a number of ancient mosques, shrines and temples in and around the city. There are also numbers of ancient mosques, shrines and temple in and around Rajshahi. The Padma River is the main tourist spots in the City.

In the generalized tectonic map of Bangladesh, Rajshahiis located in the medium risk zone. The earthquake risk of the Rajshahi City is growing with every passing moment because of the unabated growth of human settlement and establishment of administrative and economic activities, and educational institutions. The rapid increase in vulnerability of the city is evident from rapid urbanization, population growth and population migration in and around Rajshahi. 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 90% of the soil in Rajshahi City Corporation area is dense/ stiff soil and rest 10% is loose/ soft soil which has high to very 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 city. In these circumstances, a Contingency Plan is needed for ensuring better response towards earthquake hazard.

1.3 Purpose

The Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City:

- Rajshahi City Corporation
- Fire Service & Civil Defence (including urban community volunteers), Rajshahi
- Bangladesh Army, Rajshahi Cantonment
- Civil Surgeon Office, Rajshahi and Rajshahi Medical College Hospital
- Department of Disaster Management (at DC Office), Rajshahi

'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
- Bangladesh Power Development Board, Rajshahi
- Bangladesh Telecommunication Company Ltd., Rajshahi
- Paschimanchal Gas Company Ltd., Rajshahi
- Roads and Highway Department, Rajshahi
- Bangladesh Police, Rajshahi
- Ansar and VDP, Rajshahi

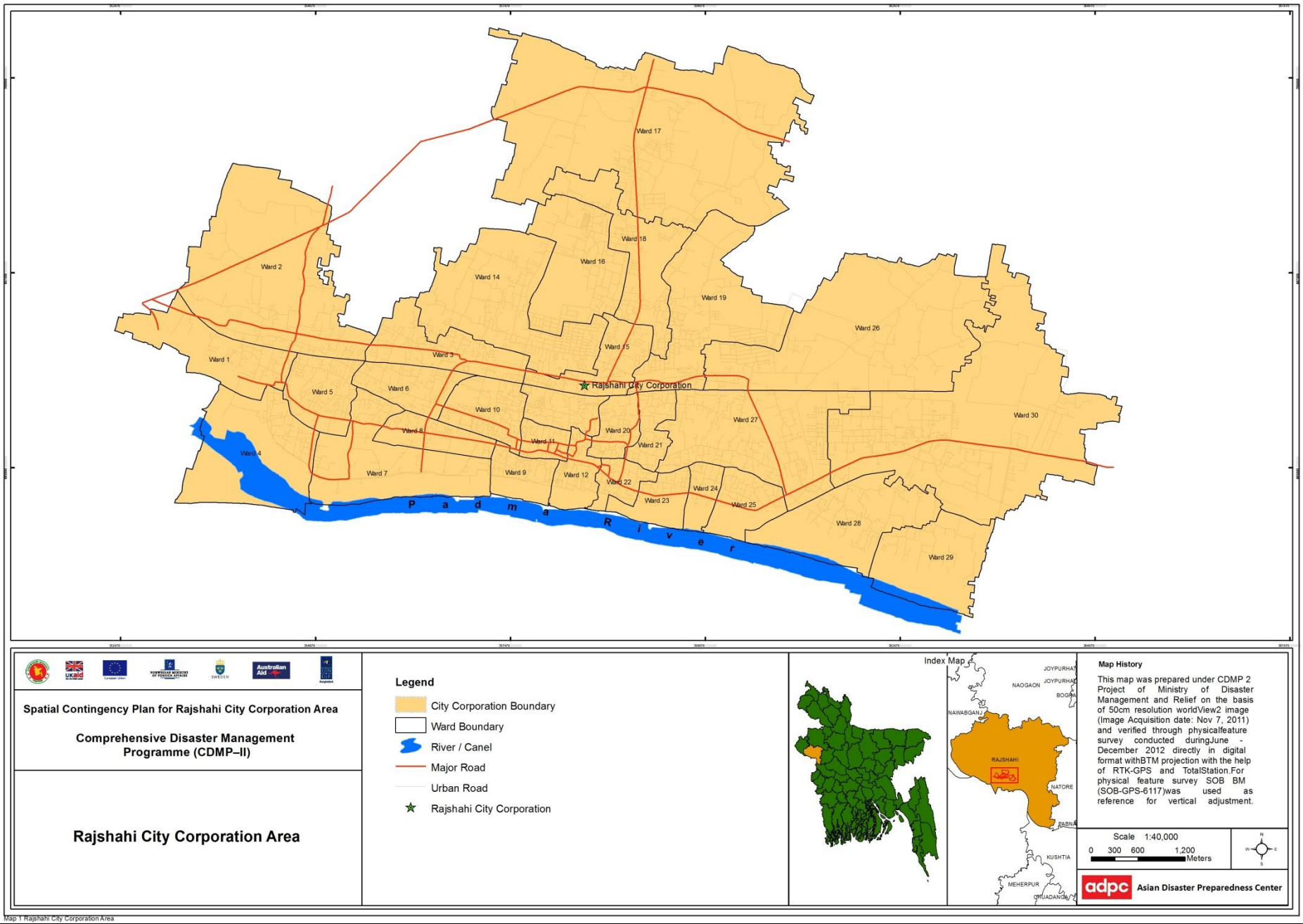
Other agencies such as Govt. Agencies and Departments, Public Works Departments, NGOs and INGOs working in the area, Electronic and Print Media, Community Based Organizations (CBOs), Civil Society Organizations (CSOs), Academia, Development Partners, Private sectors, etc. will provide support for plan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

The ultimate beneficiaries of this plan would be the communities at risk in Rajshahi City Corporation area.

1.6 Plan Limitations

The earthquake Contingency Plan has following limitations:

- The Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City Corporation.

2.2 Plan Context

The Earthquake Contingency Planfor Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City Corporation 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:

- Rajshahi City Corporation
- Department of Disaster Management (at DC Office), Rajshahi
- Fire Service and Civil Defence, Rajshahi
- Bangladesh Army, Rajshahi Cantonment, Rajshahi
- Civil Surgeon Office, Rajshahi
- Rajshahi Water Supply and Sewerage Authority
- Bangladesh Power Development Board, Rajshahi
- Bangladesh Telecommunication Company Ltd., Rajshahi
- Paschimanchal Gas Company Ltd., Rajshahi
- Bangladesh Police, Rajshahi
- Bangladesh Ansar and VDP, Rajshahi
- Rajshahi Development Authority
- Public Works Department, Rajshahi

Early in the planning process an Orientation Meeting was organized under the leadership of the City Corporation that play 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 February 2014, the City Corporation organized a Training Workshop on Preparation of Contingency Plan with regard to Earthquake for Rajshahi City Corporation 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 Rajshahi City Corporation. The results of the earthquake risk assessment and potential losses and damages for Rajshahi City Corporation 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 City Corporation 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 Rajshahi City Corporation shall undertake the leadership responsibility for implementation of the Earthquake Contingency Plan. The City Corporation Disaster Management Committee and City Corporation Disaster Response Coordination Group will be the operational arm of the City Corporation 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 City Corporation 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 City Corporation 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 City Corporation should initiate the revision/ modification process and will engage City Corporation Disaster Management Committee and other agencies/departments with relevant responsibilities.
- Each revision of the plan should be authorized by the City Corporation 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 Cachen 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 Rajshahi City Corporation 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 Rajshahi City Corporation 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 Rajshahi City Corporation due to three scenarios

Scenarios	Total Number of Buildings	Number of Building Damage		
		Moderate	Extensive	Complete
Scenario-1	93,744	1,697	56	2
Scenario-2	93,744	21,288	2,865	152
Scenario-3	93,744	41,495	15,156	1,174

It is estimated that about 2 buildings of Rajshahi City Corporation area will likely be completely damaged due to an earthquake of 43 years return period originated from Dauki Fault. During the event, about 56 buildings will likely be extensively damaged and 1,697 (1.80%) moderately damaged. About 152 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 damage about 1,174 buildings completely which is more than 1.25% of the total building stock in the City Corporation. The possible concrete and masonry building damage due to scenario-2 earthquake are sown in **Map B-1** & **Map B-2** in the **Annex-B**.

Casualties and Injuries

The estimates of the number of people that will likely 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 Rajshahi City Corporation area due to three scenarios

Scenarios	Time	Level of Injuries			
		Level-1	Level-2	Level-3	Level-4
Scenario-1	2:00 AM	52	3	0	1
	2:00 PM	41	3	0	1
Scenario-2	2:00 AM	564	59	3	79
	2:00 PM	418	45	3	53
Scenario-3	2:00 AM	1830	218	22	572
	2:00 PM	1381	179	21	445

During scenario-1 earthquake at night-time, about 1 people will likely be killed immediately in Rajshahi City Corporation area. About 3 people will likely be required hospitalization but are not considered life-threatening. Another 52 people will likely be required medical attention such as first aid or some kind of treatment. Similarly about 79 people will likely be killed, 3 people will likely needed to hospitalize on a critical condition, 59 people will likely be needed to hospitalize on moderate injuries, and about 564 people will likely be required medical attention if the scenario-2 earthquake occurred during nigh-time. Scenario-3 earthquake at night-time will likely kill 572, about 22 people will likely be needed to hospitalized on a critical condition, about 218 people will likely be required to take admission in hospital with moderate injuries, and about 1,830 people will likely be required primary medical attention.

Essential Facilities Damage

During the scenario earthquakes, essentials facilities such as major hospitals and clinics, educational institutions, fire service stations, police stations, and other government and communal structures located within the City Corporation 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	384	0	0	384
	Hospital	121	0	0	121
	Fire Station	1	0	0	1
	Police Station	14	0	0	14
Scenario-2	School	384	44	0	91
	Hospital	121	13	0	21
	Fire Station	1	1	0	0
	Police Station	14	1	0	2
Scenario-3	School	384	300	0	0
	Hospital	121	108	0	0
	Fire Station	1	1	0	0
	Police Station	14	10	0	0

The estimation shows that in Rajshahi City Corporation area, none of the buildings of essential facilities will likely be moderate or completed damaged and all the buildings will likely be damaged with more than 50% functional on day-1 in the aftermath of scenario-1 earthquake. Due to scenario-2, about 44 educational, 13 hospital/clinic, 1 fire station and 1 police station buildings will likely be moderate damaged. Similarly, about 300 educational, 108 hospital/clinic, 1 fire station and 10 police stations buildings will likely be moderate damaged due to scenario-3 earthquake in the City Corporation area. 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 the **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 Rajshahi City Corporation 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 City Corporation 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 the **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	7,819	0	0	7,819	7,819
		Bridges	1	0	0	1	1
	Railway	Segments	57	0	0	57	57
		Facilities	5	0	0	5	5
	Bus Terminal	Facilities	9	0	0	9	9
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		36	0	0	0	0
	Electrical Power		288	0	0	0	0
	Communication		41	0	0	41	41
Scenario-2	Highway	Segments	7,819	0	0	7819	7819
		Bridges	1	0	0	1	1
	Railway	Segments	57	0	0	57	57
		Facilities	5	0	0	5	5
	Bus Terminal	Facilities	9	2	0	8	9
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		36	0	0	0	0
	Electrical Power		288	0	0	0	0
	Communication		41	2	0	41	41
Scenario-3	Highway	Segments	7,819	0	0	0	0
		Bridges	1	0	0	0	0
	Railway	Segments	57	0	0	0	0
		Facilities	5	0	0	0	0
	Bus Terminal	Facilities	9	0	0	0	0
	Ferry Terminal	Facilities	0	0	0	0	0
	Potable Water		36	0	0	0	0
	Electrical Power		288	0	0	0	0
	Communication		41	35	0	36	41

The expected damage to utility pipelines within the City Corporation due to three scenario earthquakes is given in **Table-3.6**. The assessment shows that there will likely to occur 2 leaks and 1 break to water supply pipelines due to scenario-1 earthquake. In case of scenario-2 earthquake, there will likely to occur 12 leaks and 13 breaks. Similarly, there will likely to occur 32 leaks and 30 breaks to water supply pipelines due to scenario-3 earthquake.

Table 3.6 Expected damage to utility pipelines due to three scenario earthquakes

System	Scenario 1			Scenario 2			Scenario 3		
	Total Pipeline Length (km)	No. of Leaks	No. of Breaks	Total Pipeline Length (km)	No. of Leaks	No. of Breaks	Total Pipeline Length (km)	No. of Leaks	No. of Breaks
Potable Water	170	2	1	170	12	13	170	32	30
Waste Water	0	0	0	0	0	0	0	0	0
Natural Gas	0	0	0	0	0	0	0	0	0

Earthquake-Induced Fires

Fires often occur after an earthquake. Several fire incidents may occur after a major earthquake in Rajshahi City Corporation Municipality area which can burn out of control. **Table-3.7** provides the number of ignitions and probable damage due to earthquake-induced fires in different scenarios.

Table 3.7: Expected earthquake-induced fires and probable damage

Scenarios	Probable Impacts		
	No. of Ignition	Population to be Displaced	Economic Damage (thousand USD)
Scenario-1	1	27	0
Scenario-2	2	35	0
Scenario-3	2	47	0

In Rajshahi City Corporation, it is estimated that scenario-1 will likely to cause 3 ignitions and both scenario-2 and scenario-3 will likely to cause 2 ignitions. About 27, 35 and 47 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 unknown.

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 Rajshahi City Corporation due to three scenario earthquakes.

Table 3.8: Expected debris generation in the City Corporation area due to scenario earthquakes

Scenarios	Debris Generation		
	Total (Thousand Ton)	% Concrete and Steel	% of Brick, Wood and Others
Scenario-1	20	12	88
Scenario-2	200	37	63
Scenario-3	700	56	44

In Rajshahi City Corporation area, around 20 thousand tons of debris will likely be generated from Scenario-1 earthquake. In case of Scenario-2 and Scenario-3 earthquakes, there will likely to generate about 200 thousand tons and about 700 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, 869 people will likely be trapped (both in injured and dead condition) inside 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 434 victims (50%) can be extricated by the community themselves or with the light search and rescue teams, whereas another 50% (approximately 435) 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 Rajshahi City Corporation area which will primarily be responsible for conducting specialized search and rescue operation along with Rajshahi Cantonment and BDRCS during an earthquake emergency in the City Corporation. The available resources and capacities of FSCD Rajshahi are given in **Table A-1** and **Table A-2** in **Annex-A**.The Urban Community Volunteer trained by FSCD for Rajshahi City 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 Rajshahi City is shown in **Map C-1** in **Annex-C**.

Immediate Evacuation Spaces

It is estimated that about 6,678 populations will likely be displaced due to building collapse. These populations will need to be evacuated immediately to the nearest open spaces. Total 6,678 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 Rajshahi City Corporation 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 421,398 sq. m. of open spaces within Rajshahi City Corporation 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 **MapC-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 City Corporation area are sufficient for immediate evacuation for the required number of displaced population. About 414,719 additional people can be accommodated in these spaces for immediate evacuation purpose from surrounding areas of the City Corporation.

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 for safe evacuation, because other smaller urban roads inside the City Corporation 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 Rajshahi City Corporation 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 City Corporation.

Fire Control

The analysis shows that that Senario-2 earthquake will result in multiple conflagrations immediately. There will likely be at least 2 ignitions 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 City Corporation 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 Rajshahi City Corporation will likely to be overwhelmed.

Health Facilities

Currently, there are 34 major hospitals and clinics within Rajshahi City Corporation area with total 1,215 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 cause moderate to severe damage to many hospital buildings that would result in only 546 hospital beds (45%) 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 273.

The estimation shows that approximately 62people will require hospitalization immediately after the Scenario-2 earthquake. Hence, a total of 211more beds will be available for the treatment of other regular patients and other injured.

Emergency Shelters

It is estimated that approximately 6,679 populations of Rajshahi City Corporation will likely 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 31,320 sq. m. shelter spaces for approximately 696 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 **TableA-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 shelter purpose depending on the season as well as their level of functionality after the earthquake. The locations of educational and communal buildings available within Rajshahi City Corporation area 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 Rajshahi City Corporation 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 Rajshahi City Corporation area, around 200 thousand tons of debris will likely to be generated from Scenario-2 earthquake. If the debris tonnage is converted into an estimated number of truckloads, it will require about 8,000 truckloads (@25 tons per truck) to remove the debris. The location of fuel re-filling stations within the City Corporation 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 city.

The estimation shows that during Scenario-2 earthquake at night-time, about 79 people will likely be killed immediately in Rajshahi City Corporation 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 city will be carried out through a city-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 City-level Emergency Operation Center (EOC) and functional response cluster system.

Establishment and Activation of EOC:

A City-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 City-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 City Corporation 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 city, 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 City-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	• 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 Disaster Phase	• 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	• 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 City-level EOC

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

The EOC will be led by the City 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	• The Planning Desk is primarily involved in evaluating the disaster situation, determining objectives, providing overall strategic and policy directions, establishing unified actions across the city, deciding which resources should be used to achieve disaster response in the most efficient and cost-effective manner, and liaison with CCDMC, City Corporation, National EOC and international agencies (if necessary).

Coordination	• 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	• 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	• 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	• 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. Eachteam 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. Rajshahi City has a trained volunteer group of about 198 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 Rajshahi City 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 (City Corporation 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 city-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 City-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 city-level to assist the affected city.

Section 05: Action Strategies

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

CLUSTER 1: COMMAND AND COORDINATION

Lead Agency	Rajshahi City Corporation
Support Agencies	DC Office, Army, FSCD, DDM, BP, RAB, Ansar& VDP, BGB, Media, CSO, PDB, BTCL, PGCL, PWD, RHD, BR
Primary Objectives	• 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, PGCL
	Executing operation surveillance continuously covering all the earthquake affected areas	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, PGCL
	Mobilization of ICS teams at lower level command structure	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, PGCL, Local Newspapers
	Facilitating coordination of logistic supply management	DC Office, FSCD, Army, DDM, Office of Civil Surgeon BP, BR, BPDB, BTCL, PGCL
	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	DC Office, DDM, National and Local Electronic and Print Media

	facilitate media coverage by media agencies on reporting earthquake event	
	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, PGCL
	Conducting Post disaster Evaluation of performance of • 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, PGCL
	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, PGCL
	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, PGCL

CLUSTER 2: SEARCH, RESCUE AND EVACUATION

Lead Agency	Fire Service and Civil Defence (FSCD), Rajshahi
Support Agencies	DC Office, Army, FSCD, DRRO, BP, RAB, Ansar& VDP, BGB, Media, CSO, PDB, BTCL, PGCL, PWD, RHD, BR, BDRCS
Primary Objectives	• 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, PGCL
	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, PGCL
	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, PGCL
	Preparing guidelines for logistic supply management and deployment of resources	FSCD, Army, Office of Civil Surgeon, DDM, BP, Ansar & VDP, BR, BPDB, BTCL, PGCL
	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	FCSD, 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 • 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, Rajshahi
Support Agencies	City Corporation, Army, FSCD, DDM, BP, BDRCS, Hospital and Clinic Authorities, Medical College, Civil Societies, Media, NGOs
Primary Objectives	• 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	City Corporation, BDRCS, NGOs
	Methodology development for handling of dead and missing during earthquakes and emergencies	Army, BDRCS, City Corporation
	Developing networks with private & government hospitals within the area and in the neighborhood for support during emergencies like earthquakes	Army, City Corporation, Hospitals and Clinics
	Developing alert system for hospital staff including doctors to report for work during emergencies such as earthquakes	Army, City Corporation, Hospitals and Clinics
	Setting up of 24/7 State of the art ambulance services	Army, FSCD, City Corporation, Hospitals and Clinics
	Identifying needs for pre-positioning of medicine, temporary hospitals etc. and obtain the necessary resources	Army, FSCD, City Corporation, NGOs
	Methodology development for epidemic surveillance and control Conduct operation surveillance training for all First Responder Organization for quick mobilization in earthquake events	Army, FSCD, BDRCS
	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, City Corporation
	Methodology development for estimation of livestock, number of injured people and casualty	Army, FSCD, City Corporation
Emergency Response Phase	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, City Corporation
	Mobilizing pre-positioned medical facilities , Mobile Hospitals etc. to treat injured and sick	Army, FSCD, City Corporation

	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, City Corporation
	Mobilizing ambulance services to transport sick and injured	Hospital and Clinic authorities, Army, FSCD, City Corporation
	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, City Corporation
	Establishing counseling centers	City Corporation, NGOs
Early Recovery Phase	Continue providing emergency medical care to displaced persons.	Army, DDM, City Corporation
	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, City Corporation, 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, City Corporation

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

Lead Agency	Rajshahi City Corporation
Support Agencies	DC Office, Army, DDM, DoF, District Food Office, BP, Ansar and VDP, BGB, BDRCS, FSCD, NGOs, INGOs
Primary Objectives	• 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 • 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, Army
	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	Rajshahi City Corporation	
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	• 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	Rajshahi Water Supply and Sewerage Authority
Support Agencies	DPHE, Army, FSCD, DDM, DC Office, Office of Civil Surgeon, NGOs, INGOs
Primary Objectives	• 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

	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
Early Recovery Phase	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	Rajshahi City Corporation
Support Agencies	PWD, BPDB, BTCL, PGCL, DPHE, DC Office, DDM, Army, FSCD, Office Civil Surgeon, Universities, NGOs, Private Sectors
Primary Objectives	• 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, PGCL, 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, PGCL, 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, PGCL, 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, PGCL, 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, PGCL, , 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, PGCL, DPHE
	Maintenance of stocks of most essential spare parts and service personnel for attending to large scale emergencies such as earthquakes	BPDB, BTCL, PGCL, DPHE

	Developing guidelines for vulnerability assessment of utilities and conduct training for utility sector staff for undertaking vulnerability assessments	BPDB, BTCL, PGCL, 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 onutility sector and develop efficient response capacity	BPDB, BTCL, PGCL, DPHE
	Designing and implementing projects for pre-positioning of emergency water, electricity, gas supply, and telecommunication services for critical areas	BPDB, BTCL, PGCL, DPHE
	Developing procedure for post-earthquake damage assessment of all essential utilities within the city	BPDB, BTCL, PGCL, 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, PGCL, 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
Emergency Response Phase	Immediately activating the plan for shut off of all supplies of gas, electricity, waste disposal etc. at all shut off points.	BPDB, BTCL, PGCL, DPHE
	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, PGCL, 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, PGCL, 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, PGCL, 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, PGCL, DPHE, Army, FSCD, Universities, DDM
	Mobilizing pre-positioned emergency utility supply services for critical areas	BPDB, BTCL, PGCL, 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, PGCL, 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, PGCL, 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, PGCL, DPHE
	Assisting restoration of all essential utilities and services within the city by utility managers	BPDB, BTCL, PGCL, DPHE
	Providing periodic situation reports on the status of restoration of services and review the progress	BPDB, BTCL, PGCL, 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, PGCL, DPHE
	Phase by phase restoration of disrupted electricity, gas, water supply and telecommunication through assessment of degree of damage	BPDB, BTCL, PGCL, 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	Rajshahi City Corporation
Support Agencies	RHD, LGED, BRTC, BIWTC, BR, DDM, FSCD, Army, BP, Office of Civil Surgeon
Primary Objectives	• 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, Rajshahi	
Support Agencies	DC Office, DSW Army, FSCD, Ansar& VDP, RAB, BGB, City Corporation	
Primary Objectives	• 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, City Corporation
	Developing a comprehensive plan for traffic control during emergencies	Ansar& VDP, RAB, BGB, City Corporation
	Developing guidelines for control of entrance into damaged buildings, and restrict access to affected areas by unauthorized persons	FSCD, Ansar& VDP, RAB, BGB, City Corporation
	Developing guidelines for evaluation of security planning and operations for maintenance of law and order during emergencies	DC Office, FSCD, Ansar & VDP, RAB, BGB, City Corporation
	Assisting development of procedures for handling of destitute and orphans	DC Office, City Corporation, 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	City Corporation, Army, DDM, NGOs
	Developing procedures for management and maintenance of information on dead and missing	City Corporation, DC Office, DSW, Army, FSCD, Office of Civil Surgeon
	Developing procedures for burial of dead, funeral rights, mortuary services etc.	City Corporation, 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, City Corporation
	Activating the Plan for traffic control during emergencies	Ansar& VDP, RAB, BGB, City Corporation
	Exercise control of entrance into damaged buildings, and restrict access to affected areas by unauthorized persons	FSCD, Ansar & VDP, RAB, BGB, City Corporation

	Conducting periodic monitoring and evaluation of security operations for maintenance of law and order during emergencies	DC Office, Army, FSCD, Ansar & VDP, RAB, BGB, City Corporation
	Activating the Plan for handling of destitute and orphans	DC Office, City Corporation, 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	City Corporation, Army, DDM, NGOs
	Carrying out the plan for management and maintenance of information on dead and missing	City Corporation, DC Office, Army, FSCD, Office of Civil Surgeon
	Carrying out the procedures for burial of dead, funeral rights, mortuary services etc.	City Corporation, 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, City Corporation
	Reviewing the performance of implementation of plan for traffic control during emergencies	Ansar& VDP, RAB, BGB, City Corporation
	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, City Corporation
	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, City Corporation

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	• Activate Emergency Operation center (EOC)
	• Identify potential sites for evacuation centers to accommodate displaced population while emergency shelters are being opened.
	• Identify at-risk populations, notify them and begin to evacuate if warranted.
	• Assess the condition and status of critical facilities such as City Corporation office, DC office, fire service offices, hospitals and clinics, police stations, etc.
	• Identify vulnerable buildings or infrastructures that are threating to impacted area and nearby community that may be affected by cascading effects and secondary hazard and take initiative to stabilize or eliminate immediately.
	• Assess the condition of emergency communication system.
	• Begin public information dissemination regarding personal protection actions, safe congregation points, and community assistance needed.
	• Complete an initial damage assessment of the city, identifying areas affected, major incidents, and operational status of critical services.
	• Create consolidated situation assessment and declare a state of emergency.

Search Rescue and Evacuation	• Mobilize specialized search and rescue team including urban community volunteer and assist immediate life-saving rescue operations.
	• Direct and suppression of existing fires and anticipated fire spread based on conditions.
Health Services	• Deploy emergency medical services to major incidents.
	• Establish casualty collection points and field medical camps for on-scene treatment
	• 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	• Deploy law enforcement resources to support response and maintain law and order.
	• 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	• Assess critical resource shortfalls and begin requesting support through National EOC.
	• Open evacuation centers/ spaces.
	• Initiate a regular status reporting and resource requesting process between local EOC, major incident commands, and National EOC.
	• Monitor and address challenges regarding patient load balancing between hospitals and the related patient transport system.
Shelter	• Assess conditions at designated emergency shelter sites and estimate the number of displaced population who need emergency shelters.
	• Set up tented camps and ensure the distribution of emergency shelter stock to the people of greatest need.
	• 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	• Begin to supply beds, food, water and sanitation, medical support, cooking facilities, electricity and telecommunication facilities in emergency shelters.
Transportation	• Assess condition of transportation system and identify alternatives for moving critical resources into the city.
	• Designate primary evacuation routes, implement debris clearance and recover routes.
Security and Welfare	• Establish perimeter control around unsafe areas and security at critical facilities.

	• Implement an access permit system to prioritize and the limit the access and traffic control system.
	• Identify people with special support requirements (people with disability, children, aged people, female, etc.) and ensure that their needs are met.
	• 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	• 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	• Designate staging areas and begin planning to accommodate support personnel.
Transport	• Ensure that an adequate system is in place to fuel and maintain generators for providing power to critical facilities.
Security and Welfare	• 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	• 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 city for their out-of-area resources.
Relief, Food and Nutrition,	• Establish a distribution network for drinking water and food for

Water Supply, Sanitation and Hygiene	persons who are not residing in mass care facilities but are without basic services.
Water Supply, Sanitation and Hygiene	• 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	• 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	• Support hospital and other medical facility re-supply efforts.
Shelter	• 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	• 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 city 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 city 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	City Corporation, 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 City Corporation area	City level Training workshops	City Corporation, DDM
Training on Damage assessment and need analysis(DANA)	City Corporation, DRRO, other city level relevant stakeholders	City level Training workshops	DDM
Earthquake Response simulations/table top exercises	Health Service, FSCD, Army, DRRO, City Corporation	City level Training workshops	City Corporation, 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 city level hospitals	Training	Civil Surgeon Office, DG Health Services, Respective Ministry
Community level first responders	Community Volunteer groups in the city	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, Rajshahi

Sl. No.	Staff Designation	No. available	Additional need
1	Senior stationer officer	1	No
2	Station officer	1	No
3	Leader	4	No
4	Driver	8	No
5	Fireman	22	No
6	Cook	2	No
7	Sweeper	1	No
Total		**39**	

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

Vehicles/Tools	Purpose	Available Number	Additional Need
Water Tender	All	3	
Tana Gari	All	3	1
Ambulance	All	2	
Two wheeler	All	0	2
Hosepipe pipe	Fire	70	20
Succession Hosepipe	Fire	22	
Succession range/key	Fire	5 set	
Portable Generator	All	6	
Smoke ejector	All	2	
Breathing apparatus	All	8	6
Face mask	All	6	6
Lock cutter	Rescue	1	3
Brunch pipe	Fire	18	
Foam making brunch pipe	Fire	3	
Spreader	Rescue	1	
Ram jack	Rescue	1	
Air lifting bag	Rescue	1	
Rotary rescue saw	Rescue	2	
Rotary hammer drill	Rescue	3	
Ladder	Rescue	2	
Portable Pump	All	3	
Foam trolley	Fire	1	

Vehicles/Tools	Purpose	Available Number	Additional Need
Strainer	fire	3 set	
Fireman exe	All	2 set	
Fireman suit	Fire	31 set	20 set
Hit protective suit	Fire	4 set	2 set
Gum boot	All	31 set	10 set
Helmet	All	31	10
Extinguisher	Fire	12	12
Search light	All	1	3
TTL	Fire	0	1

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

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
1	Ummay Maliha	2	01823711179		Rajshahi Fire Station
2	Shumaia Khatun	4	01773499200		Rajshahi Fire Station
3	Md. Rakibul Islam	3	01744563451	01724338695	Rajshahi Fire Station
4	Md. Habibur Rahman	3	01719250154	01838400793	Rajshahi Fire Station
5	Miss. Sharmen Akter Shanta	8	01759254536	01716697418	Rajshahi Fire Station
6	Hazra Tanas	2	01843828338	01724267221	Rajshahi Fire Station
7	Md. Aminul Hossain	4	01773776500	01835115781	Rajshahi Fire Station
8	Ms. Fathama Akter	2	01764727684	01747335916	Rajshahi Fire Station
9	Mst. Salma Shaikh	2	01922522692	01911786858	Rajshahi Fire Station
10	Md. Abuhena Mostafa Kamal	2	01723060774	01737056261	Rajshahi Fire Station
11	Md. Mahedi Hasan	3	01913684587	01711577080	Rajshahi Fire Station
12	Md. Jubair Rahman	2	01911795155	01736434442	Rajshahi Fire Station
13	Md. Omour Faruck	2	01840146111	01840592248	Rajshahi Fire Station
14	Md. Sahid Hasan	3	01813745622		Rajshahi Fire Station
15	Mst. Unzila Khatun	3	01831838525	01823263056	Rajshahi Fire Station
16	Md. Sojibul Islam	2	01831039476	01199460108	Rajshahi Fire Station
17	Tomalika Khatun	5	01746406999	01912893124	Rajshahi Fire Station
18	Sabina Yeasmin	2	01712943294	01750082867	Rajshahi Fire Station
19	Farhana Afroze	2	01744774279	01724326621	Rajshahi Fire Station
20	Md. Shamsuzzaman	2	01713814468	01687744780	Rajshahi Fire Station
21	Md. Sahib Ali	2	01838075737		Rajshahi Fire Station
22	Aupu Kumar Chowdhury	4	01675981334		Rajshahi Fire Station
23	Khadiza Khatun	1	01773687291	0173057225	Rajshahi Fire Station
24	Mst. Nitu Khatun	22	01824237987	01190059910	Rajshahi Fire Station
25	Mst. Shaila Khatun	1	01723153296	01843318348	Rajshahi Fire Station
26	Salma Kabir Putul	3	01724051788	01676360860	Rajshahi Fire Station
27	Mst. Jesmin Kabir	3	01733157169	01755403727	Rajshahi Fire Station
28	Most. Mahafuza Khatun	3	01774207807	01725538492	Rajshahi Fire Station
29	Tamim Ahmed	5	01834859679	01750365351	Rajshahi Fire Station
30	Md. Shohanuj Jaman	3	01770702868	01725194219	Rajshahi Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
31	Md. Tasdeedye Ameen	2	01739925529		Rajshahi Fire Station
32	Md. Nawab Ali	8	01736498842	01737950463	Rajshahi Fire Station
33	Md. Omar Faruk	7	01824301827	01671158400	Rajshahi Fire Station
34	Md. Ishaq Hossain	1	01838300687	01912687998	Rajshahi Fire Station
35	Md. Alamgir	1	01737521644		Rajshahi Fire Station
36	Abu Taher	1	01672158176	01723968619	Rajshahi Fire Station
37	Atia Farjana	2	01677652974	01918937538	Rajshahi Fire Station
38	Fatema Yesmin	5	01942252848		Rajshahi Fire Station
39	Md. Israfil Haque	2	01918182730	01749781197	Rajshahi Fire Station
40	Md. Saiful Islam	2	01824302201	01923552015	Rajshahi Fire Station
41	Md. Basitum Miazan	1	01743130493	01759584398	Rajshahi Fire Station
42	Md. Robiul Islam	0	01713789536	01719473257	Rajshahi Fire Station
43	Md. Saddam Hossain	22	01738030115	01674486888	Rajshahi Fire Station
44	Mahfuzul Hasan	3	01750003269	01912804399	Rajshahi Fire Station
45	Md. Zeeban Chowdhury	1	01722925965	01827772733	Rajshahi Fire Station
46	Md. Salauddin	24	01722725630		Rajshahi Fire Station
47	Md. Shahinur Rahman	2	01751566650		Rajshahi Fire Station
48	Al Fatta Samad	8	01716697418	01915442972	Rajshahi Fire Station
49	Mst. Farjana Khatun	1	01840053202	01775882459	Rajshahi Fire Station
50	Anar Koly	7	01197337801		Rajshahi Fire Station
51	Mst. Tahmina Khatun	2	01961310112	01744506266	Rajshahi Fire Station
52	Mst. Jesmin Nargish	4	01737357422	01843866798	Rajshahi Fire Station
53	Rajina Khatun	4	01913168260	01921008884	Rajshahi Fire Station
54	Most. Reshma Khatun	5	01723174067	01741505415	Rajshahi Fire Station
55	Israt Jahan	2	01736406346	01773232727	Rajshahi Fire Station
56	Taniya Akter	3	01920440077	01911561783	Rajshahi Fire Station
57	Firoza Khatun	1	01760859403	01922732779	Rajshahi Fire Station
58	Md. Shakhawat Hossain	3	01741350059		Rajshahi Fire Station
59	Md. Mosiur Rahman	3	01741623939		Rajshahi Fire Station
60	Md. Nurnoby Islam	6	01826604261	01683256697	Rajshahi Fire Station
61	Most. Sonia Akter	3	01725538492	01724338695	Rajshahi Fire Station
62	Nondita Rani Ghosh	8	01754558283	01715360282	Rajshahi Fire Station
63	Diparane Sarker	8	01770928084	01737778254	Rajshahi Fire Station
64	Nite Rani Surkur	8	01761058099	01925191767	Rajshahi Fire Station
65	Sabrin Shohely Nipa	9	01922306499	01682247596	Rajshahi Fire Station
66	Nasrin Akter	9	01762333414	01735122072	Rajshahi Fire Station
67	Mst. Shakila Nargish	4	01191803561	01924242488	Rajshahi Fire Station
68	Mst. Labon Nahar	4	01911541446	01716851072	Rajshahi Fire Station
69	Habibnoor Faruq	2	01756026286	01674586225	Rajshahi Fire Station
70	Antu Kumar Ghosh	8	01754558283	01715360282	Rajshahi Fire Station
71	Joyashree Saha	4	01761111324	01742015343	Rajshahi Fire Station
72	Md. Moshiur Rahman	0	01724349783		Rajshahi Fire Station
73	Md. Harunur Rasid	4	01912460498	01191803562	Rajshahi Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
74	Md. Ahad Ali	3	01740618769		Rajshahi Fire Station
75	Runa Khatun	4	01741529362	01720252533	Rajshahi Fire Station
76	Nazmin Aktar	1	01824301332	01929110496	Rajshahi Fire Station
77	Tamann Aakter	3	01916512003	01911561783	Rajshahi Fire Station
78	Md. Mahedi Hasan	3	01719403974	01737066491	Rajshahi Fire Station
79	Md. Fazlul Haq	3	01731256014	01731256014	Rajshahi Fire Station
80	Md. Masudur Rahman	12	01712206505	01195360326	Rajshahi Fire Station
81	Md. Abu Raihan	9	01733294226	01849716812	Rajshahi Fire Station
82	Md. Joinal Abedin	2	01945183402	01744596547	Rajshahi Fire Station
83	Md. Abdul Kader Saleh	3	01740865752	01745736363	Rajshahi Fire Station
84	Md. Shakil Uddin	8	01747252072	01937415246	Rajshahi Fire Station
85	Md. Sanaullah Nuri	5	01710439031		Rajshahi Fire Station
86	Md. Saibur Rahman	3	0177059711	01920184730	Rajshahi Fire Station
87	Babu Kumar Sarkar	8	01737778254	01770928084	Rajshahi Fire Station
88	Md. Kamruzzaman	1	01722504916	01770367018	Rajshahi Fire Station
89	Nur Mohammad	1	01736131619	01722504916	Rajshahi Fire Station
90	Md. Masum Billah	2	01750725715	01761111331	Rajshahi Fire Station
91	Mizanur Rahman	8	01735608006	01941311070	Rajshahi Fire Station
92	Md. Touhidul Hoque	4	01745909999	01914267488	Rajshahi Fire Station
93	Topon Sarkar	12	01737869312	01721665833	Rajshahi Fire Station
94	Md. Bodrul Islam	4	01718614063	01916512323	Rajshahi Fire Station
95	Md. Forhad Ali	9	01717928521	01671835826	Rajshahi Fire Station
96	Md. Sojib Hossain	1	01723061288	01823265871	Rajshahi Fire Station
97	Md. Kafi	4	01937007192	01846594616	Rajshahi Fire Station
98	Md. Abidur Reza	9	01745171178		Rajshahi Fire Station
99	Babul Hossen	9	01773644094	01737272595	Rajshahi Fire Station
100	Zarzisah Amhed	9	01721877858	01713707263	Rajshahi Fire Station
101	Rakibul Islam	7	01722936358	01670623064	Rajshahi Fire Station
102	Md. Safiul Islam	8	01675299650		Rajshahi Fire Station
103	Md. Toriqul Islam	5	01824300732	01834232359	Rajshahi Fire Station
104	Md. Masud Rana	3	01737499136		Rajshahi Fire Station
105	Md. Kawsar Hamid	3	0173645557	01737438068	Rajshahi Fire Station
106	Md. Jakaria Hossain	13	01838075949		Rajshahi Fire Station
107	Md. Rahanur Rahman	13	01747868137	01834861168	Rajshahi Fire Station
108	Md. Salahuddin	2	01740863999		Rajshahi Fire Station
109	Mst. Samsun Nahar	6	01922522788	01758784050	Rajshahi Fire Station
110	Most. Tania	6	01722547154	01192002866	Rajshahi Fire Station
111	Ms. Mitu	6	01736234962		Rajshahi Fire Station
112	Mst. Shamima Islam	6	01197122342	01765945977	Rajshahi Fire Station
113	Md. Abu Wadud	0	01675980635	01719531844	Rajshahi Fire Station
114	Md. Masbah Uddin	6	01670982644	01712218221	Rajshahi Fire Station
115	Md. Faisal Kabir	11	01722947847	01911546623	Rajshahi Fire Station
116	Md. Shariful Islam	19	01829594287	01681246392	Rajshahi Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
117	Sree. Prosenjeet Kumar Ray	8	01718408763	01190692750	Rajshahi Fire Station
118	A. K. M Asaduz Zaman	6	01728007600	01681243493	Rajshahi Fire Station
119	Md. Kausar Ahamed	6	01191613592	0192213398	Rajshahi Fire Station
120	Md. Nuruzzaman Rabbi	9	01756260081		Rajshahi Fire Station
121	Mst. Tumpa Khatun	5	0168423638	01762599689	Rajshahi Fire Station
122	Ayesa Samad	8	01823050987		Rajshahi Fire Station
123	Shamima Parvin	7	01745615612		Rajshahi Fire Station
124	Mst. Halima Khatun	8	01672865749		Rajshahi Fire Station
125	Sultana Parvin	4	01736408354		Rajshahi Fire Station
126	Mst. Sima Khatun	8	01750795845	01920267986	Rajshahi Fire Station
127	Shirajum Monera	6	01750440670	01198167718	Rajshahi Fire Station
128	Kamrun Nahar	7	01674282886	01722360969	Rajshahi Fire Station
129	Shafali Khatun	2	01750726053		Rajshahi Fire Station
130	Nasrin Parvin	19	01737917809		Rajshahi Fire Station
131	Most. Sonia	19	01826515577		Rajshahi Fire Station
132	Nazmin Haque	19	01765708647		Rajshahi Fire Station
133	Shemul Islam	30	01717487897	01721334922	Rajshahi Fire Station
134	Md. Sohag Rana	24	01749845845	0167785060	Rajshahi Fire Station
135	Md. Anisur Rahman	8	01731479841	01677548440	Rajshahi Fire Station
136	Md. Tazizul Islam	30	01712786341	01711578553	Rajshahi Fire Station
137	Md. Sahidul Islam	9	01922211121	01721907130	Rajshahi Fire Station
138	S. M Asif	9	01764820359	01938752477	Rajshahi Fire Station
139	Md. Asaduz Zman	9	01734111397	01672148662	Rajshahi Fire Station
140	Md. Mokter Hossain	16	01723625664	01553450352	Rajshahi Fire Station
141	Md. Moniruzzaman	9	01710244229	01925645441	Rajshahi Fire Station
142	Md. Tosikul Islam	2	01558654073		Rajshahi Fire Station
143	Md. Sarwar Kamal	2	01740863993	01727814404	Rajshahi Fire Station
144	Md. Nafiz Iqbal	10	01744748806	01191626136	Rajshahi Fire Station
145	Md. Alamin Hoque	2	01846678874	01723048174	Rajshahi Fire Station
146	Md. Hasibul Islam	4	01710633578		Rajshahi Fire Station
147	Md. Sobuzhasan	2	01733190948		Rajshahi Fire Station
148	Mst. Gulsa Nara	5	01762599689	0193154746	Rajshahi Fire Station
149	Md. Shoriful Islam	30	01723306873	01761311327	Rajshahi Fire Station
150	Md. Al Amin	15	01745965386	01912060384	Rajshahi Fire Station
151	Md. Bipul Ali	4	01741432842	01948723840	Rajshahi Fire Station
152	Md. Al Foruq	20	01712312209		Rajshahi Fire Station
153	Md. Habibur Rahman	8	01714525496	01733113802	Rajshahi Fire Station
154	Md. Hafizur Rahman	10	01737506834	01711781868	Rajshahi Fire Station
155	Md. Shazadul Islam	13	01717514396	`01761189377	Rajshahi Fire Station
156	Meherunnesha Shapla	12	01826600287	01961336340	Rajshahi Fire Station
157	Bilash Kumar Kundu	9	01912310635	01727144502	Rajshahi Fire Station
158	Md. Summon Ali	19	01745005043	01918795896	Rajshahi Fire Station
159	Md. Rafsan Janin Ahid	18	01744749747	01820800221	Rajshahi Fire Station

Sl. No	Participant Name	Ward No	Contact no.1	Contact no.2	Attached Fire Station
160	Md. Rahmat Ullah	9	01739164303	01912310635	Rajshahi Fire Station
161	Md. Barkat Ullah	13	01749529880	01747335236	Rajshahi Fire Station
162	Md. Abdul Hakim	13	01732653544		Rajshahi Fire Station
163	Md. Tajjin Haque	0	01731016616	01930439458	Rajshahi Fire Station
164	Mohammad Ali	7	01718629599	01719475500	Rajshahi Fire Station
165	A. H. M Kamrul Hasan	26	01714334390	01914300358	Rajshahi Fire Station
166	Md. Jakaria Sarkar	30	01717623648	01718243325	Rajshahi Fire Station
167	Md. Zahir Uddin Ahmed	23	01681404250	01930936400	Rajshahi Fire Station
168	Md. Mahafuj Korim Badhon	1	01763102431	01715672829	Rajshahi Fire Station
169	Md. Forhadur Rahman	30	01720464247	01752662611	Rajshahi Fire Station
170	Tasmin Hasan	6	01712137000	0	Rajshahi Fire Station
171	Md. Enayet Kabir	22	01912434231		Rajshahi Fire Station
172	Md. Ariful Haque	20	01738673476	01721775634	Rajshahi Fire Station
173	Md. Arfan Ali	13	01744507705	01917185699	Rajshahi Fire Station
174	Md. Shamsuj Joha	7	01751245888		Rajshahi Fire Station
175	Md. Firoj Hossan	9	01735122072	01820800528	Rajshahi Fire Station
176	Mst. Monira Khatun	3	01831039468	01718720771	Rajshahi Fire Station
177	Susoma Sarkar Hashi	8	01715324672	0	Rajshahi Fire Station
178	Tasmim Ara Toma	7	01914327451	01913864315	Rajshahi Fire Station
179	Most. Ratna Khatun	9	01716347277	01716347277	Rajshahi Fire Station
180	Sathi Khatun	26	01714334390	01741624509	Rajshahi Fire Station
181	Anjuman Ara	9	01737056716	01198266609	Rajshahi Fire Station
182	Rahul Kumar	1	01744513003	01723427270	Rajshahi Fire Station
183	Md. Wahidimran	26	01730935050	01712908590	Rajshahi Fire Station
184	Saimum Sadat	7	01716916727	01711467372	Rajshahi Fire Station
185	Salina Akter	24	01744812543		Rajshahi Fire Station
186	Sraboni Akter	17	01192029290	01916811317	Rajshahi Fire Station
187	Rowshon Ara	9	01719476093	01680986610	Rajshahi Fire Station
188	Parmita Sarkar	28	01721801485	01712772146	Rajshahi Fire Station
189	Iffatzahan Khan	9	01816697001	01197071728	Rajshahi Fire Station
190	Umme Kulsum Rony	7	01727606946	01741546929	Rajshahi Fire Station
191	Mst. Irin Akter Orin	6	01743942519	01712663646	Rajshahi Fire Station
192	Mst. Ankhi Khatun	7	01918889873	01770789378	Rajshahi Fire Station
193	Most. Masuma	3	01738600331	01738600340	Rajshahi Fire Station
194	Mst. Rajia Sultana	30	01765917791	01932521872	Rajshahi Fire Station
195	Eshtiuk Ahmed	25	01726641542	01558685320	Rajshahi Fire Station
196	Md. Ramija Raja	26	01715772826	01943202402	Rajshahi Fire Station
197	Mst. Zannatul Ferdoush Shopna	8	01737101883	01721031674	Rajshahi Fire Station
198	Shohaly Sultana	8	01825058031	01737101883	Rajshahi Fire Station

Table A-4: List of available open spaces within the city corporation 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	Kathalbaria Playground	01	16,497	16,497	**6,679**	**414,719**
2	Haripur Playground	01	1,772	1,772		
3	Rajpara Playground	05	15,416	15,416		
4	PWD Play Ground	07	13,728	13,728		
5	DPHE Compound Playground	07	4,367	4,367		
6	Eidgah	13	32,032	32,032		
7	Uposhohor Playground	14	7,920	7,920		
8	Rajshahi Divisional Stadium	14	34,466	34,466		
9	Rajshahi District Stadium	15	26,869	26,869		
10	Dorikhanbona Playground	15	14,315	14,315		
11	New Market Road Open Field	15	7,948	7,948		
12	Water Development Board Rest House Open Field	15	6,056	6,056		
13	Shah Maghdum College Playground	18	4,214	4,214		
14	ShahiJame Mosque Field	18	3,204	3,204		
15	ChhotaBanagram Open Field	19	4,041	4,041		
16	Rani Nagar Open Field	25	20,207	20,207		
17	Vodra Park	26	42,088	42,088		
18	MeherChandiPurbo Para Open Field	26	13,377	13,377		
19	Tika Para Playground	27	48,708	48,708		
20	Sekandar Ali Road Open Field	27	9584	9584		
21	KajlaPukurpar open field	27	5722	5722		
22	Water Development Board Rest House Open Field	28	3,761	3,761		
23	Sakender Ali Road Open Field	28	7,865	7,865		
24	Uposhohor Playground	28	1,195	1,195		
25	KajlaPukurpar open field	28	5,286	5,286		
26	MeherChandiPurbo Para Open Field	28	7,220	7,220		
27	Daharampara Playground	28	25,802	25,802		
28	Rajshahi University Stadium	30	37,738	37,738		
Total			**421,398**	**421,398**	**6,679**	**414,719**

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

Road name	Road type	Road width (m)
Circuit House Road	Pucca	25
Greater Road	Pucca	25
Keshabpur Road	Pucca	6-7
Medical Road	Pucca	6-18
Mohonganj Road	Pucca	25
PATC Road	Pucca	6
RajshahNaogaon Highway	Pucca	37
Rajshah Naogaon Highway	Pucca	37
Rajshahi-Chapai Nawabganj Road	Pucca	7-19
Rajshahi City Bypass	Pucca	55
Saheb Bazar Road	Pucca	25-31
Station Road	Pucca	12-25
Sultanbad Road	Pucca	7

Table A-6: List of major hospitals/clinics within Rajshahi City Corporation area 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	Somota Nursing Home	Laxmipur, Rajshahi	10	2	3	0	6	OT, Generator	No	01711-318501
2	Apollo Nursing Home	Laxmipur, Rajshahi	10	1	3	0	6	OT, Generator.	No	01724-025872 01712-141045
3	Micro path Diagnostic Center	Laxmipur, Rajshahi	20	3	6	0	22	OT (2), X-ray, Pathological lab, Generator	No	0721-771724 01724-550544
4	Mukti Clinic Pvt. Ltd.	Laxmipur, Rajshahi	20	5	11	1	22	OT (2), Generator	No	01556-337472 0721-775447
5	Human Care Hospital	Laxmipur, Rajshahi	10	3	6	0	3	OT (2), X-ray, Pathological lab, Generator	No	0721-812739 01711-111839,
6	CDM Hospital	Laxmipur, Rajshahi	75	15	22	4	42	OT (6), X-ray(2), ICU, Pathological Lab, Generator.	No	01845-988899 0721-774415
7	Rajshahi Royal Hospital	Kazihata, Rajshahi	30	9	18	0	38	OT (3), X-ray(2), Pathological Lab, Generator	No	
8	Jamuna Clinic	Shershah Road, Rajshahi	10	2	4	0	9	OT, Generator	No	0721-811646 01711-576364
9	Doctors Clinic and Diagnostic Center.	Shershah Road, Rajshahi	10	2	3	1	10	OT, Pathological Lab, Generator	No	01716-472006 01714-837787
10	Rajshshi General Hospital	Sher shah Road, Rajshahi	10	3	5	2	11	OT, Generator	No	01765-716573
11	Mission Hospital	Sri Ram Rajshahi	50	15	30	5	34	OT (4), X-ray(2), Pathological Lab, Generator	No	0721-776180
12	Rajshahi Metropolitan Hospital Ltd.	C&B More, Rajshahi	30	15	18	2	45	OT (3), X-ray(2), Pathological Lab, Generator	No	0721-770977 01781-258778
13	Cure Nursing Home	Greater Road, Rajshahi	10	3	6	0	12	OT, Generator	No	0721-776392

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		
										01711-340611
14	Zam Zam Islami Hospital	Kazihata, Rajshahi	30	9	18	2	44	OT (3), X-ray(2), Pathological Lab, Generator	No	0721-771146-7 01711-192600
15	Care Nursing Home	Greater Road, Rajshahi	20	4	8	0	38	OT, Generator	No	0721-770301 01718-676060
16	Modern Hospital	Greater Road, Rajshahi	10	3	6	0	15	OT, Generator, Ambulance	No	0721-812035 01711-483988
17	Rafi General Hospital	Laxmipur, Rajshahi	20	6	16	0	22	OT (2), Generator	No	0721-811389
18	Sharmin Nursing Home	Greater Road, Rajshahi	10	3	6	0	12	OT, Pathological Lab, Generator	No	0721-774437 01558-686944
19	Mother land Hospital	GPO Rajshahi	20	6	12	0	21	OT, Pathological Lab, Generator	No	0721-775266 01711-377074
20	Saudia Hospital	GPO Rajshahi	10	1	3	0	12	OT, Generator	No	01721-101457
21	Dolphin Clinic	Kadirgonj, Rajshahi	20	6	12	0	21	OT,X-rays, Pathological Lab, Generator		0721-776070,776344
22	AL Arafa Clinic	Kadamtola, Rajshahi	10	3	6	0	14	OT (2), Pathological Lab, Generator	No	01197-119655 01839-919621
23	Jonosheba Clinic	Gaurohanga, Rajshahi	10	3	6	0	10	OT, Generator	No	0721-770624 01711-267905,01556-333645
24	Rajshahi Chokkhu Hospital	Malopara, Rajshahi	20	1	3	0	9	OT,Generator	No	01718-439651
25	Mohanagar Clinic	Chondipur, Rajshahi	20	6	12	0	20	OT (2), Pathological Lab, Generator, Ambulance	No	0721-775346, 01711-839623
26	Rajshahi Shihsu Hospital	Sipahipara, Rajshahi	100	10	30	0	40	OT (5), X-rays(2), Pathological Lab, Generator.	No	0721-770506

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		
27	Tasin Hospital	Fire Service More, Rajshahi	10	3	6	0	15	OT, Generator	No	0721-812555 01745-74099
28	Rajshahi Lions Chokkhu Hospital	Shaikhpara ,Rajshahi	10	1	3	0	12	OT, Generator.	No	0721-770055
29	Railway Hospital	Inside Railway Station	10	4	6	7	55	OT, Pathological Lab, X-rays(2), Ambulance, Generator	No	0721-776201
30	Ma & Shisu Kallayan Kendra	Southern side of PDB Bhaban	20	2	6	0	22	OT, Generator	No	0721-774285
31	Mother's Clinic	Uposahar, Rajshahi	20	4	6	0	30	OT (2), Generator	No	0721-762111
32	Bridge Hospital	Sher Shah Road, Rajshahi	10	3	6	0	14	OT, Generator	No	01732-565523 01716-164926
33	Zilia Medicare	Laxmipur more, Rajshahi	10	3	6	0	12	OT, Pathological Lab, Generator	No	0721-773325 01913-803222
34	Rajshahi Medical College Hospital	Laxmipur more, Rajshahi	530	250	350	50	100			

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	Kathalbaria Playground	01	16,497	336
2	Rajpara Playground	05	15,416	342
3	PWD Play Ground	07	13,728	305
4	Eidgah	13	32,032	711
5	Uposhohor Playground	14	7,920	176
6	Rajshahi Divisional Stadium	14	34,466	765
7	Rajshahi District Stadium	15	26,869	597
8	Dorikhanbona Playground	15	14,315	318
9	New Market Road Open Field	15	7,948	176
10	WDB Rest House Open Field	15	6,056	134
11	Rani Nagar Open Field	25	20,207	449
12	Vodra Park	26	42,088	935
13	Meher Chandi Purbo Para Open Field	26	13,377	297
14	Tika Para Playground	27	48,708	1082
15	Sekandar Ali Road Open Field	27	9584	212
16	Kajla Pukurpar open field	27	5722	127
17	Sakender Ali Road Open Field	28	7,865	174
18	Kajla Pukurpar open field	28	5,286	117
19	Meher Chandi Purbo Para Open Field	28	7,220	160
20	Daharampara Playground	28	25,802	573
21	Rajshahi University Stadium	30	37,738	838
Total			**398,488**	**8,824**

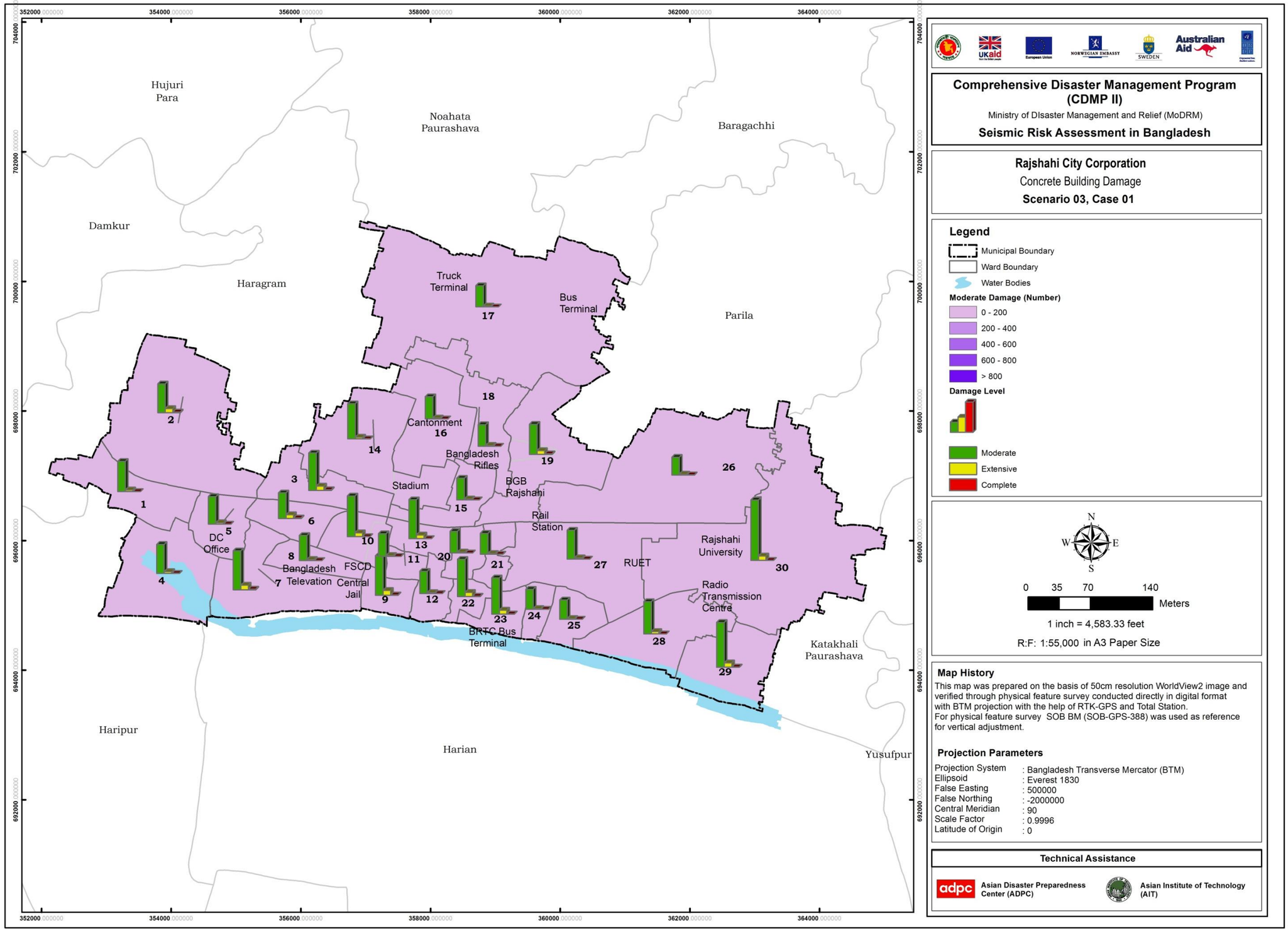
Table A-8: Food Requirements in Different Shelter Camps

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
Kathalbaria Playground	16,497	1.65	4.12	2.47	0.58	49.49	123.73	74.24	17.32
Rajpara Playground	15,416	1.54	3.85	2.31	0.54	46.25	115.62	69.37	16.19
PWD Play Ground	13,728	1.37	3.43	2.06	0.48	41.18	102.96	61.78	14.41
Eidgah	32,032	3.20	8.01	4.80	1.12	96.10	240.24	144.14	33.63
Uposhohor Playground	7,920	0.79	1.98	1.19	0.28	23.76	59.40	35.64	8.32
Rajshahi Divisional Stadium	34,466	3.45	8.62	5.17	1.21	103.40	258.50	155.10	36.19
Rajshahi District Stadium	26,869	2.69	6.72	4.03	0.94	80.61	201.52	120.91	28.21
Dorikhanbona Playground	14,315	1.43	3.58	2.15	0.50	42.95	107.36	64.42	15.03
New Market Road Open Field	7,948	0.79	1.99	1.19	0.28	23.84	59.61	35.77	8.35
WDB Rest House Open Field	6,056	0.61	1.51	0.91	0.21	18.17	45.42	27.25	6.36
Rani Nagar Open Field	20,207	2.02	5.05	3.03	0.71	60.62	151.55	90.93	21.22
Vodra Park	42,088	4.21	10.52	6.31	1.47	126.26	315.66	189.40	44.19
Meher Chandi Purbo Para Open Field	13,377	1.34	3.34	2.01	0.47	40.13	100.33	60.20	14.05
Tika Para Playground	48,708	4.87	12.18	7.31	1.70	146.12	365.31	219.19	51.14
Sekandar Ali Road Open Field	9584	0.96	2.40	1.44	0.34	28.75	71.88	43.13	10.06
Kajla Pukurpar open field	5722	0.57	1.43	0.86	0.20	17.17	42.92	25.75	6.01
Sakender Ali Road Open Field	7,865	0.79	1.97	1.18	0.28	23.60	58.99	35.39	8.26
Kajla Pukurpar open field	5,286	0.53	1.32	0.79	0.19	15.86	39.65	23.79	5.55
MeherChandiPurbo Para Open Field	7,220	0.72	1.81	1.08	0.25	21.66	54.15	32.49	7.58
Daharampara Playground	25,802	2.58	6.45	3.87	0.90	77.41	193.52	116.11	27.09
Rajshahi University Stadium	37,738	3.77	9.43	5.66	1.32	113.21	283.04	169.82	39.62
Total	**398,844**	**39.88**	**99.71**	**59.83**	**13.96**	**1196.53**	**2991.33**	**1794.80**	**418.79**

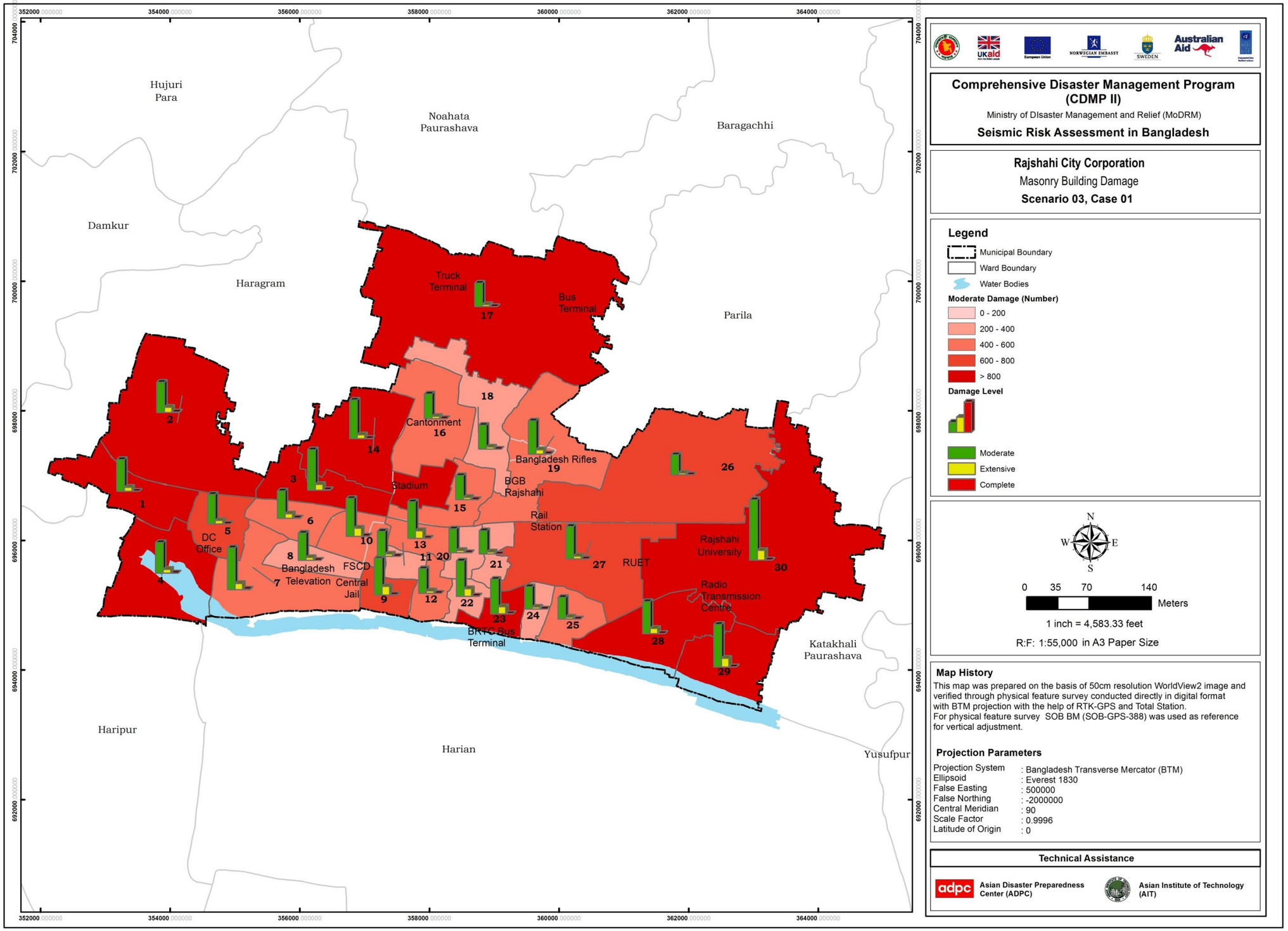
Table A-9: Water and Toilet Requirements in Different Shelter Camps

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	
Kathalbaria Playground	16,497	247.455	742.365	825
Rajpara Playground	15,416	231.24	693.72	771
PWD Play Ground	13,728	205.92	617.76	730
Eidgah	32,032	480.48	1441.44	1602
Uposhohor Playground	7,920	118.8	356.4	396
Rajshahi Divisional Stadium	34,466	516.99	1550.97	1724
Rajshahi District Stadium	26,869	403.035	1209.1	1344
Dorikhanbona Playground	14,315	214.725	644.17	716
New Market Road Open Field	7,948	119.22	357.66	398
WDB Rest House Open Field	6,056	90.84	272.52	303
Rani Nagar Open Field	20,207	303.105	909.3	1011
Vodra Park	42,088	631.32	1893.96	2105
Meher Chandi Purbo Para Open Field	13,377	200.655	601.97	669
Tika Para Playground	48,708	730.62	2191.86	2436
Sekandar Ali Road Open Field	9584	143.76	431.28	480
Kajla Pukurpar open field	5722	85.83	257.49	286
Sakender Ali Road Open Field	7,865	117.975	353.92	394
Kajla Pukurpar open field	5,286	79.29	237.87	265
Meher Chandi Purbo Para Open Field	7,220	108.3	324.9	361
Daharampara Playground	25,802	387.03	1161.09	1290
Rajshahi University Stadium	37,738	566.07	1698.21	1887
Total	**398,844**	**5,982.66**	**17,947.98**	**19,993**

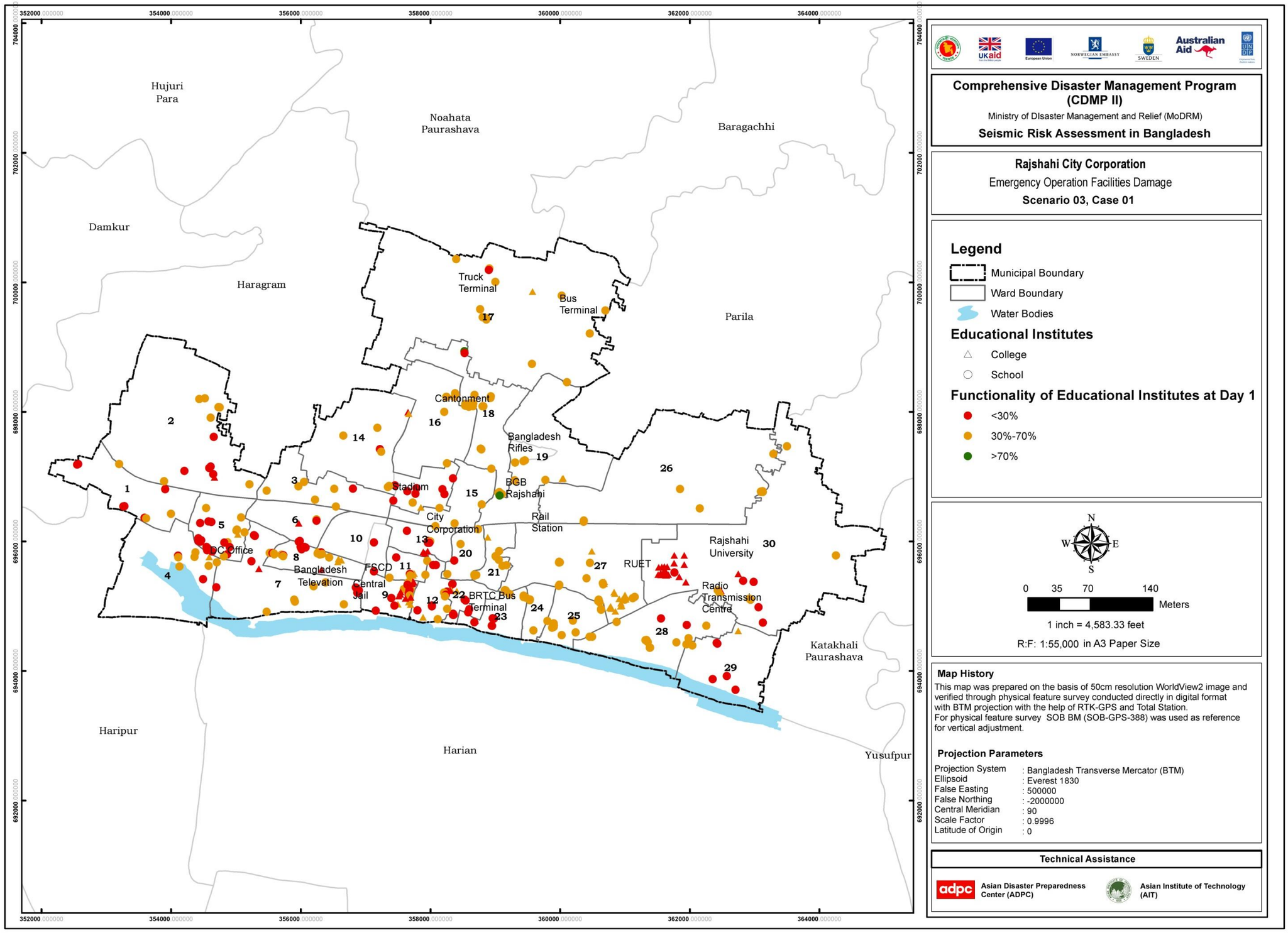
Annex-B: Earthquake Hazard and Risk Maps



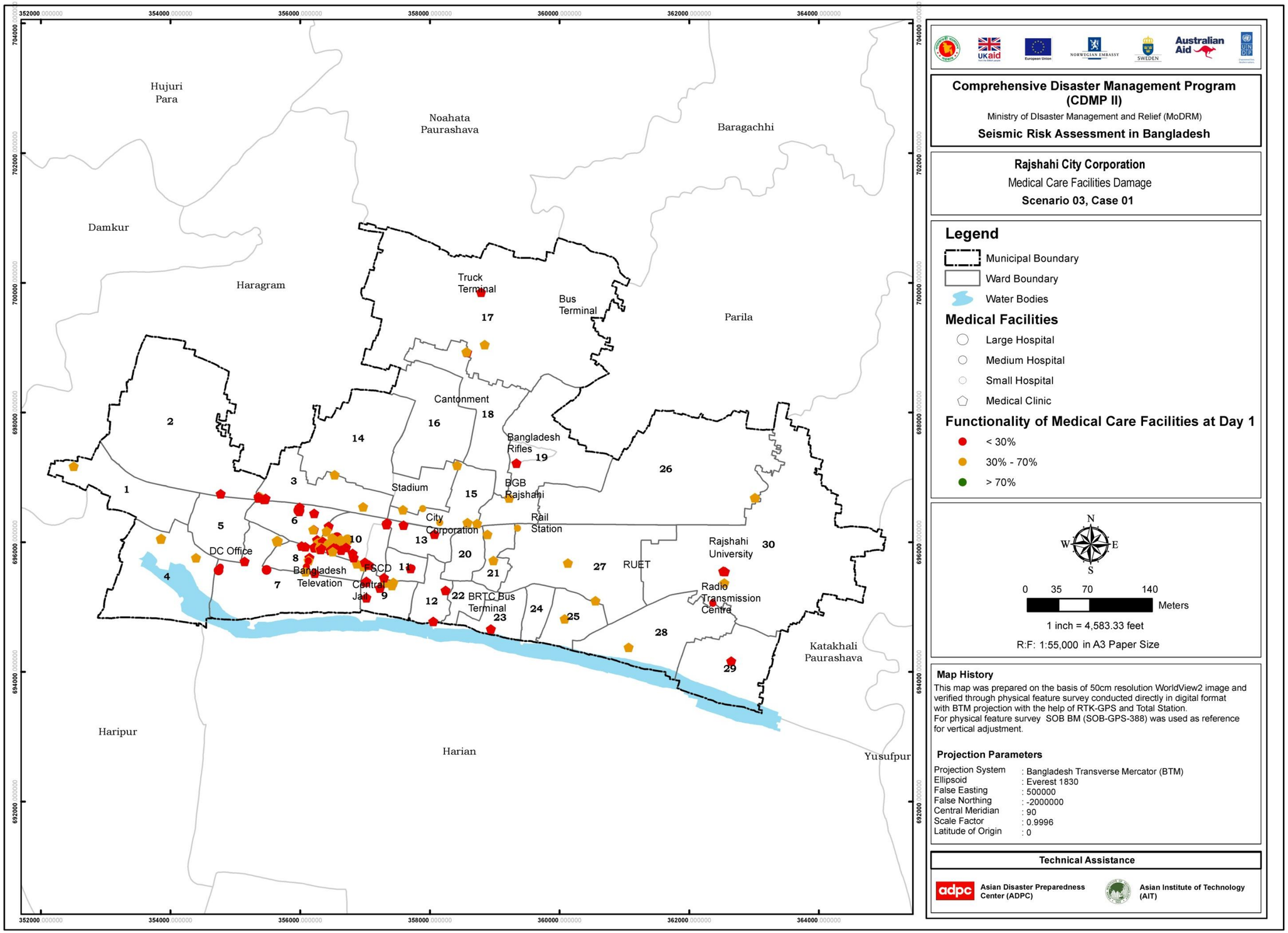
Map B-1: Possible concrete building damage map due to scenario-2 earthquake



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



Comprehensive Disaster Management Program (CDMP II)

Ministry of DIsaster Management and Relief (MoDRM)

Seismic Risk Assessment in Bangladesh

Rajshahi City Corporation

Medical Care Facilities Damage

Scenario 03, Case 01

Legend

- Municipal Boundary
- Ward Boundary
- Water Bodies

Medical Facilities

- Large Hospital
- Medium Hospital
- Small Hospital
- Medical Clinic

Functionality of Medical Care Facilities at Day 1

- < 30%
- 30% - 70%
- > 70%

N, W, E, S

0 35 70 140 Meters

1 inch = 4,583.33 feet

R:F: 1:55,000 in A3 Paper Size

Map History

This map was prepared on the basis of 50cm resolution WorldView2 image and verified through physical feature survey conducted directly in digital format with BTM projection with the help of RTK-GPS and Total Station.
For physical feature survey SOB BM (SOB-GPS-388) was used as reference for vertical adjustment.

Projection Parameters

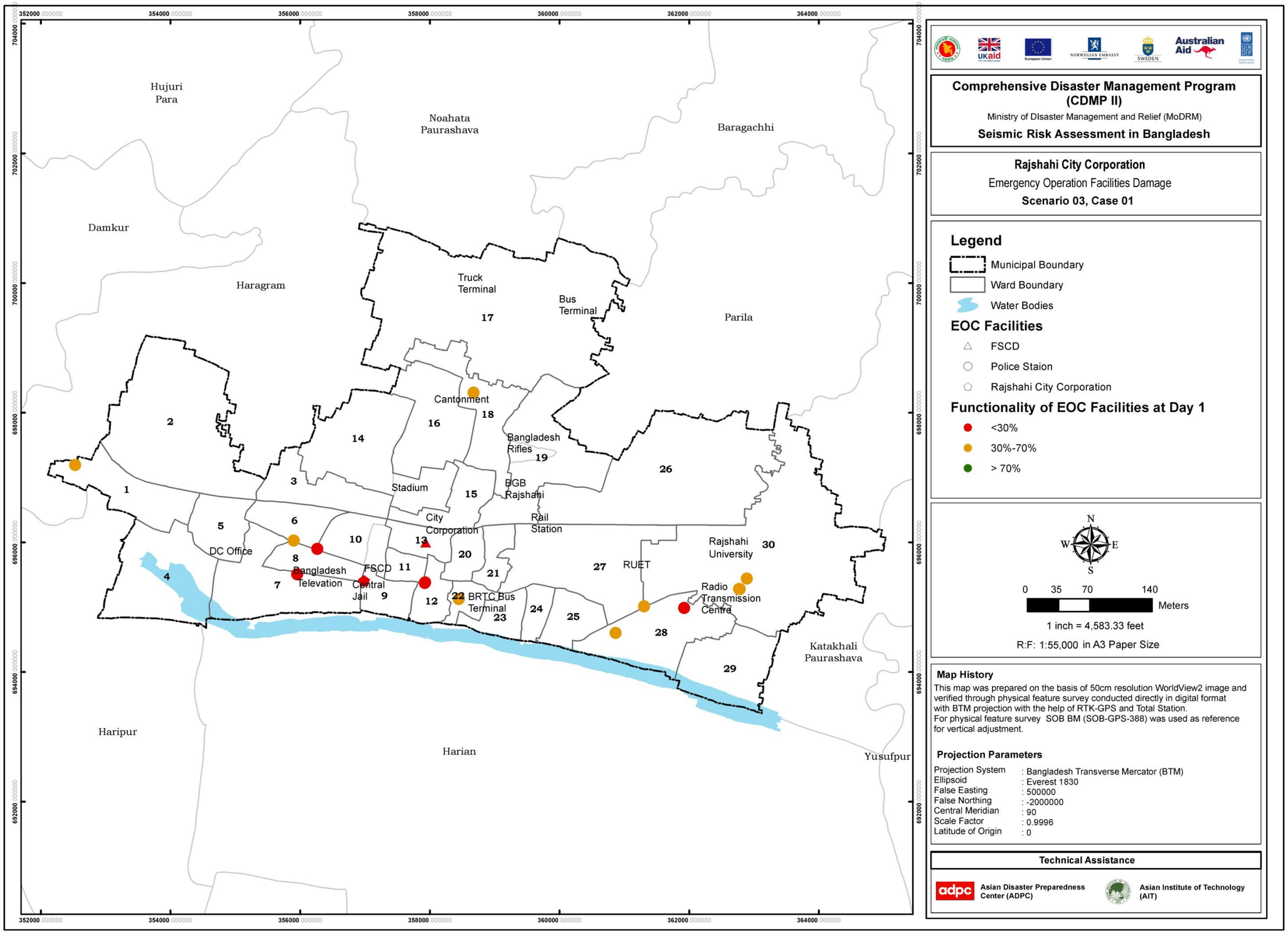
Projection System	: Bangladesh Transverse Mercator (BTM)
Ellipsoid	: Everest 1830
False Easting	: 500000
False Northing	: -2000000
Central Meridian	: 90
Scale Factor	: 0.9996
Latitude of Origin	: 0

Technical Assistance

adpc Asian Disaster Preparedness Center (ADPC)

Asian Institute of Technology (AIT)

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



Comprehensive Disaster Management Program (CDMP II)

Ministry of DIsaster Management and Relief (MoDRM)

Seismic Risk Assessment in Bangladesh

Rajshahi City Corporation

Emergency Operation Facilities Damage

Scenario 03, Case 01

Legend

- Municipal Boundary
- Ward Boundary
- Water Bodies

EOC Facilities

- FSCD
- Police Staion
- Rajshahi City Corporation

Functionality of EOC Facilities at Day 1

- <30%
- 30%-70%
- > 70%

N W E S

0 35 70 140 Meters

1 inch = 4,583.33 feet

R:F: 1:55,000 in A3 Paper Size

Map History

This map was prepared on the basis of 50cm resolution WorldView2 image and verified through physical feature survey conducted directly in digital format with BTM projection with the help of RTK-GPS and Total Station.
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Projection Parameters

Projection System	: Bangladesh Transverse Mercator (BTM)
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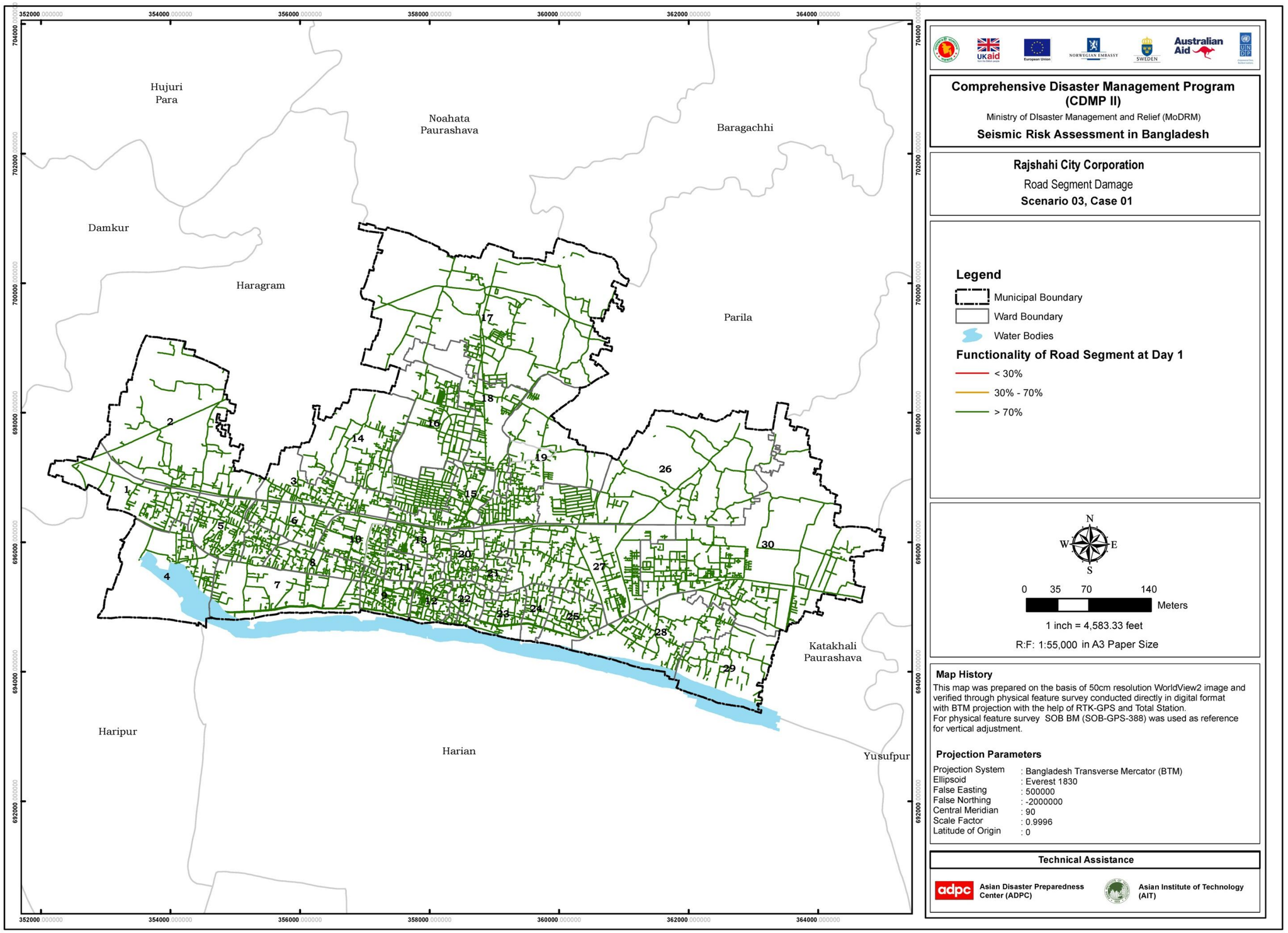
False Northing	: -2000000
Central Meridian	: 90
Scale Factor	: 0.9996
Latitude of Origin	: 0

Technical Assistance

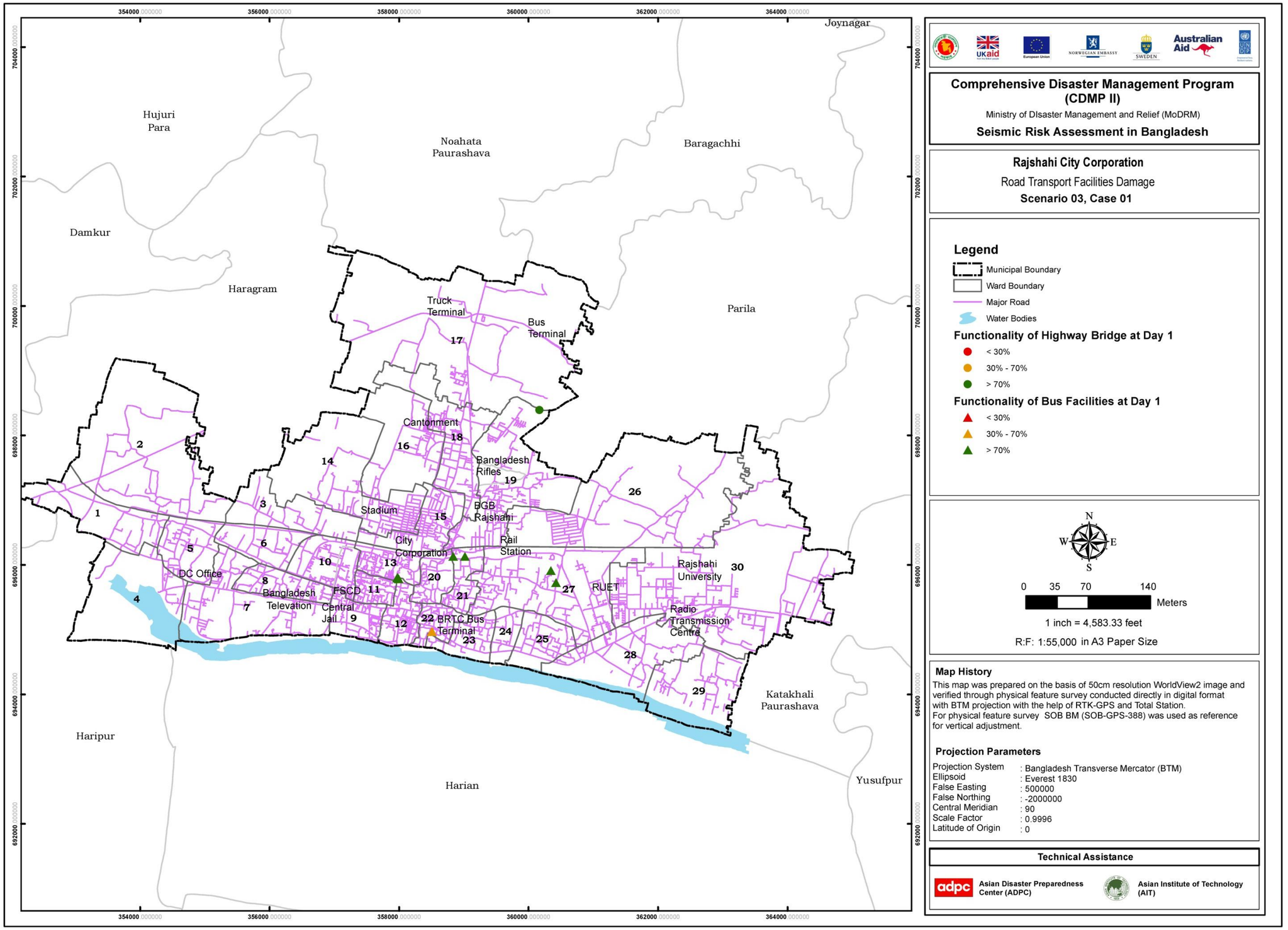
adpc Asian Disaster Preparedness Center (ADPC)

Asian Institute of Technology (AIT)

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

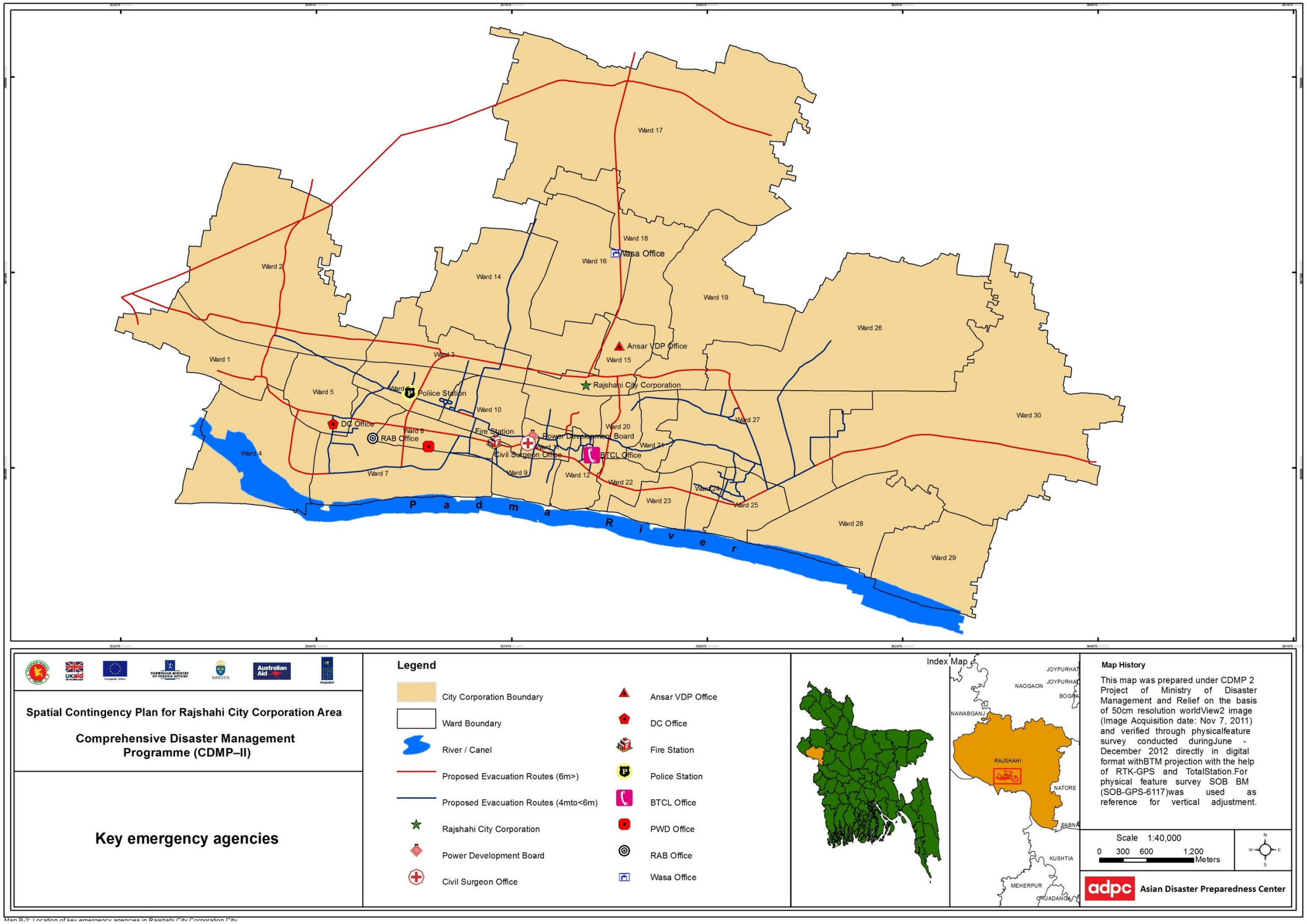


Map B-6: Probability of functionality of road network at day-1 due to scenario-2 earthquake



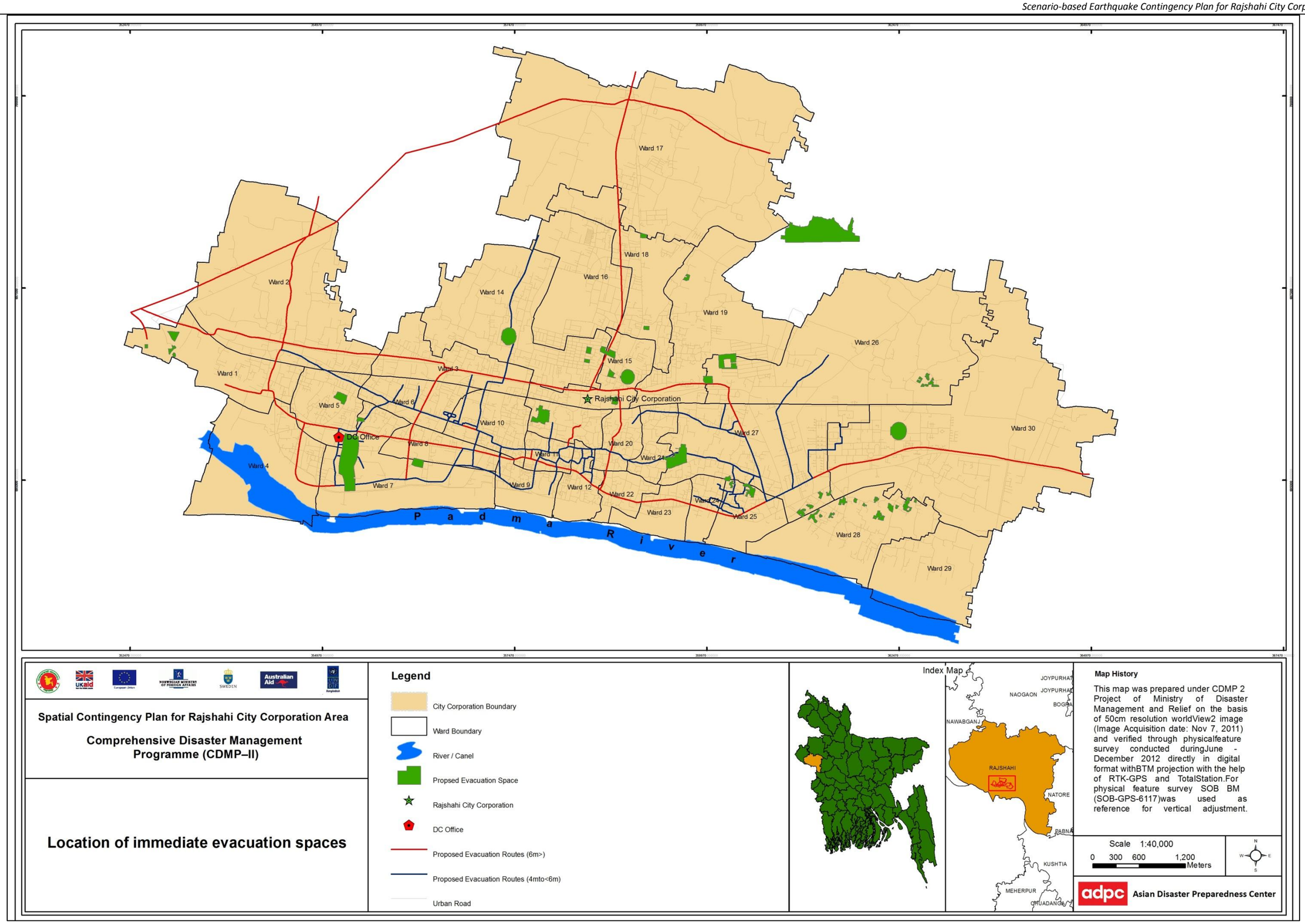
Map B-7: Probability of functionality of transportation facilities at day-1 due to scenario-2 earthquake

Annex-C: Contingency Planning Maps

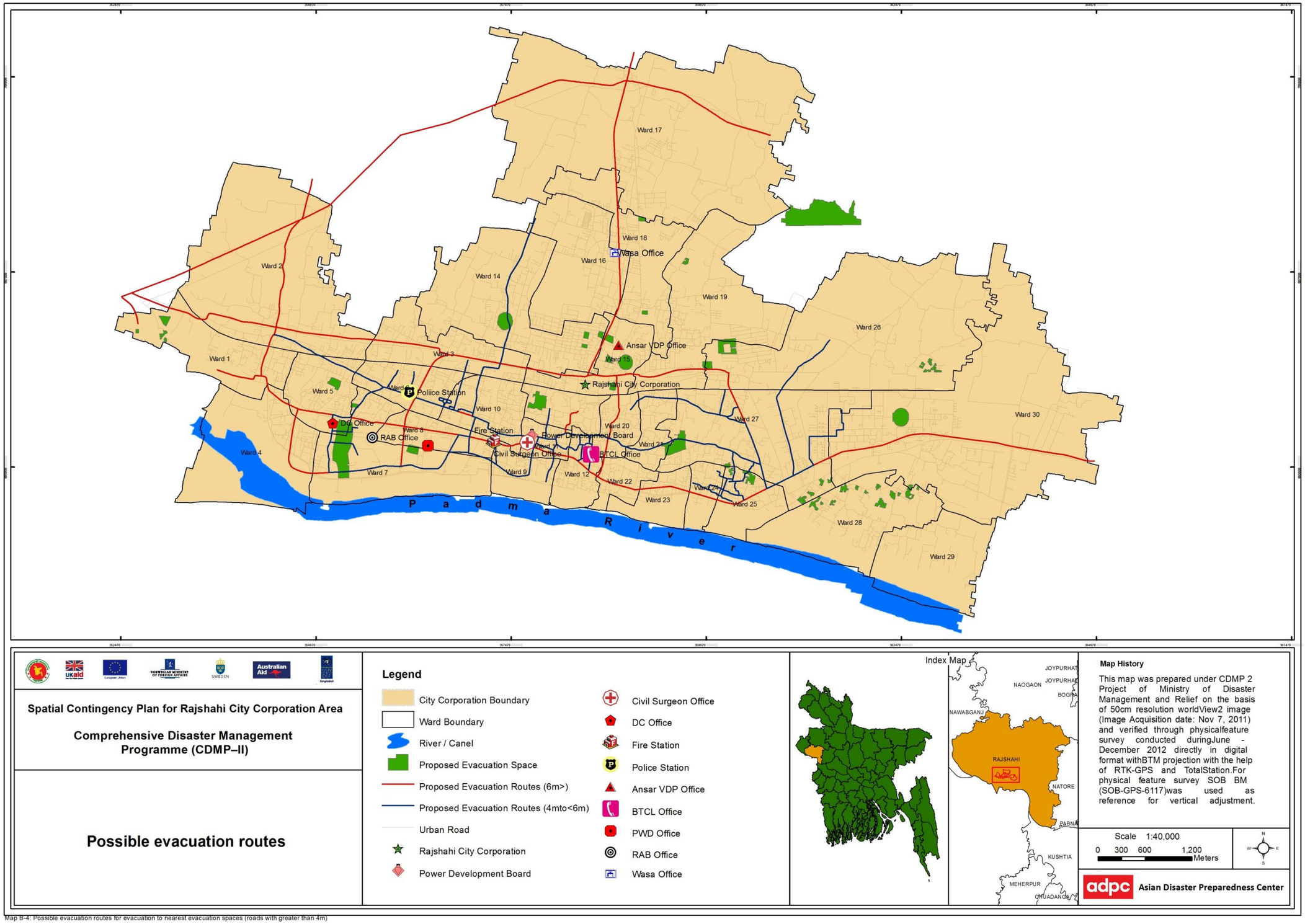


Map B-2: Location of key emergency agencies in Rajshahi City Corporation City

Map C-1: Location of key emergency agencies in Rajshahi City

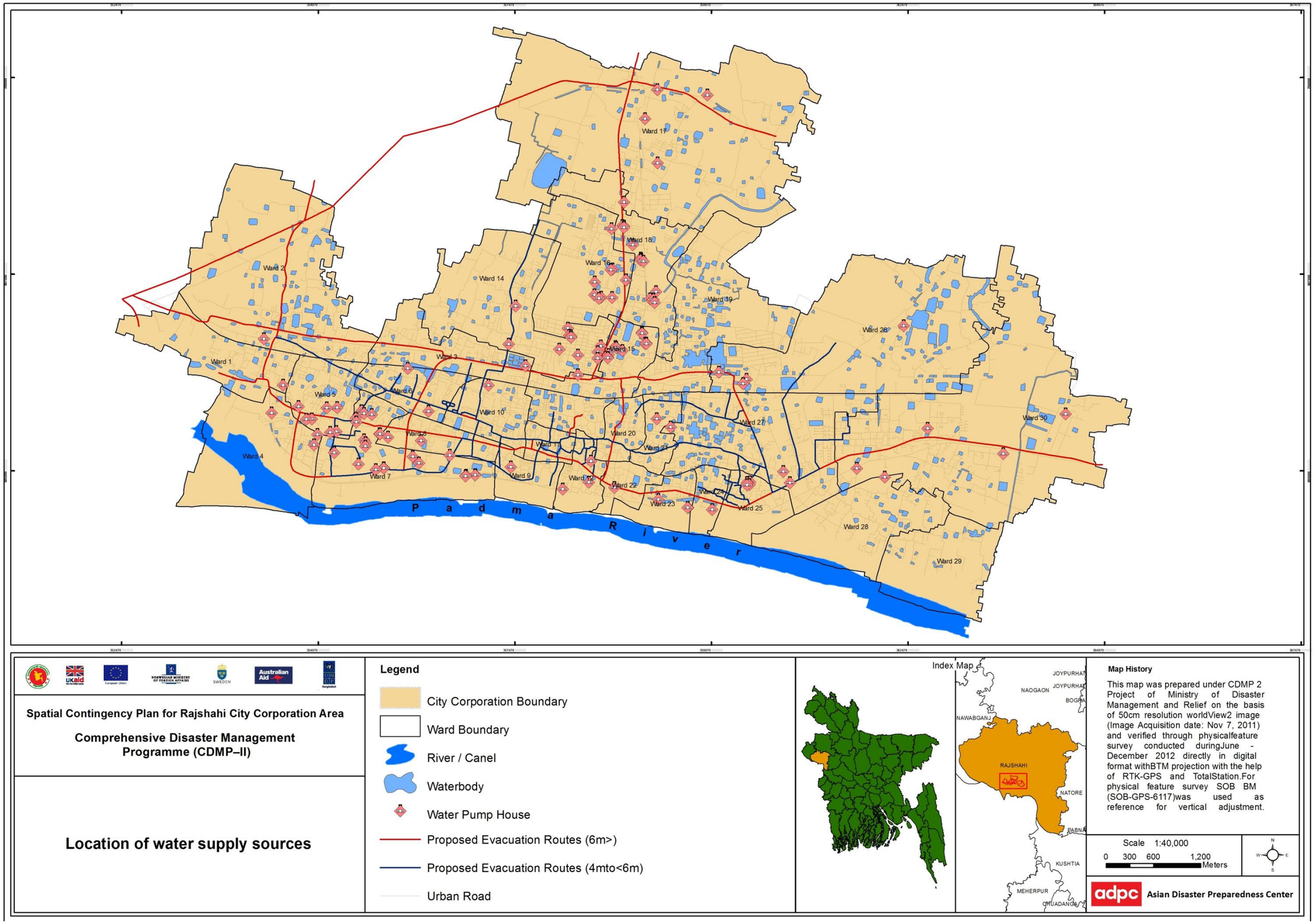


Map C-2: Location of proposed immediate evacuation spaces

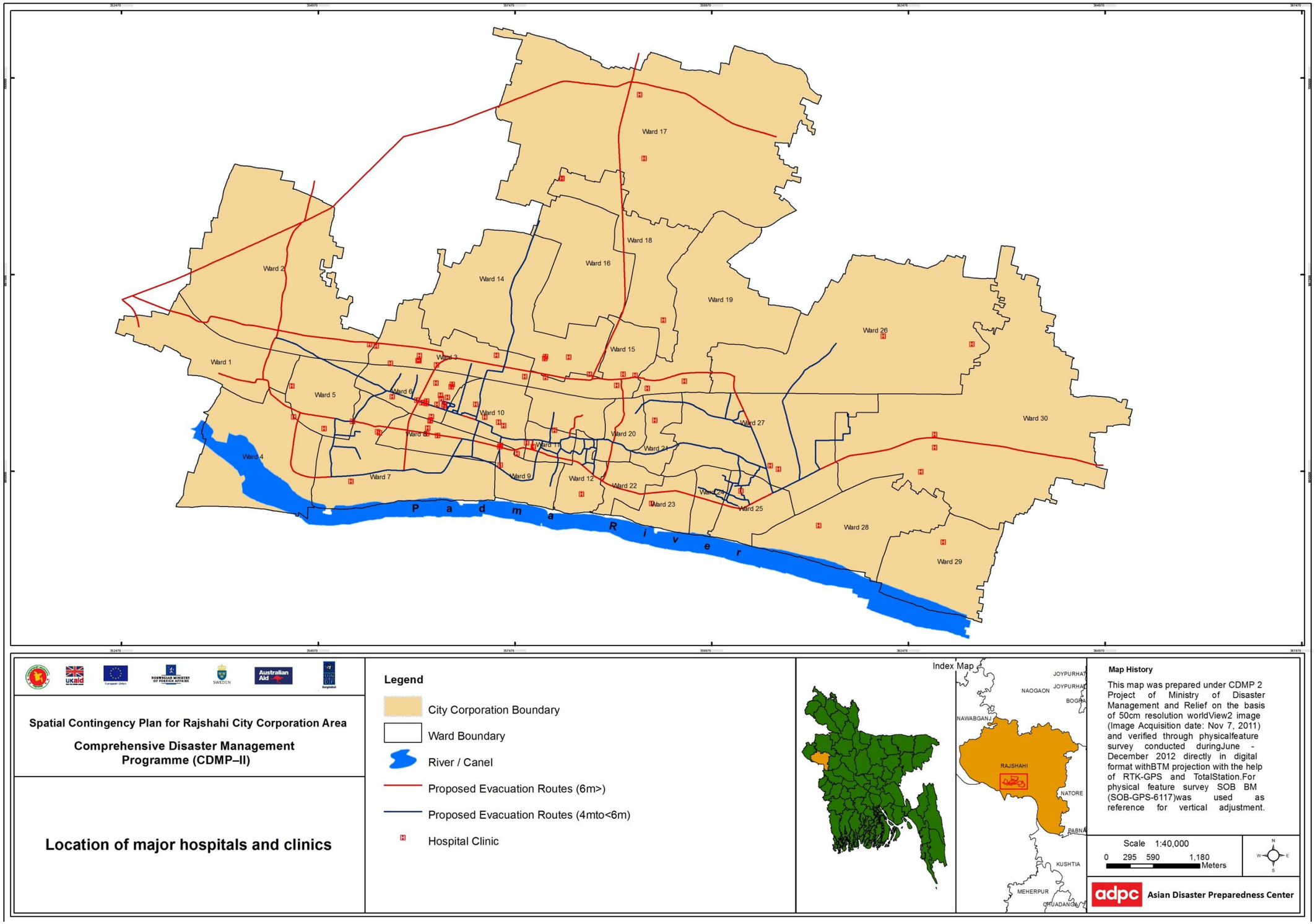


Map B-4: Possible evacuation routes for evacuation to nearest evacuation spaces (roads with greater than 4m)

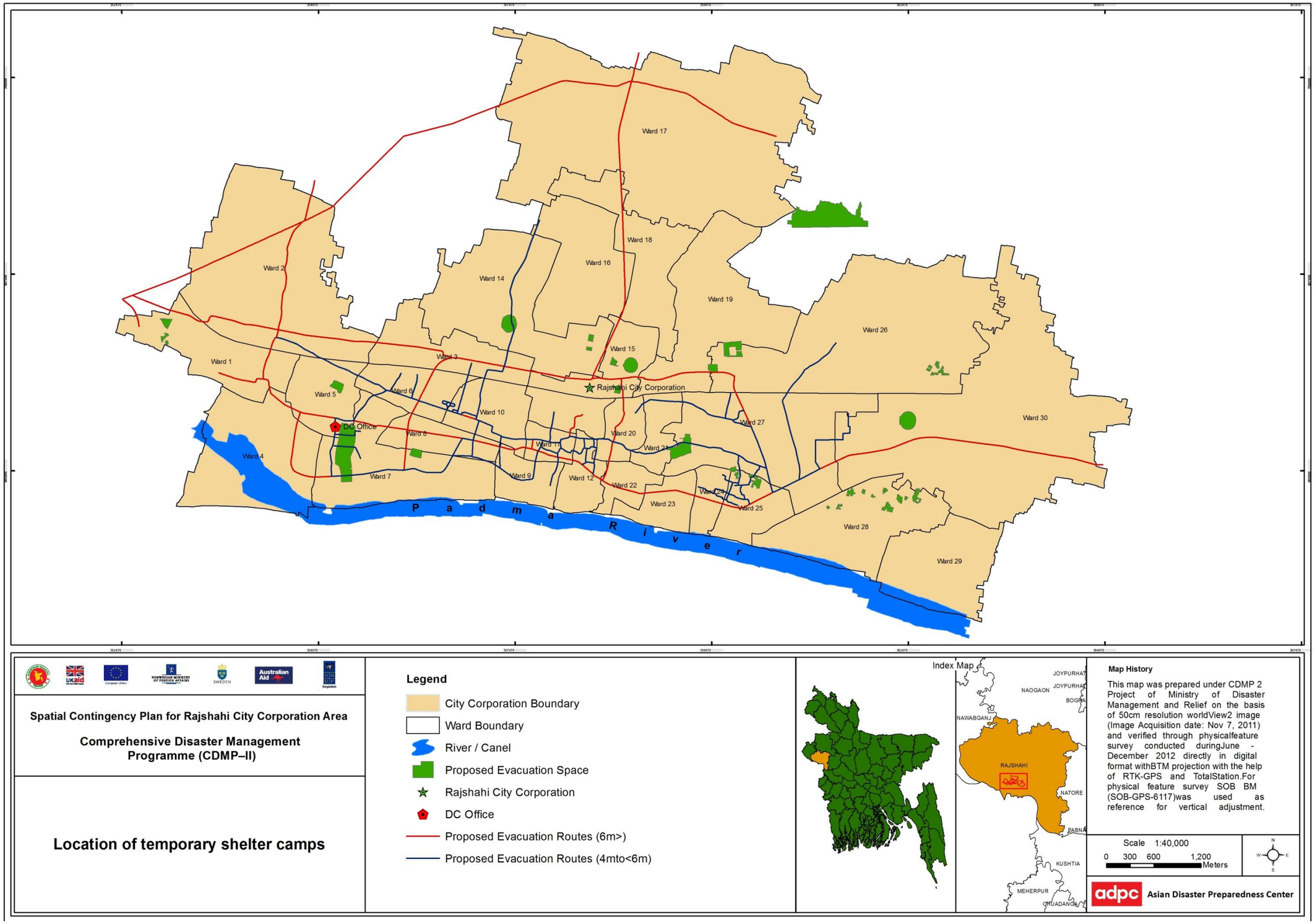
Map C-3 Proposed evacuation routes



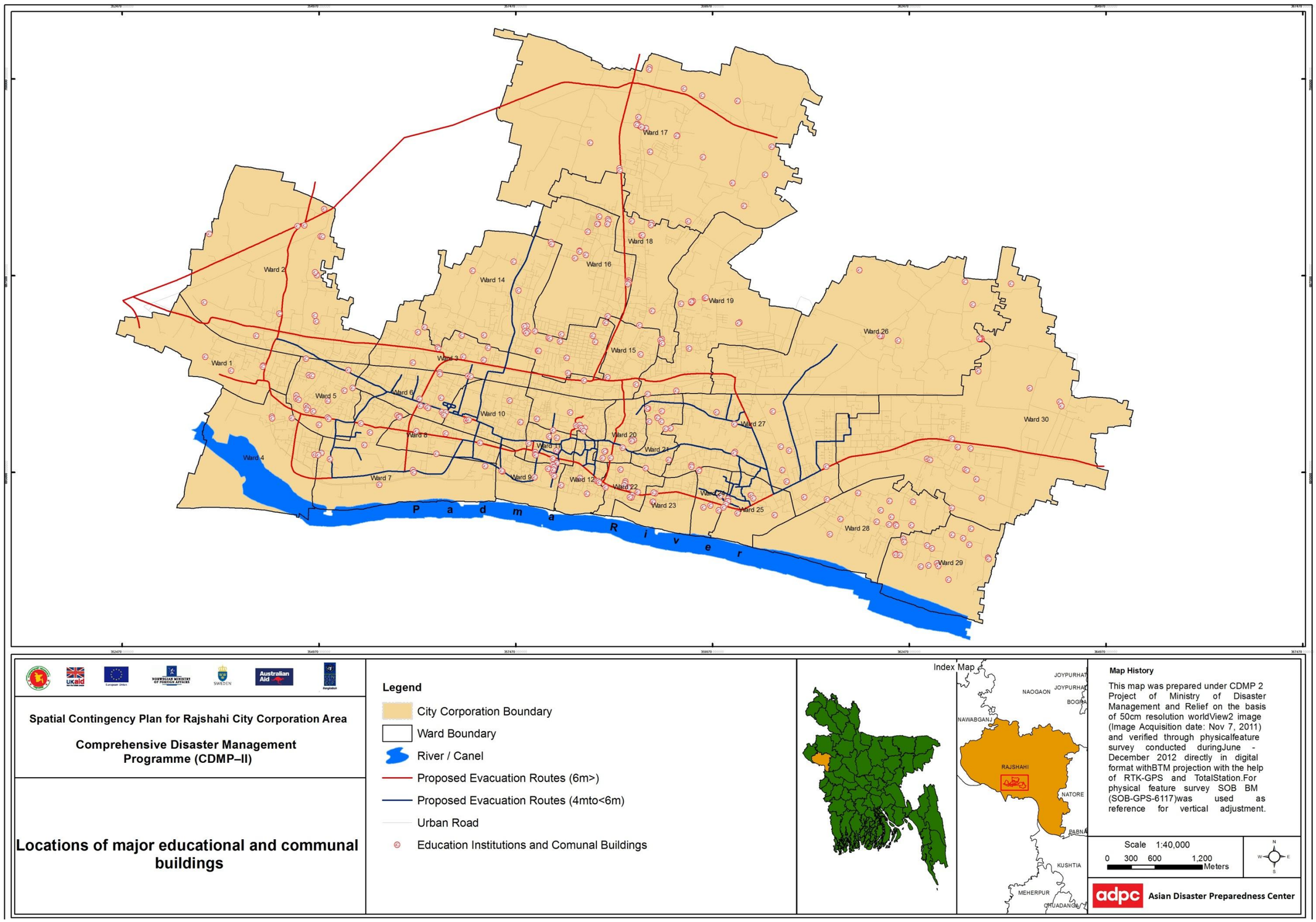
Map C-4: Location of water supply sources



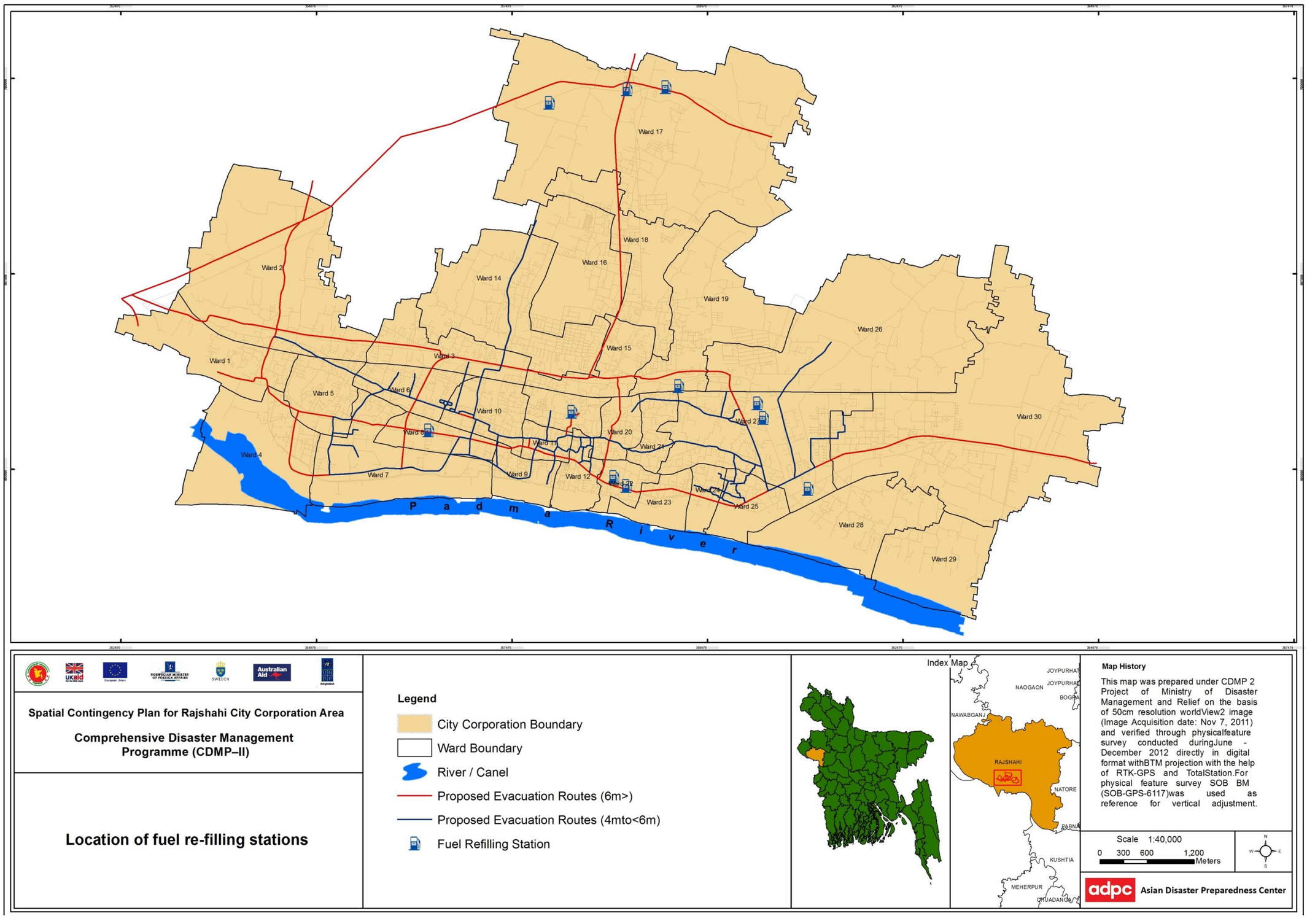
Map C-5: Location of major hospitals and clinics



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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