National Earthquake Response Plan

(*Revised draft 1999)*

Sub-Plan of the National Disaster Plan

This plan outlines the intended actions to be taken by the Government of Jamaica in response to a damaging earthquake. This is the second draft document, which is termed "interim " pending complete implementation of required capabilities by all agencies affected by the plan.

Prepared by: Office of Disaster Preparedness and Emergency Management and Joint Ministries and Emergency Response Services.

Office of Disaster Preparedness and Emergency Management
12 Camp Road
Kingston 4
Jamaica.

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National Earthquake Response Plan

(Revised draft January 2001)

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Part 1

THE EARTHQUAKE THREAT

INTRODUCTION

Owing to Jamaica's geographical location and its geological formation, the island is susceptible to earthquakes. Earthquakes have been reported since the late 1600s. Population growth has and still is positive and this has been accompanied by an escalated vulnerability of the population to earthquakes among other hazards. The development of a National Earthquake Response Plan was mandated in reaction to the recognition of the ever-increasing threat that earthquakes pose to human life and property, not to mention the economic state of Jamaica.

This part of the plan will cover the nature of the earthquake threat to Jamaica, the location of source zones for earthquakes affecting Jamaica, the damage frequency, and the potential hazards associated with the occurrence of an earthquake. It also covers the basic policies and concepts for response in the situation related to the earthquake hazard.

NATURE OF THREAT

The first recorded earthquake in Jamaica dates back to 1687. We now average about 80 tremors per year as recorded by the Earthquake Unit, UWI. The island has experienced several high intensity earthquakes in the past. Table 1 gives examples of earthquakes that have had damaging effects on Jamaica. Thirteen earthquakes,

including the January 1993 event, with intensities of MM VII and greater have been documented among the more than 326 years of recorded felt earthquakes in Jamaica (Tomblin & Robson, 1997).

The most common and damaging effect in inhabited areas is ground shaking. Ground shaking and movement along the fault (ground motion) causes an offset between rocks on opposite sides of the fault. This results in the breakage of power lines, pipelines, buildings, roads, bridges and other structures that actually cross the fault. The shaking causes damage to and sometimes complete failure of buildings. The secondary earthquake hazards such as landslides and liquefaction (ground failure), tsunamis and fires have also had devastating effects on Jamaica. The effects of three major earthquakes (1692, 1907 and 1993) proved how vulnerable Jamaica is to earthquakes and highlighted the risks that are present.

Table1 Examples of Damaging Earthquakes in Jamaica

Return period (years)	Example	Modified Mercalli Intensity	**Effect**
7	1945	VI	Broken windows. Weak plaster cracked.
			Fall of plaster, loose bricks. Difficult to stand.
38	1924	VII	Cracks in reinforced hollow block walls
38	Aug. 3, 1914	VII	Numerous landslides.
			Pipes broken. General panic. Possible damage to earthquake-resistant structures.
38	January 13, 1993	VII	Ground failure, damaged electricity line and pipelines, ground cracks in car parks, driveways, & Mona Reservoir.
87	Nov. 11, 1812	VIII	Unreinforced structures destroyed. Serious damage to earthquake resistant structures.
137	14 January, 1907	IX	1000 people killed and thousands homeless. 85% buildings in Kingston area damaged or destroyed. Fire burned 56 acres.
273	June 7, 1692	X-XI	Damage in Port Royal and 3000 people were killed. 2/3 of Port Royal plunged/ submerged beneath the sea because of liquefaction.

(After Pereira 1982)

The 1692 earthquake resulted in 3000 dead, destruction and damage to many buildings, liquefaction, fissures, subsidence and landslides (see Figure 1). Most of the damage occurred in Port Royal, in fact, 2/3 of Port Royal plunged into the sea because of

the earthquake.

The 1907 earthquake resulted in damage and destruction to 85% of the buildings in Kingston and Port Royal, 1000 dead, fires, broken water mains, landslides, slumps. Losses were estimated at US$ 30 million dollars (Munich Re, 1998 as seen in KMA Seismic Hazard Assessment, 1999).

The earthquake of 1993 resulted in J$ 200 million dollars in damage. The effects of ground shaking were highly felt in August Town where extensive damage to housing occurred (ODPEM Disaster Catalogue, 2000). Non –structural and structural damages occurred in several reinforced, engineered buildings. There was also landslides, lateral spreading, ground cracks, localized subsidence and submarine slumping. Landslides were common along roads in eastern parishes, and the consequences were damaged electricity lines and water pipelines. Ground cracks were also evident, on roadways and on the southwestern side of the Mona Reservoir. The earthquake also damaged buildings in the health and education sectors.

Location of Source Zones

The major source zone for earthquakes affecting Jamaica is the Cayman Trench, which parallels the north coast of the island and is a major bathymetric feature in this region (see Figure 2).

Figure 2 Map showing Cayman Trench & Jamaica(map not to scale).

*Source: **The Longman Atlas for Caribbean Examinations, 1991. (Map modified)***

Teleseismic data from the Earthquake Unit show that most epicentres are within the Cayman Trench at depths of less than 100km and the more severe shocks originate off Jamaica's northeast coast parallel to the axis of the trench (Shepherd, 1971). Shepherd and Aspinall (1980) suggest a possible linear seismic source to the south of the island at the southern termination of the Mid-Cayman rise (Latitude 17.5N, Longitude 76.5W). However, only seven (7) Teleseismic events have been recorded from this zone.

Taber (1920) suggests that the 1914 earthquake in Blue Mountains demonstrate the capability of on-island faults to produce locally damaging earthquakes. The two highest concentrations of felt reports – Kingston and western Jamaica (near Santa Cruz)- occur in the vicinity of the two largest topographic provinces/ features on the island which are the Blue Mountains and the Santa Cruz/ Don Figuerero Mountains, respectively.

More recently, Jackson (personal communication, 1988) has noted an increase in low-level seismic activity in northeastern Jamaica along the Wagwater Fault. In general, earthquakes originating on the island have been of low intensity and low magnitude or of high intensity but confined to a small region (e.g. 1957).

The January 13, 1993 earthquake took place on a fault with NE-SW orientation. The fault lies within the Wagwater Belt roughly perpendicular to the trend of known faults bordering the Belt.

Frequency of Damaging Earthquakes

The following Table 2 shows the number of damaging earthquakes that have occurred in Jamaica between 1880 and 1960.

Table 2 Number of Damaging Earthquakes in Jamaica 1880-1960

Parish/Region	**Number 1880-1960**
Kingston	20
St. Andrew	15-19
Portland	5-9
St. Thomas	5-9
St. Mary	10-14
St. Elizabeth	10-14
Central Jamaica	5-9
Western Jamaica	5-9

(Data from: Shepherd, 1971)

RISK OF SEVERE EARTHQUAKES

Thirteen earthquakes, including the January 1993 event, with intensities of MM VII and greater have been documented among the more than 326 years of recorded felt earthquakes in Jamaica (Tomblin & Robson, 1997).

Table 3 shows the return periods for earthquakes of given intensities for the Kingston area.

Table 3 Return Periods for Earthquakes - Kingston Area

MM Intensity	VII	VIII	IX	**X**
Return Period 50 years	38	87	157	273
Probability	73	44	30	16

(After Shepherd, 1971)

The third line of the table gives the probability of an earthquake of the stated intensity occurring in any fifty-year period. This clearly shows that an earthquake response plan is needed.

POTENTIAL HAZARDS

Potential hazards, which might occur as a result of an earthquake, are:

i) Liquefaction
ii) Landslides
iii) Ground failure, e.g. ground settlement, ground cracks, foundation failures
iv) Flooding
v) Tsunamis
vi) Dam, Reservoir Failure
vii) Fire
viii) Fault ruptures

i) LIQUEFACTION

The liquefaction potential can be classified as follows:

Very High:
Areas in which liquefaction has occurred on a large scale in the past.

High:
Areas in which liquefaction has occurred in the past.

Moderate:
Areas in which liquefaction has not been reported but whose geology makes them susceptible to liquefaction.

Low:
Areas in which liquefaction might occur but which are at low risk. Localities in Kingston and St. Andrew which can be classified according to this scheme are listed below.

Table: 4 Areas susceptible to liquefaction

Very High	High	Low
Port Royal Peninsula - Harbour Head 44% probability in 50 year period	Bull Bay - Harbour Head, along Windward Road to Bournemouth 30% in 50 year period. Newport East and West Hunts Bay Dawkins Pond Reclaimed land around Kingston Harbour, Portmore Ferry.	Rest of Liguanea Plains

(*After Shepherd, 1971)*

Figure 3 shows the areas within the Kingston Metropolitan area which will be most affected by an earthquake based on peak ground acceleration.

ii) LANDSLIDES

Large landslide were triggered by the 1692 earthquake. The most spectacular is undoubtedly Judgement Cliff, St. Thomas. Potential high risk areas for landslides in Kingston and St. Andrew area:

Jacks Hill - Skyline Drive
Northern Barbican, Billy Dunn
Newcastle Road
Golden Spring

Given the existing conditions earthquakes of various magnitudes could trigger landslides.

iii) GROUND FAILURES

It has been observed that soft ground of thickness 10m or more often experiences considerable intensification of ground shaking causing ground failure such as ground settlement, foundation failures and ground cracks. In extreme cases, there can be a difference of a factor of 10 between ground acceleration in massive bedrock and that in thick, unconsolidated alluvium or fill. Buildings react differently to the same magnitude earthquake since ground acceleration differs sometimes greatly based on the underlying geology.

The Liguanea Formation which underlies Kingston is the type of formation in which low frequency vibrations, which cause most damage to tall buildings, will be easily transmitted. The GREATEST RISK is a major event of Richter Magnitude 8 originating off the north coast. Seismic waves generated by such an event will enter the Liguanea Plain across a sharp discontinuity, the Wagwater Fault, and will emerge through the thick alluvium of Downtown Kingston with an acceleration up to ten times (10x) that on bedrock. Resulting damage to 10-15 storey buildings will be 2-3 units higher on the MM scale since approximately 1,000 time the energy will be involved.

IV FLOODING

This can be caused by:

I) Blocking of river courses by earth movement and subsequent change in direction of the river.

II) Tsunamis

III) Breaching of dams and reservoirs

It is difficult to predict where the river might go even if a slide occurs. A danger is sudden breaching of the dam and consequent flooding of areas downstream.

VI) Tsunamis are known to have occurred after the 1692 and 1907 earthquakes, with the north coast being the most affected area. After the 1907 earthquake, a tsunami traveling at 150MS with waves 3-6m high affected the area from Port Antonio to St. Ann's Bay.

Low lying areas should not be considered safe until three hours after a strong quake (ODPEM Library).

V) Dam failure - this possibility should be considered for the Hermitage Dam, (Possible HEC 2 Analysis?) and the Mona Reservoir

SUMMARY

In planning response to a large earthquake, the following should be taken into consideration:

1) The possibility of liquefaction along the Palisadoes Peninsula. Such an event would cut off the airport, Port Royal and Coast Guard Headquarters, and could result in major damage to the airport, thus affecting incoming relief supplies and rescue attempts to Port Royal.

2) Possibility of liquefaction between Harbour Head and Windward Road in context of Harbour View and major industries located in that area.

3) Possibility of liquefacation or other types of ground failure in all reclaimed land. Although the modern multi-storey buildings along the waterfront have been built to high engineering standards, liquefaction or differential settlement could disrupt critical lifeline facilities and hamper rescue attempts.

4) Possibility of slope failures on weak rock slopes, particularly on hillsides which are increasingly becoming urbanized. Also to be considered are marginal lands consisting of hillside slopes which have been taken over by informal/ squatter settlements. An example is landslides in residential areas in the foothills surrounding Kingston and St. Andrew. A tremor of MMI = VIII could trigger large landslides particularly if preceded by rain.

5) Poor performance of certain types of buildings during earthquakes, particularly brick bonded with lime, concrete nog, reinforced hollow blocks not properly constructed. Knowledge of locations of these types of buildings would allow planning of evacuation routes etc.

6) Vibrational effects - Particularly, susceptible are high-rise building on "man-made" land e.g. along waterfront in Kingston and in some north coast areas. There is a

likelihood of ground failures in soft soils especially along coastal zones where a high percentage of the population and economic activity is concentrated. Soft soils tend to amplify considerably and can create resonance effects during earthquake vibrations. The greatest impact will be on high-rise buildings.

7) Possible need for boats in rescue attempts if flooding occurs.

8) "Tsunamis awareness" in populations at risk in low-lying areas.

The Plan

1.1 Purpose & Scope

Purpose:
The name of the plan will be the National Earthquake Response Plan. It describes the response system in the event of a major Earthquake in Jamaica, and also describes the total response, which should be provided at the national level of government. The purpose of the plan will be to:

a) Assign specific responsibilities for response to agencies;
b) To coordinate response and support activities island-wide;
c) To ensure timely response so as to save lives and minimize injuries and damage to property.

Part 1: - of the plan identifies basic policies and concepts for response in the situation related to the Earthquake Hazard.

Part 2: - of the plan outlines the standard operation procedures for the Earthquake plan.

Part 3: - of the plan outlines the Emergency response Functions and

the operational annexes for the specific Earthquake Response function within the authority of the government. The annexes outline the tasks to be accomplished by the respective ministries and agencies, and the support to be provided to them from the national level.

Scope
This plan will detail **emergency response** functions immediately following a damaging earthquake. It will also provide co-ordination of National resources and support as arranged by the government, from ministries, corporations, private sector and international assistance.

1.2 AUTHORITY AND RESPONSIBILITY

The Office of Disaster Preparedness will be responsible for coordination of all preparedness, response and relief activities for earthquakes.

1.3 RELATIONSHIP TO NATIONAL DISASTER PLAN

This plan is a sub-plan of the National Disaster Plan. Authority, roles and responsibilities of Ministries and Agencies and standard procedures remain the same as outlined in the National Disaster Plan and Matrix, except in those instances where actions specific to earthquake response are needed.

1.3.1 Warning and Notification

Following a damaging earthquake, the ODPEM will notify the National Disaster Executive and all Parish Disaster Committees.

1.3.2 Activation

This plan will be activated by the most senior surviving member of the Office of Disaster Preparedness in conjunction with the Chairman of the National Disaster Committee if possible.

1.4 PLANNING ASSUMPTIONS

Earthquake Scenarios:- Appendix 1 has the hazard assessment related to Earthquakes in Jamaica. It is difficult to classify Earthquakes by their damaging effects and response required. Therefore the development of this plan is based on the following assumptions:-

- Earthquakes respond without warning therefore pre-event response activities would not be possible

- A damaging earthquake will cause large numbers of deaths and injuries and extensive damage to or destruction of buildings, emergency facilities and infrastructure.
- The earthquake will strike without warning and maximum causalities will occur including large numbers of foreign nationals.
- Secondary effects of the earthquake will include any or all of the following:-
  Tsunamis, fire, flood, damming of rivers, landslides, and dam failure, release of hazardous and toxic chemicals.
- Strong aftershocks will continue for several days
- Large (hundreds of thousands) numbers of persons will be in need of shelter.
- *Access will be severely restricted due to debris, landslides, collapsed bridges etc. and aerial support will be needed*

1.5 **EMERGENCY PREPAREDNESS**

Assumptions.

1.6 **GENERAL CONCEPT OF OPERATIONS**

Due to the nature of Earthquakes and there suddenness, the response actions must be geared to address the difficulties that it would encounter in damage assessment, the resources and capabilities needed to administer the different levels of response that will be needed.

a) At the local level Initial response actions must be almost automatic. The local emergency operations centre should be quickly established. The local government will request assistance to the NEOC.

b) At the National Level The NEOC will control the repection coordination of resources which are provided by ministries, private sectors and international assistance.

c) Operational Area - In the event where more than three (3)

parishes are affected on the damage is sever. The National Plan will consider the overall area affected "The disaster Area".

1.7 FUNCTIONAL RESPONSE CONCEPT

Response Requirements. In the event of a large earthquake, a large number of response requirements will be needed for effective coordination and response of all agencies at all levels of government and in the private sector. In light of this a functional organization for response will be used to guide the process. This will identify, define and assign *responsibilities* to lead and support agencies within the plan. *The emergency response functions* are assigned to Primary and Supporting agencies who would have that responsibility within the plan.

Primary and Secondary Response Function . *The primary agency or ministry for a response function is that agency which has the most authority, resources, capabilities, and expertise in the area. The agency is responsible for:-*

- *The detailed planning for the function*
- *Its management during the response*

The Secondary agency is to assist the primary agency when requested to do so, subject to coordination by the response management structure in place.

Functions	*Primary Response*	*Secondary Response*
• **Search and Heavy Rescue**	• Jamaica Fire Brigade	• Jamaica Defence Force
• **Health Service & Welfare**	• Ministry of Health	• Red Cross , St John's Ambulance, (JDF & JCCF support function)
• **Request for External assistance for search and rescue**	• Jamaica Constabulary force	•
• **Law Enforcement & Security**	• PDC	• MOH
• **Emergency Shelter & Mass Care**	• JFB	•
• **Fire-fighting/Rescue**	• GSD	• ODPEM
• **Communications**	• JCF/MOH	• JRC, JCCF
• **Damage Assessment**		

• **Identification Care & Disposal of Dead (Coroner/Mortuary)**	•	•
• **Hazardous Material Response**	• NRCA/JCG JFB	• ODPEM
• **Relief Coordination**	• JIS	• ODPEM
• **Relief distribution**	• MOF	•
• **Health & Welfare of Visitors**	• JPS, NWC,C&W	•
• **Building inspection & demolition**	•	•
• **Inspection of Bridges overpasses, debris, etc**	•	•
• **Inspection of Silos, smoke stacks petroleum tank Farms etc**		
• **Inspection of dams, reservoirs etc**		
• **Public Information announcements &warnings**		
• **Transportation**		
• **Finance and Claims**		
• **Restoration**		
• **Utilities**		
• **Pollution of Waterways & Marine Environments**		

Figure: 1

National Earthquake Response Plan

(Revised draft 1999)

Sub-Plan of the National Disaster Plan

Part - 2

EMERGENCY RESPONSE MANAGEMENT

2.1 **STANDARD OPERATING PROCEDURES**

These procedures apply specifically to EARTHQUAKE RESPONSE

I) Following a damaging earthquake the ODPEM will activate the National Emergency Operations Centre (NEOC).

II) All ministries, agencies and Parish Disaster Committees will activate their Emergency Operations Centres.

III) In case of damage to ODPEM offices, the NEOC will be established at York Park Fire Station.

IV) All members of the National Disaster Executive should make contact with the Chairman of the NDE who is the Prime Minister or with the Senior Minister with responsibility for the ODPEM.

V) All members of the National Disaster Committee should make contact with ODPEM Base/NEOC.

VI) All members of the Emergency Operations Group as defined in the Standing Operating Procedures for the National Emergency Operations Centre should report to the NEOC.

VII) The Jamaica Defence Force Air Wing will provide aircraft for aerial reconnaissance.

VIII) The Jamaica Defence Force Coast Guard will provide boats for marine reconnaissance.

IX) The Earthquake Research Unit (SRU) will provide the location and magnitude of the earthquake.

X) The following persons will comprise the preliminary aerial reconnaissance team where possible:

Representative	-	ODPEM
''	-	MOC (W)
''	-	MOC (DEMS)
''	-	Fire Brigade
''	-	Ministry of Health

XI) Following aerial reconnaissance reports, ground teams will be dispatched to areas of greatest damage.

XII) If necessary, Satellite or Regional EOC's may be established in areas of greatest damage. Such centres will operate under

the direction of the Regional Coordinator or the Parish Disaster Coordinator. If neither is available officers from the NEOC may coordinate activities. Appropriate agencies and NGO's will be requested to send representatives to these centres as is necessary for relief and response operations.

2.2 ORGANIZATION AT RESCUE SCENES

The on-scene commander will coordinate all activity at the scene. The senior fire officer present will be in charge of rescue. The senior medical officer present will be in charge of emergency medical care. The rescue scene will be arranged as follows where circumstances permit:

2.2.1 Command post

This is the area from which coordination of on-site rescue takes place.

2.2.2. Loading area

Area for parking of ambulances/medical vehicles. Ambulances and other medical vehicles should be assured of free access and exit. Jamaica Constabulary Force (JCF) representative will take this responsibility. If no JCF representative is present, any senior emergency management personnel will assume responsbility.

2.2.3 Treatment area

I) This is the designated safe area to which rescued victims are moved. Triage will take place in this area.

II) Area in close proximity to ambulances for patients needing immediate transportation to hospital/casualty collection point.

III) Area for serious but non-critical patients

2.2.4 Equipment bank area

This is the area for storing rescue and medical equipment

2.2.5 Staging area

Area designed for parking of EMERGENCY VEHICLES only

2.2.6 Rest area

Area for rescue and emergency personnel who require rest, first aid treatment etc.

2.2.7 On-scene coordination

The on-scene commander will ensure the following:

1) Demarcation and organizing of incident scene.
2) Access to and from scene
3) Security
4) Communications to National Emergency Operations Centre
5) Emergency Medical Care
6) Transportation
7) Access to supplies
8) Situation reports to National Emergency Operations Centre
9) Routing of emergency vehicles to and from site
10) Health and Welfare needs of emergency management personnel
11) Inspection of buildings
12) Placarding/marking of searched buildings

National Earthquake Response Plan

(Revised draft 1999)

Sub-Plan of the National Disaster Plan

Part - 3

EMERGENCY RESPONSE FUNCTIONS CONCEPT

3.1 SELECTION OF EMERGENCY RESPONSE FUNCTIONS

A large number of tasks and actions will be performed in an Earthquake response. These tasks and functions can be grouped into number of functions as a planning vehicle with which can assign responsibilities to relevant ministries for primary and support functions. The selection of emergency response functions has been done considering:

- *Orientation towards those tasks with the jurisdiction of the government*
- *The earthquake response scenario*

3.2 RELATIONSHIP TO OTHER RESPONSE PLANS

Other plans may require implementation during an earthquake response. For example The National Fire, or Hazardous Material plan. Those responsibilities will not be repeated in this plan. However, priorities and responsibilities may require adjustments to synchronise with the response management structure during the earthquake response.

3.3 SUMMARY OF RESPONSIBILITIES OF RESPONSE AGENCIES

National Earthquake Response Plan

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Sub-Plan of the National Disaster Plan

Part - 4

EMERGENCY RESPONSE FUNCTION
ANNEX A- Search and Rescue and Evacuation (Heavy Rescue)

PRIMARY: JAMAICA FIRE BRIGADE
SECONDARY: JAMAICA DEFENCE FORCE
SUPPORT: SEE RESPONSE MATRIX

SCOPE OF THE RESPONSE FUNCTION

Introduction:

The Jamaica Fire and Emergency Services has primary responsibility for the following:

- Search and Rescue
- Evacuation
- Fire-Fighting
- Hazardous Materials Response

Once an earthquake has occurred, all fire fighters having secured their families should report to the nearest station. If necessary, fire personnel can organize and take charge of search and rescue operations in their communities.

Once no immediate threat to life exists, firefighters will report to the nearest station.

The National Fire Brigade Command Centre will be located at York Park or other locations as designated.

The National Fire Brigade Command Centre will be staffed by:

1. Deputy Commissioner
2. Assistant Commissioner Area 1
3. Superintendent in charge of KSA Fire Division and Staff

The Commissioner will be assigned to the National Emergency Operations Centre at the Office of Disaster Preparedness (ODPEM HQ).

Reporting:

On arriving at the scene of any rescue, the officer in charge will immediately provide the following information to the station commander:-

1. Location

2. Type of structure
3. Number of victims alive and trapped.
4. Any dangers which might exist - live wires, gas, hazardous materials, etc.
5. Assessment of resources needed to effect rescue
6. Any medical assistance needed
7. Any other relevant information

The Officer in Charge will commence rescue operations as necessary and will provide reports every three hours (3 hours), then every six hours (6 hours), then twelve hours (12 hours) at discretion of the Officer in charge. Reports will be sent to the National EOC at ODPEM Head Quarters every 12 hours. The following information will be provided:-

i) Number dead
ii) Number injured
iii) Number of victims still trapped
iv) Number of persons reported missing
v) Type of structures damaged
vi) Existing hazards
vii) Availability of water
viii) Road conditions

Mutual aid
Help from neighbouring fire stations will be requested following standing protocols

TASKS
The tasks to be carried out by the primary agency

Priorities:
The priorities for rescue shall be as follows:

1. Hospitals and Emergency Services Facilities
2. Schools, Educational and Residential Institutions/High Population Areas
3. Hotels/Government Buildings
4. Penitentaries (Security presence should be requested)

COMMUNICATIONS

Communications will be routed as follows:-

Officer in charge of First Responder to National Fire Brigade Command Centre to National Emergency Operations Centre.

Damage to the islandwide VHF network will be immediately reported to the National EOC at ODPEM HQ by National Fire Brigade Command Centre. Status of Citizen's Band Communications system should also be reported.

If the VHF network is not functional, then limited CB contact can be maintained via the following stations:-

York Park
Montego Bay
St. Ann's Bay
Mandeville

EMERGENCY SERVICES CHECKLIST

Upon receipt of a report that a Search and Rescue Operation is required, take the following actions:

1) Notify the appropriate authority who, if the situation warrant, will activate the Emergency Operation Centre (EOC) in accordance with standard operational procedures.

2) a) assess the requirement for search;
   b) determine where search efforts should be directed;
   c) determine what land, water, air, manpower equipment and supplies are needed;
   d) decide how the search can best be handled and by whom.

3) While the search is underway, review local rescue plans and initiate preparedness actions for rescue operations based upon whether access to the victims will require air, water or land rescue forces, or a combination.

4) When the search produces the location of victims, dispatch correct type(s) of rescue unit if available locally, of obtain rescue assistance from other sources.

5) Obtain details from the Senior Rescue Officer at the scene of operations as to what general strategy and tactics he intends to use and whether there is need for more aid, and what kind is needed.

6) At this point, be prepared to provide specific information for broadcasts by radio and television.

7) If the rescue problem calls for special skills and equipment such as a cave rescue, call for specialists to augment the

rescue unit at the scene.

8) Heavy rescue generally calls for:

   a) gaining access to the victims which is usually hazardous and time consuming.

   b) giving emergency first aid to the victims who are injured and in shock;

This may call for considerable emergency services, cordoning the area, providing medical assistance and feeding, relieving members of the rescue area.

The Emergency Operations Centre is the central point for coordinating these interrelated actions.

9) If the rescue operation is beyond local capability such as heavy structural rescue operations, initiate mutual aid in accordance with agreements. A massive heavy rescue problem can follow such catastrophes as flash floods and earthquakes. If this happens, use appropriate Emergency Services Action checklists, coordinate all actions at the Emergency Operation Centre. Keep the public informed.

10) Maintain rescue operations until all known victims are found. Notify relatives by messenger, phone or telegram. Close out rescue operations and put the scene of operations in a safe condition to prevent accident and further victims.

11) When rescue operations are completed, notify the Emergency Operations Centre and prepare final report as required.

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX B- Health Service and Welfare

EMERGENCY MEDICAL CARE

PRIMARY: MINISTRY OF HEALTH
SECONDARY: RED CROSS, ST. JOHNS AMBULANCE BRIGADE
SUPPORT: JDF, JCCF

Immediately following a damaging earthquake, the Ministry of Health will activate its Disaster Plan

The Ministry of Health will have responsibility for all medical care and triage procedures for victims of the earthquake.

Pre-designated casualty collection points CCP's shall be decided for each parish by the Parish Disaster Committee. CCP's should have adequate space for vehicular access and turn-around as well as adequate landing area for helicopters.

In designated CCP'S, care should be taken to see that these areas are free from hazards such as poles, fencing, walls, unstable slopes, buildings, power lines, water mains etc.

Casualty Handling Procedures

Casualty Handling Procedures are outlined in appendix

EMERGENCY RESPONSE FUNCTION CONCEPTS ANNEX C- Request for External assistance for Search and Rescue

Response.

PRIMARY: MINISTRY OF FOREIGN AFFAIRS
SECONDARY: OFFICE OF DISASTER PREPAREDNESS

The need for specialized search and rescue assessment of equipment and personnel should be carried out by the Fire and Emergency Services immediately following the Earthquake so as to improve the chances of survival of trapped victims.

In the event that specialized rescue equipment and specially trained personnel are needed, requests for such assistance will be made by the ODPEM to the Ministry of Foreign Affairs who will make all necessary arrangements in conjunction with foreign missions and embassies. Names and addresses of Rescue Teams are given in appendix

EMERGENCY RESPONSE FUNCTION CONCEPTS ANNEX D - Law Enforcement and Security

PRIMARY: JAMAICA CONSTABULARY FORCE
SECONDARY: JAMAICA DEFENCE FORCE

The Jamaica Constabulary Force will ensure the following:

i) Crowd control
ii) Security of rescue personnel and equipment
iii) Traffic control
iv) Access to and from rescue sites for emergency response personnel and vehicles
v) Idenfication and tagging of bodies
vi) Restricting or preventing entry to damaged buildings

EMERGENCY RESPONSE FUNCTION CONCEPTS ANNEX E - Emergency Shelter and Mass Care

PRIMARY: PARISH DISASTER COMMITTEE
SECONDARY: MINISTRY OF HEALTH

SUPPORT: See Response Matrix

It is anticipated that a large percentage of housing stock will be destroyed, extensively damaged or will be unsafe during and after a major earthquake. It is therefore likely that large numbers of victims will be homeless for extended periods after the earthquake necessitating provision of emergency shelter and care for up to several months after the earthquake.

Parish Disaster Committees will, in conjunction with the Office of Disaster Preparedness and other appropriate agencies, publicize the locations of shelters for the parish and coordinate manning and supply of shelters. It is the responsibility of the Parish Disaster Committee to ensure that buildings are structurally sound and safe for occupancy before opening the building as a shelter. This activity will be carried out in conjunction with the Ministry of Construction (Works) and will involve inspection by qualified personnel.

Procurement of relief supplies will be in accordance with the procedures laid down in the National Relief Procurement and Distribution Plan. (Appendix 3.1.5)

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX F- Fire-fighting/Rescue

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX G - Communications

PRIMARY: POST AND TELEGRAPH DEPARTMENT
SECONDARY: MINISTRY OF LOCAL GOVERNMENT AND WORKS (DEMS)
SUPPORT: JARA, CB, TOJ

Immediately following a damaging earthquake, the National Communications Plan will be activated (Appendix 3.5)

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX H - Damage Assessment

PRIMARY ROLE: GEOLOGICAL SURVEY DIVISION
SECONDARY: OFFICE OF DISASTER PREPAREDNESS
PARISH DISASTER COMMITTEES

SUPPORT: See Response Matrix

Immediately following a damaging earthquake the Geological Survey Department will ensure that a Damage Assessment Officer is present at the EOC. It will be the responsibility of this officer to coordinate all incoming damage data and to provide 24-hour situation reports to the ODP. Damage reports will be

recorded on the official forms provided. (Appendix 3.2)

EMERGENCY RESPONSE FUNCTION CONCEPTS ANNEX I - Identification, Care, and Disposal of Dead

BURIAL OF VICTIMS in cases where mass burial becomes necessary.

PRIMARY: JAMAICA CONSTABULARY FORCE/MINISTRY OF HEALTH
SECONDARY: JAMAICA RED CROSS, JAMAICA COMBINED CADET FORCE

It is anticipated that in a major earthquake, the number of casualties will exceed refrigeration and storage capacity of hospitals and private morgues. Should it become necessary to employ mass burial of victims, the following measures should be followed.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX J - Hazardous Materials Response

Once a damaging earthquake occurs, the following stations will make a team available for hazardous materials response:-

All Parish Fire Brigade Headquarters

The senior officer in charge of coordinating hazardous materials response in Kingston and St. Andrew will be:-
Assistant Superintendent (Watch Commissioner)

In case of incidents of land-based pollution or contamination, the following agencies will be consulted for advice:

The Government Chemist
Hope Gardens
Telephone: 927-1829/927-1830/927-1911
Name 1. Mrs. Patience Dennis
2. Mr. Henry McCreath

Natural Resources Conservation Authority
10 Caledonia Avenue
Kingston 5
Telephone: 754-7550
Name 1. Dr. Marcel Anderson
2. Mr. Lloyd Gardener

Centre for Nuclear Sciences
University of the West Indies
Mona
Kingston 7
Telephone: 927-1777
Name 1. Dr. Hilary Robothom

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX K - Relief Coordination

PRIMARY: OFFICE OF DISASTER PREPAREDNESS
SECONDARY:
SUPPORT: JAMAICA COMBINED CADET FORCE

The Office of Disaster Preparedness will have responsibility for Coordinating the following:

(i) Relief needs assessment - information to be supplied by Parish Disaster Committeess and Private Voluntary Organizations.
(ii) Establishment of needs list and transmitting these to Ministry of Foreign Affairs.
(iii) Matching resources needed against those supplied and keeping needs list current.
(iv) Tracking quantities, type and origin of incoming relief and maintaining a current listing of these.

EMERGENCY RESPONSE FUNCTION CONCEPTS
ANNEX L - Relief Distribution

PRIMARY: JAMAICA RED CROSS AND THE SALVATION ARMY
SECONDARY: PARISH DISASTER COMMITTEE
SUPPORT: COUNCIL OF VOLUNTARY SOCIAL SERVICES AND OTHER NON-GOVERNMENTAL ORGANIZATIONS

Relief Distribution will be in accordance with procedures laid down in the Relief Procurement and Distribution Plan (Appendix 3.1.5)

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX M- Health and Welfare of Visitors (Tourist)

PRIMARY: MINISTRY OF TOURISM
SECONDARY: JAMAICA TOURIST BOARD
SUPPORT: TOURISM ACTION PLAN, JAMAICA RED CROSS, JAAMICA HOTEL AND TOURISM ASSOCIATION, JUTA

The Ministry of Tourism will be responsible for coordinating health and welfare aspects for all tourists. This will include:

(i) Preparation of lists of dead and injured.

(ii) Health and welfare enquiries from next-of-kin

(iii) Liaison with foreign embassies and missions in Jamaica

(iv) Coordination of departure from island when this becomes possible

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX N - Building Inspection and Demolition

PRIMARY: TOWN PLANNING DEPARTMENT
SECONDARY: MINISTRY OF LOCAL GOVERNMENT AND WORKS
SUPPORT: See Response Matrix (Appendix 1)

Immediately following a damaging earthquake, the Town Planning Department will commence inspection of buildings. They will be assisted by the Ministry of Construction (W), The Jamaica Institution of Engineers, Estate Development Company, the Parish Council Building Departments. Results of inspections will be recorded on the Rapid Inspection Forms (Appendix 3.2.1).

Priorities for inspection are as follows:-

(i) Hospitals
(ii) Shelters
(iii) Schools/Educational Facilities
(iv) Infirmaries/Old People's Homes
(v) Prisons
(vi) Community Facilities/Public Use Buildings
(vii) Utilities

Following inspection, buildings will be color coded and placards indicating the building's status will be clearly posted on the outside of the building in accordance with procedures for the Rapid Inspection of Buildings.

The Jamaica Constabulary Force will restrict or prevent access to damaged buildings, and the Attorney General's Department will ensure the necessary legal framework is present for demolition of privately owned buildings.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX O - Inspection of Bridges, Overpasses, Debris, Clearance, Restoration of Roads

PRIMARY: MINISTRY OF LOCAL GOVERNMENT AND WORKS
SECONDARY: PARISH COUNCILS

Following a damaging earthquake, the MOC(W) will activate its contingency plan. Priority will be given to inspection of critical structures such as bridges, overpasses, highways.

Situation reports and damage reports will be relayed to the NEOC via VHF radio, or other alternative means as listed in the communications Sub-Plan.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX P- Inspection of Silos, Smoke Stacks, Petroleum Tank Farms Hazardous Materials Storage Areas/Tanks

PRIMARY: MINISTRY OF AGRICULTURE AND MINING

Inspection of facilities mentioned above should be undertaken by the owners and/or operators of these facilities, who should report their findings to the NEOC.

If such a report is not made to the NEOC within two hours, the Ministry of Mining and Energy should actively seek a situation report from the owners/operators, the Fire and Emergency Services, the Jamaican Institution of Engineers or other agency or organization capable of carrying out such inspections.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX Q - Inspection of Dams, Reservoirs and Water Storage Facilities

RESPONSIBILITY: NATIONAL WATER COMMISSION

Immediately following an earthquake the National Water Commission will inspect all dams, reservoirs and water storage facilities. Priority will be given to these facilities which pose a threat of flooding to populated areas.

A verbal report on the status will be sent to the NEOC, to be followed by a written report. Inspection should take into account the possibility of further damage by after shocks.

If the possibility of breaching and subsequent flooding exists, the NEOC should order the evacuation of any communities at risk by the Parish Disaster Committee.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX R – Public Information, Announcements and Warnings

PRIMARY: JAMAICA INFORMATION SERVICE

SECONDARY: OFFICE OF DISASTER PREPAREDNESS

SUPPORT: PARISH DISASTER COMMITTEES
See Response Matrix

Authority for making public announcements will be in keeping with Chapter 21 of the National Disaster Plan. Authority for a public announcement or media announcement during an emergency or disaster can be given only by the Chairman, National Disaster Committee, the Officer in Command of the lead agency or his designated representative or by the Director, Office of Disaster Preparedness or designated representative.

All media announcements will be made through the officer-in-command of the lead agency or through the Director of the Office of Disaster Preparedness in conjunction with the Jamaica Information Service.

Information on location, size and occurrence of the earthquake as well as warnings on aftershocks will be provided to the NEOC by the Earthquake Research Unit. If a threat of coastal flooding from Tsunamis exists, warnings should immediately be disseminated via the Electronic Media, JIS, loudspeaker systems, Police Stations and Post Offices and other government and non-government agencies with appropriate means of communications.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX S - Transportation

PRIMARY: TRANSPORT AUTHORITY
SECONDARY: MINISTRY OF LOCAL GOVERNMENT AND WORKS
SUPPORT: See Response Matrix

Immediately following a damaging earthquake, the National Transportation Sub-Plan will be invoked (Appendix 3.4). Transportation will here mean any means of travel - by road, air or sea.

Other activities to be undertaken include:

1. Inspection of runaways, taxiways, tarmac areas and buildings of airports -Civil Aviation Department.

2. Inspection for jetties, piers and other port facilities, navigation lights, lighthouses - Port Authority and Harbours Department.

3. Surveying of Harbours and shipping lanes and channels - Survey Department

4. Notification of on status of runaways and facilities of international airports.

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX T- Administrative and

Financial Support

PRIMARY: MINISTRY OF FINANCE

The Ministry of Finance will review and approve all expenditure of funds related to search, rescue, health and welfare and importation of essential items and emergency supplies. Authority for expenditure may be delegated to responsible ministries and agencies for pre-determined amounts. These arrangements should be put in place before an earthquake strikes.

Procurement of supplies will be in accordance with the Relief Procurement and Distribution Plan. (Appendix 3.1.5)

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX U - Restoration

RESTORATION OF GOVERNMENT SERVICES AND REOPENING OF OFFICES

PRIMARY: MINISTRY OF THE PUBLIC SERVICE
SECONDARY: MINISTRY OF FINANCE

It will be essential that Government services be restored as rapidly as possible after the earthquake.

Every effort should be made to restore Government Services within three working days of the earthquake or as soon thereafter as possible.

The Ministry of the Public Service will coordinate all activities necessary to the restoration and proper functioning of Government Services. This will entail:

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX V - Utilities

EMERGENCY RESPONSE FUNCTION CONCEPTS

ANNEX W – Pollution of Waterways and Marine Environment

PRIMARY: JAMAICA DEFENCE FORCE
SECONDARY: NRCA

Response to pollution or contamination of waterways and the marine environment will be the responsibility of the Jamaica Defence Force Coast Guard. The procedures will be

in accordance with the National Pollution Contingency Plan.

Appendix - 1