

Republic of Armenia
Rescue Service, Ministry of Emergency Situations (RS)

The Project for Seismic Risk Assessment and Risk Management Planning in the Republic of Armenia

Final Report

Vol. III Main Report 2

Seismic Risk Management Plan for Yerevan City

December 2012

Japan International Cooperation Agency (JICA)

**OYO International Corp.
Nippon Koei Co., Ltd.
Kokusai Kogyo Co., Ltd.**

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The Project for Seismic Risk Assessment and Risk Management Planning in the Republic of Armenia
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Volume III Main Report 2
Seismic Risk Management Plan for Yerevan City

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Abbreviations

Armenian	English	Japanese
¹⁴C 14 զանգվածային թվով ածխածնի իզոտոպ	¹⁴C Carbon Isotope Mass Number 14	炭素の放射性同位体 (原子量 14)
ADSL Ասիմետրիկ թվային բաժանորդային գիծ	ADSL Asymmetric Digital Subscriber Line	非対称デジタル加入者回線
ՀՎՄ Հիերարխիայի վերլուծության մեթոդ	AHP Analytic Hierarchy Process	分析階層処理
ALOS Հողի դիտարկման առաջադեմ արբանյակ (Ճապոնիա)	ALOS Advanced Land Observing Satellite (Japan)	陸域観測技術衛星
AMS Արագացումային զանգվածաալեկտրաչափում	AMS Accelerator Mass Spectrometry	加速器質量分析
ՀԿԽԸ Հայկական կարմիր խաչի ընկերություն	ARCS Armenian Red Cross Society	アルメニア赤十字社
Հայպետհիդրոմետ Հայաստանի հիդրոոդերևութաբանության և մոնիտորինգի ծառայություն	ArmHydromet Armenian State Hydrometeorological and monitoring Service	アルメニア水文気象観測サービス
ԱՇՊ Աշխատանքների շարունակականության պլան	BCP Business Continuity Plan	事業継続計画
CAD Ավտոմատացված նախագծում	CAD Computer-aided design	コンピュータ支援設計
Կադաստր ՀՀ կառավարությանն առընթեր անշարժ գույքի կադաստրի պետական կոմիտե	Cadaastro State Committee of the Real Property Cadastre of the Government of the RA	地籍局
ՀՎՀԱՌԿ Համայնքի վրա հիմնված աղետի ռիսկի կառավարում	CBDRM Community based disaster risk management	コミュニティ防災
ՔԿՃՄՊՆ Քիմիական, Կենսաբանական, Ճառագայթային, Միջուկային, Պայթուցիկ նյութեր	CBRNE Chemical, Biological, Radiological, Nuclear, Explosives	化学、生物、放射性物質、核、爆発物
ՔՊ Քաղաքացիական պաշտպանություն	CD Civil Defence	民間防衛
ԱՊՀ Անկախ պետությունների համագործակցություն (անկախ պետությունների մի խումբ, որոնք մինչև 1991թ. մտնում էին Խորհրդային Միության կազմի մեջ)	CIS Commonwealth of Independent States (a group of independent countries that were part of the Soviet Union until 1991)	独立国家共同体

ՓԲԸ Փակ Բաժնետիրական Ընկերություն	CJSC Closed Joint Stock Company	非公開型株式会社
ՃԿԿ Ճգնաժամային կառավարման կենտրոն	CMC Crisis Management Center	危機管理センター
ՃԿՊԱ Ճգնաժամային կառավարման պետական ակադեմիա	CMSA Crisis Management State Academy	国家危機管理アカデミー
DEM Բարձրության թվայնացված մոդել	DEM Digital Elevation Model	数値標高モデル
ՂԿ Ղեկավար կազմ	DISTAFF Directing Staff	訓練指示担当管理官
ԿՄԿ ՄՊԱԾ կառուցվածքների սեյսմակայունության կենտրոն	EEC Earthquake Engineering Center of NSSP	地震工学センター (NSSP)
EERI Ինժեներական սեյսմալոգիայի հետազոտական ինստիտուտ	EERI Earthquake Engineering Research Institute	地震工学会(米国)
EMS Եվրոպական մակրոսեյսմիկ սանդղակ	EMS European Macroseismic Scale	ヨーロッパ震度階級
ՄԻ Արտակարգ իրավիճակներ	ES Emergency Situations	非常事態
ՀՓՁ Հրշեջ փրկարարական ջոկատ	FRD Firefighting Rescue Detachment	消防救難部隊
ՄՄ Մարտական միավոր	FU Fighting Unit	消防部隊
ԳԽ Գառնիի խզվածք	GF Garni Fault	ガルニ断層
GIS Աշխարհագրական տեղեկատվական համակարգ	GIS Geographic Information System	地理情報システム
ԵԳԻ Երկրաբանական գիտությունների ինստիտուտ, ՀՀ գիտությունների ազգային ակադեմիա	IGS Institute of Geological Science, National Academy of Science	地質学研究所
ՃՄՀԳ Ճապոնիայի միջազգային համագործակցության գործակալություն	JICA Japan International Cooperation Agency	国際協力機構
ՃՕԳ Ճապոնիայի օդերևութաբանության գործակալություն	JMA Japan Meteorological Agency	気象庁(日本)
ՃՀԽ ՃՄՀԳ հետազոտական խումբ	JST JICA Study Team	JICA 調査団
ԵԲՎ Երկարատև բնակության վայր	LTSP Long Term Settlement Place	長期避難場所

ԱԻՆ	MES/MoES	
Արտակարգ իրավիճակների նախարարություն	Ministry of Emergency Situations	非常事態省
MSK սանդղակ	MSK scale	
Մեդվեդև-Սպոնհեյեր-Կարնիկի սեյսմիկ ինտենսիվության սանդղակ	Medvedev Sponheuer Karnik Seismic Intensity Scale	MSK 震度階級
ԼՓՁ	MRD	
Լեռնափրկարարական ջոկատ	Mountain Rescue Detachment	山岳救助部隊
NGA	NGA	
Գրունտի շարժման մարման մոդելների հաջորդ սերունդ	Next Generation of Ground-Motion Attenuation Models	新世代地震動減衰モデル
ՀԿ	NGO	
Հասարակական կազմակերպություն	Non-Governmental Organization	非政府組織
ՍՊՀ	NorSSP	
Սեյսմիկ պաշտպանության հյուսիսային ծառայություն	Northern Department of NSSP	NSSP 北部支部
ԱՎԾ	NSS	
Ազգային վիճակագրական ծառայություն	National Statistical Service	国家統計局
ՍՊԱԾ	NSSP	
Սեյսմիկ պաշտպանության ազգային ծառայություն	Armenian National Survey for Seismic Protection	国家地震防災調査所
ԲԲԸ	OJSC	
Բաց բաժնետիրական ընկերություն	Open Joint Stock Company	公開型株式会社
ԳՄԱ	PGA	
Գրունտի մաքսիմալ արագացում	Peak Ground Acceleration	最大加速度
ԲՊ	PP	
Բնակչության պաշտպանություն	Population Protection	住民保護
ՓՍՄԽ	PSSF	
Փամբակ-Սևան-Սյունիք խզվածք	Pambak-Sevan-Sunik Fault	パンバック・セバン・チュニツク断層
ԲՏՊՎ	PTPD	
Բնակչության և տարածքների պաշտպանության վարչություն	Population and Territories Protection Department	市民／国土保護部
ՀՀ	RA	
Հայաստանի Հանրապետություն	Republic of Armenia	アルメニア共和国
ՀՀՇՆ	RABC	
Հայաստանի Հանրապետության շինարարական նորմեր	Republic of Armenia Building Code	アルメニア国建築基準
ԵԲ	RC	
Երկաթբետոն	Reinforced Concrete	鉄筋コンクリート
ՓՈԻՎ	RFD	
Փրկարար ուժերի վարչություն	Rescue Forces Department	救助隊部
ԸԿ	RP	
Ընդունման կետ	Reception Point	受付場所

ՄՓՎ	RRD	
Մարզային փրկարարական վարչություն	Regional Rescue Department	Marzes (地方政府) のレスキュー部隊
ՓԾ	RS	
փրկարար ծառայություն	Rescue Service	レスキューサービス
ՈՓ	SAR	
Որոնողափրկարարություն	Search and Rescue	搜索救難
ՀՀՋ	SFD	
Հատուկ հրշեջ ջոկատ	Special Firefighting Detachment	特殊消防部隊
ՊՈԱԿ	SNCO	
Պետական ոչ-առևտրային կազմակերպություն	State Non-commercial Organization	国家非営利組織
ՀՓՋ	SRD	
Հատուկ փրկարարական ջոկատ	Special Rescue Detachment	特殊救助部隊
ԺՏԿ	TDP	
Ժամանակավոր տեղաբաշխման կետ	Temporally Distribution Point	一時避難場所
ՄԱԶԾ	UNDP	
Միացյալ Ազգերի Ջարգացման Ծրագիր	United Nations Development Program	国連開発計画
ՄՆԵՀ	USGS	
Միացյալ Նահանգների երկրաբանական հետազոտություն	United States Geological Survey	米国地質調査所
ՄՈՒԼ պրոյեկցիա	UTM projection	
Մերկատորի ունիվերսալ լայնական պրոյեկցիա	Universal Transverse Mercator projection	ユニバーサル横メルカトル投影法
ԱԽ	WG	
Աշխատանքային խումբ	Working Group	ワーキンググループ
ՋՈՋ	WMD	
Զանգվածային ոչնչացման զենքեր	Weapons of Mass Destruction	大量破壊兵器
ՋՓՋ	WRD	
Ջրափրկարարական ջոկատ	Water Rescue Detachment	水難救助部隊
ՄՊԱԲԾ	WSSP	
Մեյսմիկ պաշտպանության արևմտյան ծառայություն	Western Department of NSSP	NSSP 西部支部
ԵԽ	YF	
Երևանի խզվածք	Yerevan Fault	エレバン断層
ԵՓՎ	YRD	
Երևանի փրկարարական վարչություն	Yerevan Rescue Department	RS エレバン支部

Part 1 Basic Considerations

Chapter 1 Basic considerations

1.1 Goal of the Plan

This plan clearly defines all the measures aimed at effective management of earthquake disaster as well as roles and responsibilities of all relating bodies and describes the actions to be implemented. This plan also clearly mentions circle of cooperation, exchange of instructions and response to situations, and also way of communication, such as reception of necessary information and support.

In order to reduce seismic disaster risk in Yerevan City, it is necessary to promote earthquake disaster management activities, which include the formulation of plans and implementation of measures. The Plan describes the measures to be implemented. As the basic consideration of the Plan, “Promotion of comprehensive disaster management activities” is set as a global agenda.

The “Promotion of comprehensive disaster management activities” means that all the personnel and bodies autonomously and proactively promote the earthquake disaster management activities, mentioned in the Plan from several viewpoints mentioned below.

(1) Long-sighted disaster management (setting ultimate goals)

To mitigate risks related to earthquake disaster, promotion of earthquake disaster management activities is recommended upon definition of ultimate goals, which are 1) Saving human lives, 2) Securing the livelihood of residents, 3) Maintaining social/ economic systems and 4) Maintaining the governance of the City and the nation.

(2) Overall disaster management (responsibilities shared under vertical and horizontal organization schemes as well as collaboration of activities by all stakeholders with a sense of ownership)

Disaster management activities should be promoted by all the personnel and organizations. In order to facilitate earthquake disaster management activities, it is necessary for all personnel/ organizations to clarify their own roles and to engage in activities with a sense of ownership through coordination with one another (See Figure 1.1.1).

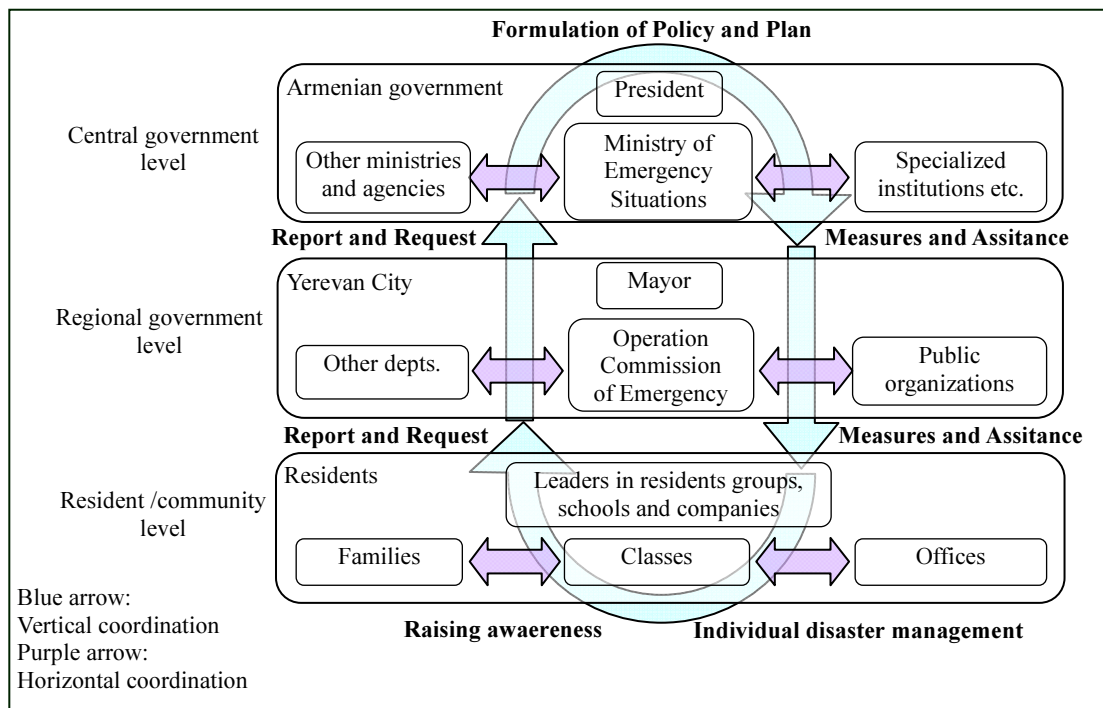


Figure 1.1.1 Collaboration of organizations in vertical and horizontal schemes

(3) Systematic disaster management (Sequencing activities within the disaster management cycle)

In order to reduce earthquake disaster risks, it is important that activities on mitigation and preparedness for emergency response activities are initiated ahead of the occurrence. Emergency response immediately after the occurrence should be followed by subsequent rehabilitation/reconstruction activities. Furthermore, the rehabilitation/reconstruction should take a consistent approach for quake-resistant development by not only recovering to the pre-earthquake state but also linking with disaster mitigation and preparedness for future earthquakes (See Figures 1.1.2 and 1.1.3).

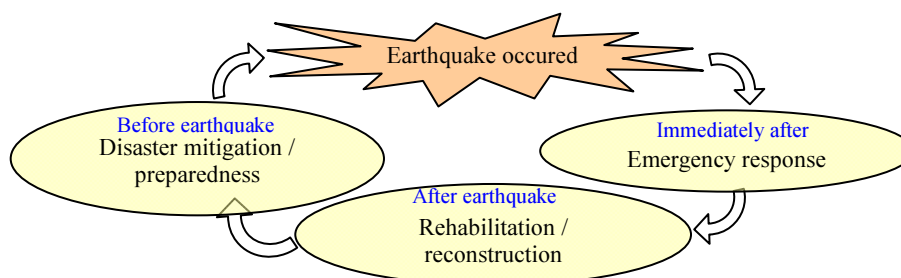


Figure 1.1.2 Concept disaster management cycle

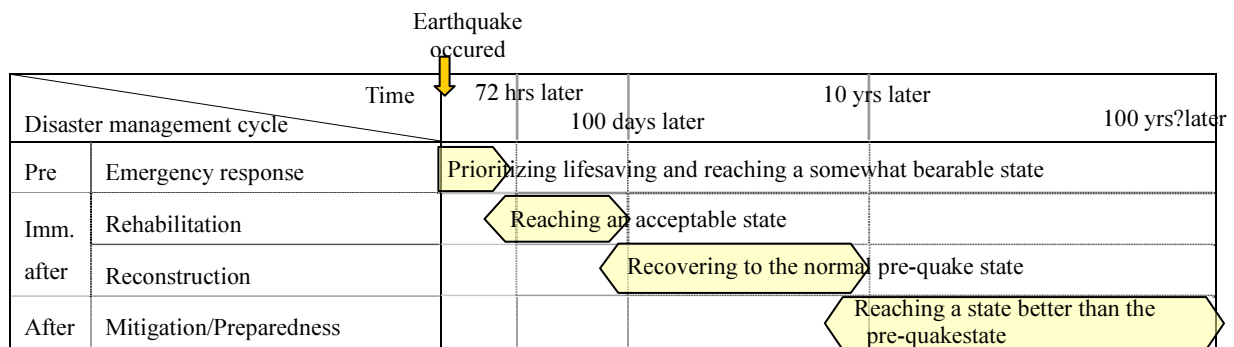


Figure 1.1.3 Activities under the disaster management cycle in chronological order

(4) Specific/ efficient disaster management (activities upon risk awareness)

In order to efficiently implement disaster management activities, one needs to, upon learning hazard and vulnerability primarily as well as risks, formulate a disaster management plan and implement measures accordingly to mitigate risks selected in consideration of importance, urgency and efficiency of response measures.

(5) Precise and feasible disaster management (activities aligned with one's capacity and accumulation of activities)

Concerning earthquake, it is difficult to exactly forecast when, where, and how big the hazard/damage will occur, even though using advanced technology. It is also avoid all uncertainty from hazard and risk assessment results. It is thereby recommendable to implement feasible measures, considering needs of residents and financial conditions, and then, to realize a quake-resistant city with the accumulation of the feasible measures. Together with the implementation of measures, it is required to update the result of risk assessment and revise the Plan, based on the updating of assessment.

1.2 Policies for planning

The following policies for formulating the Plan were defined in conjunction with the issues identified through the study.

- Utilizing scientific risk assessment and earthquake disaster scenarios
- Focusing on mitigation for efficient activities
- Lowering vulnerability by enhancing prior measures such as building reinforcement, considering the feasibility
- Enhancing disaster management awareness of all ranging from administrative officers to residents
- Formulating a sustainable plan that emphasizes system/budget/governance enhancement through coordination with related organizations and the communities (groups of residents)
- Promoting disaster management activities through disaster education and dissemination of disaster information, utilizing real-time seismic intensity display system

1.3 Priorities for the Plan

The key elements described in the above policies will facilitate mitigation activities for earthquake disasters under the priorities for the Plan. The priority matters were selected through review and evaluation of the present situation as shown in Attachment 2 and summarized below.

- a) Raising awareness/ dissemination of information on disaster management (Priority I)
- b) Promotion of urban redevelopment and securing open space in urban areas (Priority I)
- c) Improvement of road network (Priority I)
- d) Seismic strengthening of buildings (Priority I)
- e) Research and study for damage estimation (Priority I)
- f) Collaboration and co-working with volunteers (Priority II)
- g) Prevention of fire outbreak and explosion and increasing safety of dangerous materials (priority II)

Action plans will be drawn up as attachment of the Plan for smooth and timely implement of measures associated with them.

1.4 Other considerations

(1) Detailed plans

Related organizations need to formulate detailed plans in order to deliver detailed assistance in consideration of conditions of each and the regional characteristics, and to facilitate fulfillment of roles and activities of these organizations through coordination with one another. The related organizations required for the preparation the detailed plan should be defined the Plan together with the deadline of the preparation for the approval of Ministry of Emergency Situations. The related organizations will be as follows.

Related subdivisions of central government bodies, departments of the Yerevan City office, all districts of Yerevan City, disaster management institutions, and communities (residents' groups, enterprises, and schools)

(2) Familiarizing with and updating the plan

Through annual review, necessary modifications should be made every year to the Plan as well as detailed plans.

The departments and other disaster management organizations make necessary changes by examining consistency between their detailed plans/measures and the Plan. In addition, educational/training activities including ones for informing members of their organizations of their roles will be provided in order to familiarize them with the Plan and improve their skills related to earthquake disaster management.

(3) Basic responsibilities of risk management entities

Mitigation of earthquake damage is based on the following basic concepts;

- a) Individual residents shall engage in self-help activities under the concept of “You should be

responsible for protecting your own safety and property”

- b) The communities (residents’ groups, schools and enterprises) shall engage in mutual-help activities under the awareness of “You should be responsible for protecting your community”.
- c) The city and risk management organizations shall engage in public-help activities that assist self-help / mutual-help activities in order “to create much stronger Yerevan City against earthquakes.”

Based on the above basic concepts, the disaster management organizations/communities/residents shall fulfill respective responsibilities.

1.5 Structures and contents of the Plan

The Plan was created during the phase II based on the damage assessment and the earthquake consequence scenario created during the phase I. It presented earthquake disaster management, which Yerevan City is recommended to implement, and incorporated new disaster management measures along with ongoing measures, which should be continued into the future.

ARS, the counterpart organization of the Study, is expected to utilize the Plan to promote earthquake disaster management measures for Yerevan City and to facilitate implementation of the measures by the residents/communities/related organizations.

The Earthquake Disaster Risk Management Plan for Yerevan City consists of five parts, which altogether have 41 chapters (see Table 1.5.1.);

Part 1: Basic Considerations (Chapter 1 to Chapter 3) explains policies, results of damage estimation, and basic responsibilities of disaster risk management entities.

Part 2: Mitigation Plan (Chapter 4 to Chapter 9) explains prior mitigation activities as part of quake-resistant human / community / urban development as major challenges.

Part 3: Preparedness Plan (Chapter 10 to Chapter 21) explains issues including initial response, communication, fire/hazardous materials, rescue/evacuation, transportation, medical care, missing persons, drinking water/food, lifelines etc. and waste materials.

Part 4: Emergency Response Plan (Chapter 22 to Chapter 35) explains actual emergency response activities in time of earthquake.

Part 5: Rehabilitation/Reconstruction Plan (Chapter 36 to Chapter 40) explains a framework of a reconstruction plan formulated for ever-more comfortable, livelier community building, following the emergency response.

Part 6: Assistance Plan (Chapter 41) explains a plan for assistance activities conducted for large earthquake disasters in other areas.

Table 1.5.1 Structures and contents of the Plan

Structures		Contents
Part 1	Basic Considerations	Chapter 1 Basic Considerations
		Chapter 2 Overview and damage estimation
		Chapter 3 Basic responsibilities of risk management entities
Part 2	Mitigation Plan	Chapter 4 The city's governance related to implementation of mitigation measures
		Chapter 5 Quake-resistant human development
		Chapter 6 Quake-resistant community development
		Chapter 7 Quake-resistant urban Development
		Chapter 8 Aseismic reinforcement of buildings, facility structures, etc.
		Chapter 9 Seismic study and research
Part 3	Preparedness Plan	Chapter 10 Process for preparedness and assistance by the city
		Chapter 11 Preparedness by the residents and communities
		Chapter 12 Preparedness related to initial response
		Chapter 13 Preparedness related to communication
		Chapter 14 Preparedness for fire and hazardous materials
		Chapter 15 Preparedness for rescue and evacuation
		Chapter 16 Preparedness for emergency transportation
		Chapter 17 Preparedness for emergency medical care
		Chapter 18 Preparedness for missing person search / body recovery
		Chapter 19 Drinking water and food procurement / supply process
		Chapter 20 Preparedness for rehabilitation of lifeline / communication / mudslide prevention facilities
		Chapter 21 Preparedness for handling of garbage, human waste, and debris
Part 4	Emergency Response Plan	Chapter 22 Basics of emergency response
		Chapter 23 Establishing and managing the Crisis Management Center
		Chapter 24 Collection and offering of information
		Chapter 25 Security, traffic control, emergency transport
		Chapter 26 Mutual coordination with disaster risk management bodies
		Chapter 27 Evacuation and relief
		Chapter 28 Emergency medical care, sanitation
		Chapter 29 Search and rescue of missing persons, handling of remains
		Chapter 30 Fire-fighting, countermeasures against hazardous materials
		Chapter 31 School measures
		Chapter 32 Supply of drinking water and food
		Chapter 33 Emergency rehabilitation of lifelines, telecommunications, traffic, and debris flow protection facilities
		Chapter 34 Handling of garbage, human waste, and debris
		Chapter 35 Emergency response to housing and livelihood
Part 5	Rehabilitation / Reconstruction Plan	Chapter 36 Basic ideas for reconstruction
		Chapter 37 Reconstruction Headquarters
		Chapter 38 Formulating reconstruction plans
		Chapter 39 Stability of civilian life
		Chapter 40 City reconstruction
Part 6	Assistance Plan	Chapter 41 Assistance plan

Chapter 2 Overview and damage estimation

2.1 Natural conditions

2.1.1 Landforms

The territory of Yerevan City is situated at elevation ranging from 830 m (South-western part) to 1,550 m (North-eastern part) above sea level (Figure 2.1.1). The elevation of Kentron is around 1,000m high. The river systems in the territory of Yerevan City are Hrazdan river which flows from north-east, Getar river which flows from north-east and joins to Hrazdan river at Erebuni district, Jrvezh river and Shorakhpiur river which flow down from east mountain range and join to Getar river. The territory Yerevan City consists of four landform divisions, which are;

- 1) Yeghvard volcanic plateau, Kotayk volcanic plateau , and Jrvezh-Nork volcanic plateau
- 2) Shorakhpiur-Nubarashen sloping plain and Erebuni mountain range
- 3) Fluvial plain of Hrazdan River, Getar River and Shorakhpiur River
- 4) Reclaimed land

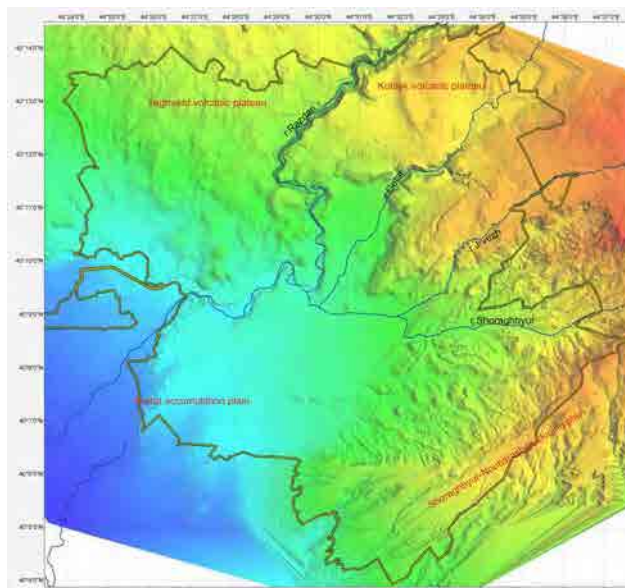


Figure 2.1.1 Relief map of Yerevan City, created from DEM (Georisk,2011)

2.1.2 Geology

Oldest geological unit in the territory of Yerevan City is the Shorakhpiur suite(P3 1sh) of Lower to Middle Oligocene, and youngest one is flood plain deposits of Holocene (Recent period).

The existing borehole database of Yerevan is collected. It is composed by 5,094 borehole data in total. The altitude of the surface of rock formation was studied using this database. The defined rock in Yerevan is studied as follows.

- a) Volcanic rocks (Basalt, Slag, welded Tuff, Clinker)

The welded Tuff is a sedimentary rock in exact meaning but included in this category from petrogenetic view.

b) Sedimentary rocks (Marl, Limestone, Sandstone, Conglomerate)

The altitude of rock surface is high in the north to south east and low in the center to south west

2.1.3 Tectonics and active faults

Armenia is situated on the north of the collision boundary between the Arabian plate and the Eurasian plate. The Arabian plate is moving northward at the rate of 20-30 mm/year and collides with the Eurasian plate. Consequently the Caucasian region is compressed and uplifted. Due to the compression with N-S direction, the tectonics around Armenia is characterized as follows: 1) WNW-ESE trending reverse and strike-slip faults, and 2) formation of extensional axes with N-S oriented direction.

The active fault map after Gerrisk report is shown in Figure 2.1.2. The data of historic and observed earthquakes after SSP are overlapped on Figure 2.1.2. The major active faults in Armenia are composed of the Pambak-Sevan-Sunik Fault (PSSF), the Mrav Fault, the Akhourian Fault, Garni Fault (GF), and Yerevan Fault (YF) etc.

The Garni Fault passes from Nakhigevan, Azerbaijan, via the east of Yerevan City, and merges into the PSSF (Fig. 2.4-3). The length is about 200 km. Four large to moderate historic earthquakes have occurred along the GF, viz. the 906 earthquake (M 7.0), the 1679 Garni earthquake (M 7.0), the 1828 earthquake (M 7.0), and the 1988 Spitak earthquake (Ms 6.9).

The Yerevan Fault is a blind fault which is inferred on the south of Yerevan City based on the gravity anomaly data (Georisk report on the Yerevan Fault). However, a low-angle reverse fault (thrust) overlying the Mesozoic sediments on the unconsolidated Gravel was confirmed by the pilot trench at Nor Ughi that was performed for this project. The part of the YF may reach to the surface, though more detailed trench survey is necessary. According to the mechanism analysis of small to moderate earthquakes, the prevailing type of motion observed within 30km from Yerevan is a reverse one (Tovmasyan, 2008). The 893 Dvin earthquake is well-known as Dvin of the ancient capital in Armenia has suffered severe damages. Dvin is located near the YF. However, the detailed epicenter of the 893 earthquake is not clarified. There is another opinion that the GF generated this earthquake (Georisk report on the Yerevan Fault). Besides, according to another opinion, Dvin earthquake occurred twice for AD 863 and AD 893 (Guidoboni, 1997).

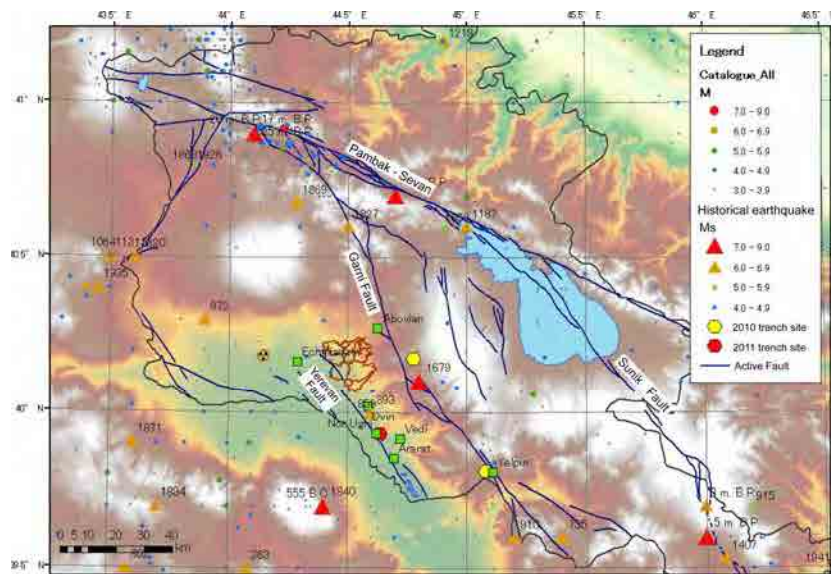


Figure 2.1.2 Active fault map after Georisk. The data of historic and observed earthquakes after NSSP are overlapped

2.2 Social conditions

2.2.1 Population

Based on the statistic data, including estimated data of the Master Plan as a target year of 2020, area, population and population density by district are indicated in Table 2.2.1. The spread of population in Yerevan City is characteristic of geographical reason and land-use, and population density is relative high at the northern to the central part of the city. The housing estate development at the north-western to the south-western part of the city has become active recently, and future population will be expected to slightly increase in these areas.

The movement of population by district is also indicated slightly increase from 1,102,000 people in 2003 to 1,119,000 people in 2010 over a long time period. An increase in population is not expected in the future.

Regarding age structure of Yerevan City in 2010, 141,737 people of over 63 years old occupy 12.7% of total, 769,319 people of 16 to 62 years old as employed population occupy 68.9%, and 205,592 people of 0 to 15 years old occupy 18.4%, respectively.

Table 2.2.1 Population and Population Density by District

District	Area ¹⁾ (ha)	Population ²⁾ (×1,000)	Population Density (Pop./ha)
Ajapnyak	2,600	108.2	42
Avan	820	51.0	62
Arabkir	1,320	130.8	99
Davtashen	650	41.1	63
Erebuni	4,940	121.9	25
Kentron	1,340	130.6	97
Malatia-Sebastia	2,530	141.8	56
Nor-Nork	1,450	147.0	101
Nork-Marash	470	11.3	24
Nubarashen	1,720	9.7	6
Shengavit	4,060	146.5	36
Kanaker-Zeytun	760	79.3	104
Total	22,660	1,119.2	49

Source : 1) Yerevan city Master Plan (2005)

2) National Statistical Service(2010) : Marzes of the Republic of Armenia in Figures

2.2.2 Land use

The Master Plan of urban development for Yerevan City (hereinafter referred to as “the Master Plan”) was elaborated in 2005. The target year of the Master Plan is from the year 2006 to the year 2020. At the present time, the Master Plan has been re-examined by Yerevan City and the Yerevan Project, CJSC since 2010.

According to the recent statistic data of Yerevan City (in 2010), land-use of Yerevan City is composed of; Agricultural land: 42.55km² (18.7%), Available agricultural land: 14.435km² (6.4%), Settlements' lands including public buildings: 67.02km² (29.5%), Industrial lands: 27.66 km² (12.2%), Green space, including parks: 11.13km² (4.9%), Groves: 12.39km² (5.5%).

Present land-use map, indicated in the Master Plan, is shown in Figure 2.2.1.

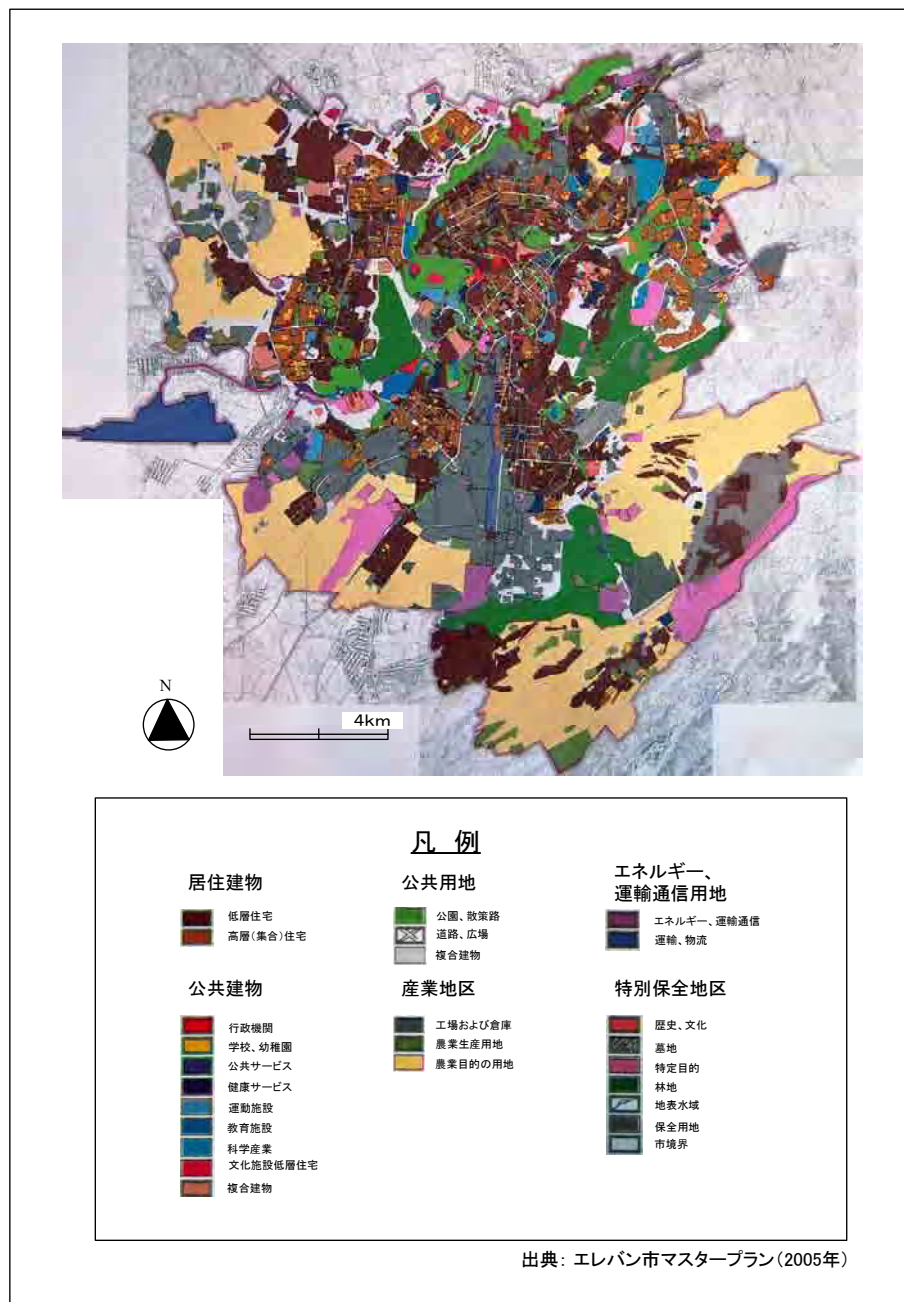


Figure 2.2.1 Present Land-use map of Yerevan City

2.3 Scenario earthquakes

Two scenarios are established for scenario earthquakes of Yerevan City as shown in Figure 2.3.1 and Table 2.3.1. It is estimated that Garni Fault is an active fault with about 200 km length and it is composed with five segments. Among them, GF2 and GF3 segments are situated near Yerevan. These segments are supposed to have occurred earthquakes within past several hundred years based on the historical records. The possibility of the earthquake occurrence due to the movement of these segments in near future is small reviewing that the standard recurrence interval of the earthquakes by the movement of inland active fault is longer than 1,000 years. However, the

possibility of the earthquake by these segments in near future cannot be fully denied considering the uncertainty of the earthquake generated source segment of the 1679 Garni Earthquake. Yerevan City has suffered severe damage during the 1679 event and it is easily presumed same situation if resemble earthquake to 1679 earthquake may occur again, therefore, GF2 and GF3 segments of Garni Fault are selected as the scenario earthquakes.

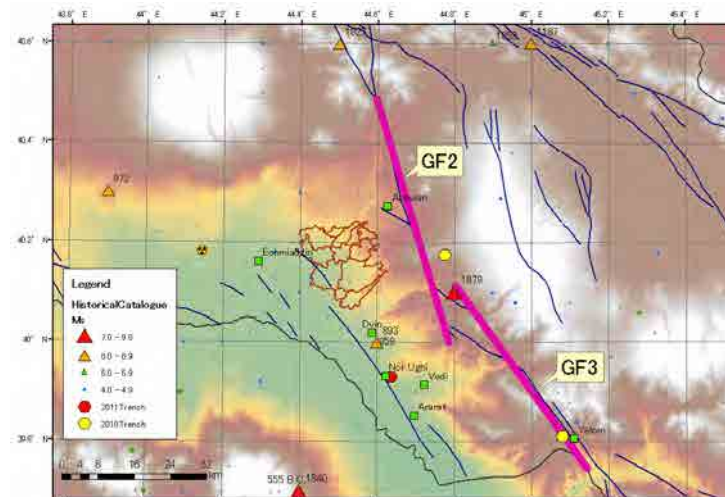


Figure 2.3.1 Fault Models of Scenario Earthquakes

Table 2.3.1 Fault Parameters of Scenario Earthquakes

	Garni Fault (GF2)	Garni Fault (GF3)
Moment Magnitude (Mw)	7.0	7.0
Fault Type	Normal Fault with Right Lateral component	Normal Fault with Right Lateral component
Length (km)	57	50
Dip (degree)	90	90
Depth(Upper - Lower) (km)	3 - 12	3 - 12
Width (km)	9	9

2.4 Calculated ground motions

The calculated acceleration by the selected attenuation equations are averaged following the weights in the logic tree and computed the acceleration at engineering seismic base rock. The formula by Akker and Bommer (2010), Boore and Atkinson (2008) and Chiou and Youngs (2008) are used.

The subsurface amplification characteristic is evaluated by the 1D equivalent linear response analyses using SHAKE91 at every grid. Three input waves for the response analysis are a) Wave form of the 1988 Spitak Earthquake (Mw=6.9) wave observed at Gukasyan, b) The wave form of the magnitude 7 class earthquake with same fault type, which was observed at comparative distance for the scenario earthquake model as shown in Figures 2.4.1 and 2.4.2. The calculated results are shown in Figure 2.4.3.

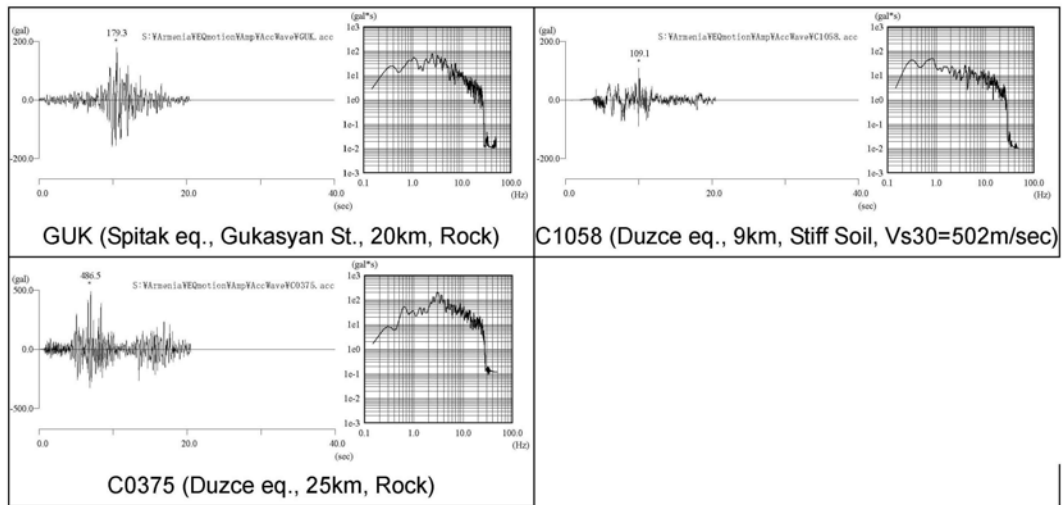


Figure 2.4.1 Input Wave Forms for Response Analysis

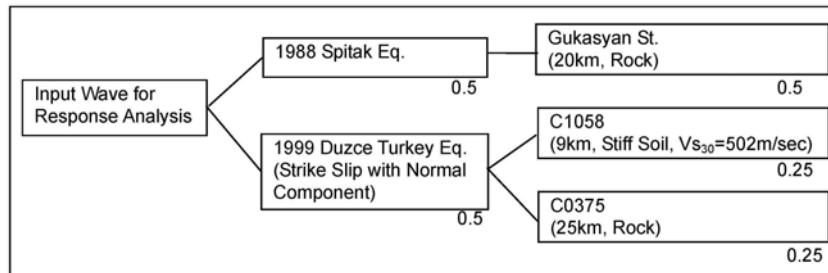


Figure 2.4.2 Logic tree for input wave form

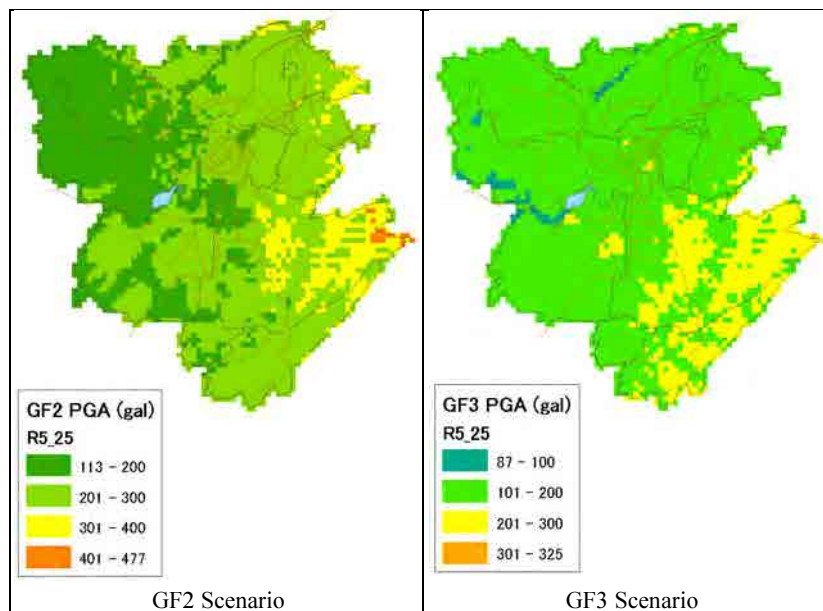


Figure 2.4.3 Acceleration distribution at ground surface

2.5 Estimated damages for planning

Based on calculated damages in the Project, estimated damages for planning have been set, through discussion with related agencies as well as referring the existing plans and regulations.

2.5.1 Building

Building damage was calculated for residential buildings and hospitals/schools as show in Tables 2.5.1 and 2.5.2.

In case of the scenario earthquake on GF2, numbers of heavily damaged buildings are 860 for multi-story apartment and 12,800 for individual houses. Number of housing units, suffered with heavy damage to their residential buildings is 53,700. The results are used for planning.

Table 2.5.1 Damage to residential buildings

No.	District	Inventory			GF2						GF3					
		Multi-story Apartment (x100)	Individual House (x100)	Housing Unit (x100)	Multi-story Apartment (x100)		Individual House (x100)		Housing Unit (x100)		Multi-story Apartment (x100)		Individual House (x100)		Housing Unit (x100)	
1	Ajapnyak	3.9	30.6	267	0.5	12%	10.8	35%	36	14%	0.1	4%	4.8	16%	12	5%
2	Avan	2.3	12.2	127	0.6	27%	6.0	49%	39	31%	0.2	7%	2.2	18%	11	8%
3	Arabkir	5.8	33.2	347	1.2	21%	10.7	32%	73	21%	0.4	6%	4.3	13%	24	7%
4	Davtashen	1.7	7.8	98	0.0	2%	3.2	41%	5	5%	0.0	0%	1.3	17%	2	2%
5	Erebuni	2.2	106.4	228	0.5	23%	33.8	32%	64	28%	0.2	11%	18.7	18%	33	15%
6	Kentron	7.1	55.1	364	2.5	35%	15.2	28%	102	28%	1.2	16%	7.4	13%	47	13%
7	Malatia-Sebastia	5.7	45.3	346	0.3	6%	10.3	23%	27	8%	0.1	2%	4.8	11%	11	3%
8	Nor Nork	6.4	1.8	369	1.0	16%	0.5	29%	71	19%	0.3	5%	0.2	10%	23	6%
9	Nork-Marash	0.0	24.0	24	0.0	23%	7.2	30%	7	30%	0.0	7%	3.1	13%	3	13%
10	Nubarashen	0.3	5.5	16	0.1	26%	1.2	22%	4	24%	0.0	15%	0.7	14%	2	14%
11	Shengavit	5.5	72.0	298	1.4	26%	15.3	21%	72	24%	0.8	15%	8.7	12%	40	13%
12	Kanaker-Zeytun	2.9	32.4	163	0.5	16%	13.9	43%	36	22%	0.1	5%	5.2	16%	11	7%
Total		43.7	426.3	2,649	8.6	20%	128.0	30%	537	20%	3.5	8%	61.5	14%	219	8%

Table 2.5.2 Damages to buildings of hospitals/ schools

	Inventory	GF2 Scenario		GF3 Scenario	
School	229	49	21%	19	8%
Hospital	44	11	25%	4	9%

2.5.2 Bridge

The damage estimation was done for forty bridges in Yerevan City by means of Katayama's method. The summary of the inventory of the bridges is shown in Table 2.5.3.

Table 2.5.3 Result of bridge inventory

No.	Code	Name	Category												Risk Factor												Evaluation													
			Spans	Distribution	Girder Type	Bearing Type	Width of Bridge	Height of Substructure	Foundation Type	Material of Substructure	Ground Class	Existing Condition	Seismic Intensity	Sensitivity of Liquefaction	1	1.00	1.00	0.60	0.80	1.00	1.00	1.00	0.50	1.00	1.00	1.00		1.00												
															2	1.75	2.00	1.00	1.20	1.35	1.40	1.40																		
															3		3.00	1.15																						
															4																									
5																																								
1	ARB-1	Overpass bridge on the Friendship Square	2	3	1	2	2	1	1	2	1	3	1	1.75	3.00	0.60	1.20	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	12.25	C													
2	ARB-2	Bridge on Vatutin str.	2	1	2	2	2	1	1	2	2	3	1	1.75	1.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	8.16	C													
3	ARB-3	Bridge on Riga str.	2	3	2	2	2	1	1	2	3	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.50	2.40	1.00	30.62	A													
4	ARB-4	Bridge on Saralanji HW near Riga str.	1	3	2	2	2	1	1	2	1	3	1	1.00	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	11.66	C													
5	ARB-5	Bridge on Komitas ave.	2	3	2	2	3	1	1	2	2	3	1	1.75	3.00	1.00	1.20	1.70	1.00	1.00	1.00	1.00	1.20	2.40	1.00	30.84	A													
6	AVN-1	Avan 1st bridge	2	2	2	1	2	1	1	2	1	3	1	1.75	2.00	1.00	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	9.07	C													
7	AVN-2	Avan 2nd bridge	2	3	2	2	2	1	1	2	1	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	20.41	C													
8	AVN-3	Bridge on Yerevan - Sevan HW	2	3	2	1	3	1	1	2	2	3	1	1.75	3.00	1.00	0.80	1.70	1.00	1.00	1.00	1.00	1.20	2.40	1.00	20.56	C													
9	DVT-1	Bridge of 2nd road	2	3	1	1	3	1	1	2	1	3	1	1.75	3.00	0.60	0.80	1.70	1.00	1.00	1.00	1.00	1.00	2.40	1.00	10.28	C													
10	DVT-2	Central bridge of Davtashen transport	2	3	1	1	3	1	1	2	1	3	1	1.75	3.00	0.60	0.80	1.70	1.00	1.00	1.00	1.00	1.00	2.40	1.00	10.28	C													
11	DVT-3	Bridge of 7th road	2	3	1	1	3	1	1	2	1	3	1	1.75	3.00	0.60	0.80	1.70	1.00	1.00	1.00	1.00	1.00	2.40	1.00	10.28	C													
12	ERB-1	Bridge on Arin-Berd str.	2	1	1	1	2	1	1	2	1	3	1	1.75	1.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	2.72	C													
13	HRA-1	Davtashen bridge	2	2	2	1	3	1	1	1	1	3	1	1.75	2.00	1.00	0.80	1.70	1.00	1.00	0.50	1.00	0.50	1.00	2.40	1.00	5.71	C												
14	HRA-2	Kiev bridge	2	1	1	1	3	1	1	1	1	3	1	1.75	1.00	0.60	0.80	1.70	1.00	1.00	0.50	1.00	0.50	1.00	2.40	1.00	1.71	C												
15	HRA-3	Bridge near the Kiev bridge	1	1	1	2	2	1	1	1	1	3	3	1	1.00	1.00	0.60	1.20	1.35	1.00	1.00	0.50	1.50	2.40	1.00	1.75	C													
16	HRA-4	Bridge near the Yerevan HES	1	1	1	2	1	1	1	1	2	2	3	1	1.00	1.00	0.60	1.20	1.00	1.00	1.00	1.00	1.20	2.40	1.00	2.07	C													
17	HRA-5	Haghtanak bridge	2	1	1	1	3	1	1	1	1	2	3	1	1.75	1.00	0.60	0.80	1.70	1.00	1.00	0.50	1.20	2.40	1.00	2.06	C													
18	KNT-1	Overpass bridge of new highway	2	3	1	1	2	1	1	2	1	3	1	1.75	3.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	8.16	C													
19	KNT-2	Overpass bridge of new highway	2	3	1	2	2	1	1	1	2	1	3	1	1.75	3.00	0.60	1.20	1.35	1.00	1.00	1.00	1.00	2.40	1.00	12.25	C													
20	KNT-3	Bridge on Heratsi str.	2	2	1	1	3	1	1	2	1	3	1	1.75	2.00	0.60	0.80	1.70	1.00	1.00	1.00	1.00	1.00	2.40	1.00	6.85	C													
21	KNT-4	Bridge on Charents str.	1	3	2	2	2	1	1	2	1	3	1	1.00	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	11.66	C													
22	KNT-5	Bridge on Khaniyan str.	1	3	2	1	2	1	1	1	2	1	3	1	1.00	3.00	1.00	0.80	1.35	1.00	1.00	1.00	1.00	2.40	1.00	7.78	C													
23	KNT-6	Bridge on Tigran Mets ave.	1	3	2	1	2	1	1	2	1	3	1	1.00	3.00	1.00	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	7.78	C													
24	KNT-7	Bridge on Khorenatsi str.	2	2	2	1	1	1	1	2	2	3	1	1.75	2.00	1.00	0.80	1.00	1.00	1.00	1.00	1.00	1.20	2.40	1.00	8.06	C													
25	KNT-8	Subway bridge over Kristapor str.	2	3	1	1	1	1	1	2	2	3	1	1.75	3.00	0.60	0.80	1.00	1.00	1.00	1.00	1.00	1.20	2.40	1.00	7.26	C													
26	KNT-9	Bridge on G. Lusavorich str.	2	3	2	2	2	1	1	2	2	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	24.49	C													
27	KNT-10	Overpass bridge near the Hrazdan Stadium	2	3	2	2	2	1	1	1	3	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	0.50	1.50	2.40	1.00	15.31	C														
28	MLS-1	Bridge on Isakov ave.	2	3	2	2	1	1	1	2	2	3	1	1.75	3.00	1.00	1.20	1.00	1.00	1.00	1.00	1.00	1.20	2.40	1.00	18.14	C													
29	MLS-2	Argavand bridge	2	2	1	1	2	1	1	2	1	3	1	1.75	2.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	5.44	C													
30	MLS-3	Bridge on Isakov ave. to Echmiadzin HW	2	3	2	2	2	1	1	2	3	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.50	2.40	1.00	30.62	A													
31	NBR-1	Bridge near Nubarashen	2	2	1	1	2	1	1	2	3	3	1	1.75	2.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.50	2.40	1.00	8.16	C													
32	NNR-1	Bridge on Galshoyan str.	2	2	1	1	2	1	1	2	2	3	1	1.75	2.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	6.53	C													
33	NNR-2	Jrvehj river bridge	1	3	2	2	1	1	1	2	2	3	1	1.00	3.00	1.00	1.20	1.00	1.00	1.40	1.00	1.00	1.20	2.40	1.00	14.52	C													
34	SHN-1	Bridge on Garegin Nzhdeh str.	2	2	1	1	2	1	1	2	1	3	1	1.75	2.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	5.44	C													
35	SHN-2	Subway bridge over Shahamiryanner str.	1	3	2	1	2	1	1	2	1	3	1	1.00	3.00	1.00	0.80	1.35	1.00	1.00	1.00	1.00	1.00	2.40	1.00	7.78	C													
36	SHN-3	Subway bridge over Tamantsineri str.	1	1	1	1	2	1	1	2	3	3	1	1.00	1.00	0.60	0.80	1.35	1.00	1.00	1.00	1.00	1.50	2.40	1.00	2.33	C													
37	SHN-4	Subway bridge over railway	1	3	2	1	2	1	1	2	2	3	1	1.00	3.00	1.00	0.80	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	9.33	C													
38	SHN-5	Shirak str. 1st bridge	2	3	2	2	2	1	1	2	3	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.50	2.40	1.00	30.62	A													
39	SHN-6	Overpass bridge on Araratyan str.	2	3	2	2	2	1	1	2	2	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	24.49	C													
40	SHN-7	Shirak str. 2nd bridge	2	3	2	2	2	1	1	2	2	3	1	1.75	3.00	1.00	1.20	1.35	1.00	1.00	1.00	1.00	1.20	2.40	1.00	24.49	C													

Based on the inventory result, damage to bridges was estimated, based on the criterion shown in Table 2.5.4.

Table 2.5.4 Criterion of Katayama's Method

Rank	Degree of damages	Criterion
A	- High possibility of bridge collapse - Occurrence of big displacement - Long-term impassable, requiring reconstruction	30 or more
B	- Moderate possibility of bridge collapse - Occurrence of displacement - Temporarily impassable, requiring repair or/rehabilitation	26 to less than 30
C	- Low possibility of bridge collapse - Occurrence of minor displacement - Basically passable after safety inspection	Less than 26

The result of the estimation indicates that three bridges are in dangerous condition (Rank A) and and three other bridges are in slightly dangerous condition (Rank C with evaluation points of 24.49) as shown in Figure 2.5.1.

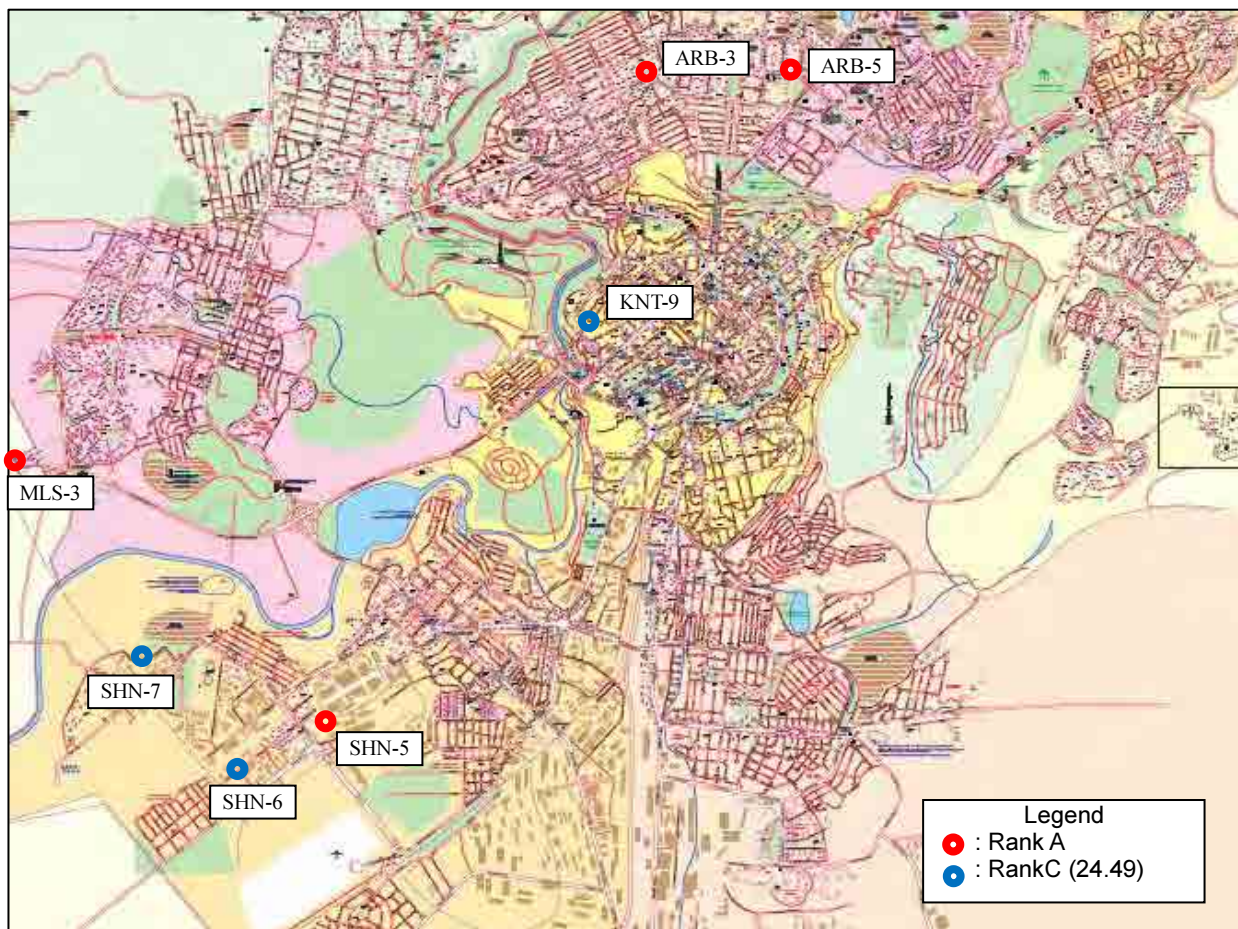


Figure 2.5.1 Result of damage estimation on bridges

2.5.3 Lifeline 1 (water supply)

Based on the calculation results and discussion with Yerevan Djur, damage to water supply pipe lines is estimated as shown in Table 2.5.5.

Table 2.5.5 Damage of water supply pipe lines

No.	District	Pipe Length	Number of Damage (points)			
			GF2 Scenario		GF3 Scenario	
		km	Maximum	Average	Maximum	Average
1	Ajapnyak	132.3	15.3	0.0	6.7	0.0
2	Avan	48.7	17.3	0.2	4.9	0.0
3	Arabkir	114	34.2	0.2	12.7	0.0
4	Davtashen	37.2	5.7	0.0	2.1	0.0
5	Erebuni	218.7	47.3	0.3	24.4	0.0
6	Kentron	153.3	26.4	0.0	11.8	0.0
7	Malatia-Sebastia	131.2	11.2	0.0	5.7	0.0
8	Nor Nork	63.5	20.5	0.1	7.4	0.0
9	Nork-Marash	33.5	9.6	0.0	4.0	0.0
10	Nubarashen	57.7	20.2	1.1	11.4	0.0
11	Shengavit	217.4	32.5	0.0	19.2	0.0
12	Kanaker-Zeytun	85.6	33.7	0.0	11.1	0.0
Total		1,293.1	273.9	2.0	121.6	0.0

Required number of days for the rehabilitation of the pipe lines and the rate of water outage at one day after the disaster is calculated as follows.

- 1) Condition
 - Number of damaged points: 274 points (0.21 km/km)
 - Number of staff in one group for rehabilitation works: 1 supervisor and 8 workers/group
 - Workable rate of the rehabilitation: 2 points/group for 8 hours a day
 - Working duration: twenty four hours with triple shifts
 - Number of the working groups: 15 groups (15 supervisors and 120 workers in total)
- 2) Required days for the rehabilitation (D)

$$D = 274 \text{ points} / (15 \text{ groups} * 2 \text{ points/day})$$

$$= 10 \text{ days}$$
- 3) Rate of water outage at one day after (P)

$$P = 1 / (1 + 0.303 * R^{-1.17})$$

$$= 1 / (1 + 0.303 * 0.21^{-1.17})$$

$$= 0.344 \text{ (34.4\%)}$$

where, R = damage rate (points/km) = 0.21

Based on the above-mentioned calculation result, water outage will be 100% just after the disaster, and water supply will be available about 10 days after the disaster.

In case that the other node facilities, such as water intakes, reservoirs, water purifying plants, pumping stations, etc., are damaged, water outage may continue for one month or more.

In case that main water conveying pipelines from Garni is seriously damaged, the rehabilitation work may require long time, more than one month, even one year, since the procurement of big-size piles takes long time.

2.5.4 Lifeline 2 (waste water sewerage)

Based on the calculation results and discussion with Yerevan Djur, damage to waste water pipe lines is estimated as shown in Table 2.5.6.

Table 2.5.6 Damage of waste water pipe lines

No.	District	Pipe Length	Number of Damage (points)			
			GF2 Scenario		GF3 Scenario	
		km	Maximu	Average	Maximu	Average
1	Ajapnyak	62.4	32.0	0.0	14.0	0.0
2	Avan	28.5	40.0	0.0	12.0	0.0
3	Arabkir	70.8	64.0	0.0	25.0	0.0
4	Davtashen	22.6	17.0	0.0	6.0	0.0
5	Erebuni	164.8	130.0	0.0	67.0	0.0
6	Kentron	104.6	90.0	0.0	40.0	0.0
7	Malatia-Sebastia	109.3	40.0	0.0	21.0	0.0
8	Nor Nork	42.0	58.0	0.0	21.0	0.0
9	Nork-Marash	24.6	32.0	0.0	13.0	0.0
10	Nubarashen	14.2	19.0	0.0	11.0	0.0
11	Shengavit	161.4	115.0	0.0	67.0	0.0
12	Kanaker-Zeytun	60.0	79.0	0.0	27.0	0.0
Total		865.2	714.0	0.0	324.0	0.0

Required number of days for the rehabilitation of the pipe lines is calculated as follows.

1) Condition

- Number of damaged points: 714 points
- Number of staff in one group for rehabilitation works: 1 supervisor and 8 workers/group
- Workable rate of the rehabilitation: 1 points/group for 8 hours a day
- Working duration: twenty four hours with triple shifts
- Number of the working groups: 15 groups (30 supervisors and 240 workers in total)

2) Required days for the rehabilitation (D)

$$D = 714 \text{ points} / (30 \text{ groups} * 1 \text{ points/day})$$

$$= 24 \text{ days}$$

Since waster water treatment facilities do not function, even in the ordinary time, it is no foreseen the rehabilitation of waste water system is delayed due to the rehabilitation of the treatment facilities.

2.5.5 Lifeline 3 (rain water sewerage)

Based on the calculation results and discussion with Yerevan Djur, damage to rain water pipe lines is estimated as shown in Table 2.5.7.

Table 2.5.7 Damage of rain water pipe lines

No.	District	Pipe Length	Number of Damage (points)			
			GF2 Scenario		GF3 Scenario	
		km	Maximu	Average	Maximu	Average
1	Ajapnyak	12.4	4.0	0.0	2.0	0.0
2	Avan	12.7	13.0	0.0	4.0	0.0
3	Arabkir	24.2	14.0	0.0	6.0	0.0
4	Davtashen	1.9	1.0	0.0	1.0	0.0
5	Erebuni	30.5	13.0	0.0	7.0	0.0
6	Kentron	31.4	8.0	0.0	4.0	0.0
7	Malatia-Sebastia	23.5	4.0	0.0	2.0	0.0
8	Nor Nork	15.4	19.0	0.0	7.0	0.0
9	Nork-Marash	1.4	2.0	0.0	1.0	0.0
10	Nubarashen	0.0	0.0	0.0	0.0	0.0
11	Shengavit	18.7	4.0	0.0	2.0	0.0
12	Kanaker-Zeytun	10.6	12.0	0.0	4.0	0.0
Total		182.6	95.0	0.0	38.0	0.0

Required number of days for the rehabilitation of the pipe lines is calculated as follows.

- 1) Condition
 - Number of damaged points: 95 points
 - Number of staff in one group for rehabilitation works: 1 supervisor and 8 workers/group
 - Workable rate of the rehabilitation: 1 points/group for 8 hours a day
 - Working duration: twenty four hours with triple shifts
 - Number of the working groups: 9 groups (9 supervisors and 72 workers in total)
- 2) Required days for the rehabilitation (D)
 - $D = 95 \text{ points} / (9 \text{ groups} * 1 \text{ points/day})$
 - = 11 days

2.5.6 Lifeline 4 (electric line)

Based on the result of discussion with electric companies; Electric Networks of Armenia CJSC, High Voltage Electric Networks CJSC, and Yerevan City Light CJSC, the calculation result of the damage to aerial lines can be used for the planning. The calculation result is shown in Table 2.5.8. Damage to underground electric line is calculated, in proportion with damage ratio of buildings of 9 stories or more, since damage to underground line is caused with the collapse of high-rise buildings as shown in Table 2.5.9. Multiplying damage ratio of high-rise buildings with total number of underground lines, the damage is calculated to be 305.1 km. Number of damaged electric poles is calculated in proportion with damaged lines as shown in Table 2.5.10.

Table 2.5.8 Damage of aerial electric lines

No	District	Cable Length	Damage Length (km)			
			GF2 Scenario		GF3 Scenario	
		km	Maximu	Average	Maximu	Average
1	Ajapnyak	185.8	0.8	0.0	0.1	0.0
2	Avan	59.6	1.4	0.1	0.1	0.0
3	Arabkir	154.7	1.7	0.1	0.1	0.0
4	Davtashen	68.4	0.6	0.0	0.0	0.0
5	Erebuni	355.9	6.1	0.3	1.8	0.0
6	Kentron	237.2	2.1	0.1	0.3	0.0
7	Malatia-Sebastia	232.6	0.8	0.0	0.1	0.0
8	Nor Nork	133.1	2.6	0.1	0.4	0.0
9	Nork-Marash	48.7	0.6	0.0	0.1	0.0
10	Nubarashen	80.2	1.4	0.1	0.6	0.0
11	Shengavit	275.1	2.3	0.0	0.7	0.0
12	Kanaker-Zeytun	118.8	1.9	0.1	0.2	0.0
Total		1,950.2	22.4	0.9	4.5	0.2

Table 2.5.9 Damage of underground electric lines

No.	District	Cable Length	Damage Length (km)	
		Km	GF2 Scenario	GF3 Scenario
1	Ajapnyak	286.2	14.9	5.1
2	Avan	225.1	41.4	12.1
3	Arabkir	391.5	53.8	20.0
4	Davtashen	141.9	6.1	2.0
5	Erebuni	399.1	18.5	9.6
6	Kentron	379.2	31.8	15.1
7	Malatia-Sebastia	301.7	16.6	7.1
8	Nor Nork	392.4	38.0	12.7
9	Nork-Marash	53.3	0.0	0.0
10	Nubarashen	2.2	0.2	0.1
11	Shengavit	415.6	17.8	9.9
12	Kanaker-Zeytun	528.9	66.0	23.5
Total		3,517.1	305.1	117.3

Table 2.5.10 Damage of electric poles

Voltage	Length	Pole interval*	Damaged span	Damaged pole	Type
	km	M	Span	Pole	
10kV or less	19.7	40	493	494	Electric pole
35kV	0.5	140	4	5	Steel tower
110kV	2.2	390	6	7	Steel tower
Total	22.4		503		

Required number of days for the rehabilitation of the electric lines is calculated as follows.

- 1) Condition
 - Length of damaged aerial lines: 22.4 km
 - Length of damaged underground lines: 305.1 km
 - Number of damaged electric poles: 494

- Number of damaged steel towers: 12

A working group : for electric poles : 1 supervisor and 4 workers/group
: for steel towers : 1 supervisor and 10 workers/group
: for aerial lines : 1 supervisor and 5 workers/group
: for underground lines: 1 supervisor and 4 workers/group

Working rate : for electric poles : 1 pole/ 1 group for 8 hours
: for steel towers : 10 days (24 h by triple shifts)/ 1 tower
: for aerial lines : 1 span/ 1 group for 8 hours
: for underground lines: 20 m/1 group for 8 hours

- Working duration: 24 hours with triple shifts

- Number of the working groups:

: for electric poles : 30 groups (30 supervisors and 120 workers in total)
: for steel towers : 36 groups (30 supervisors and 120 workers in total)
: for aerial lines : 30 groups (30 supervisors and 150 workers in total)
: for underground lines: 150 groups (150 supervisors and 600 workers)

2) Required days for the rehabilitation (D)

: for electric poles : $D = 494 \text{ poles} / (30 \text{ groups} * 1 \text{ pole/day}) = 17 \text{ days}$
: for steel towers : 12 towers in same timing
: 1 tower* 10 days by 3 groups
: 12 towers* 3 groups = 36 groups
: 10 days
: for aerial lens : $503 \text{ spans} / (30 \text{ groups} * 1 \text{ span/day}) = 17 \text{ days}$
: for underground lines: $305.1 \text{ km} / (150 \text{ groups} * 20 \text{ m/day}) = 120 \text{ days}$

2.5.7 Lifeline 5 (gas pipe line)

Damage to gas pipe lines is calculated for underground pipe lines and on-the-ground pipe lines.

For the calculation of the underground pipelines, damage functions prepared in Japan and United States are used, and the result is shown in Table 2.5.11.

Table 2.5.11 Damage of underground gas pipes

No.	District	Pipe Length	Number of Damage (points)			
			GF2 Scenario		GF3 Scenario	
		km	Maximu	Average	Maximu	Average
1	Ajapnyak	11.7	0.4	0.0	0.2	0.0
2	Avan	1.6	0.1	0.0	0.0	0.0
3	Arabkir	9.6	0.6	0.0	0.2	0.0
4	Davtashen	1.6	0.1	0.0	0.0	0.0
5	Erebuni	5.2	0.2	0.0	0.1	0.0
6	Kentron	2.6	0.1	0.0	0.0	0.0
7	Malatia-Sebastia	10.4	0.2	0.0	0.1	0.0
8	Nor Nork	0.6	0.0	0.0	0.0	0.0
9	Nork-Marash	0.9	0.1	0.0	0.0	0.0
10	Nubarashen	5.8	0.3	0.0	0.2	0.0
11	Shengavit	9.0	0.3	0.0	0.2	0.0
12	Kanaker-Zeytun	8.5	0.5	0.0	0.2	0.0
Total		67.6	2.9	0.0	1.3	0.0

For the calculation of on-the-ground pipe lines, damage ratio of buildings is used, since there is no reliable damage function on on-the-ground pipe lines and damage to the pipe lines should be due to the collapse of buildings. The result is shown in Table 2.5.12.

Table 2.5.12 Damage of on-the-ground gas pipes

No.	District	Pipe Length	Damage Length (km)	
		Km	GF2 Scenario	GF3 Scenario
1	Ajapnyak	95.3	18.3	7.9
2	Avan	44.3	14.0	4.9
3	Arabkir	103.4	25.1	9.7
4	Davtashen	13.8	2.0	0.8
5	Erebuni	173.2	38.4	21.2
6	Kentron	130.5	30.8	14.7
7	Malatia-Sebastia	97.5	13.9	6.4
8	Nor Nork	50.8	7.1	2.3
9	Nork-Marash	37.1	10.5	4.3
10	Nubarashen	22.0	3.2	2.0
11	Shengavit	162.8	26.9	15.3
12	Kanaker-Zeytun	96.3	31.1	11.5
Total		1,027.0	221.1	101.0

2.5.8 Lifeline 7 (telephone line)

Damage functions used for the calculation of the damage of underground telephone lines are the same as that for underground electric lines, and the result is shown in Table 2.5.13.

Table 2.5.13 Damage of underground telephone lines

No.	District	Cable Length	Damage Length (km)			
			GF2 Scenario		GF3 Scenario	
		km	Maximu	Average	Maximu	Average
1	Ajapnyak	27.3	0.0	0.0	0.0	0.0
2	Avan	14.3	0.0	0.0	0.0	0.0
3	Arabkir	30.2	0.0	0.0	0.0	0.0
4	Davtashen	7.2	0.0	0.0	0.0	0.0
5	Erebuni	35.7	0.0	0.0	0.0	0.0
6	Kentron	62.9	0.0	0.0	0.0	0.0
7	Malatia-Sebastia	31.6	0.0	0.0	0.0	0.0
8	Nor Nork	25.7	0.0	0.0	0.0	0.0
9	Nork-Marash	7.8	0.0	0.0	0.0	0.0
10	Nubarashen	3.8	0.0	0.0	0.0	0.0
11	Shengavit	36.8	0.0	0.0	0.0	0.0
12	Kanaker-Zeytun	18.2	0.0	0.0	0.0	0.0
Total		301.5	0.0	0.0	0.0	0.0

Since the data of the length of aerial lines has not been obtained, the length of the aerial lines is calculated on the following formulae.

$$L_a = a * L_u$$

L_a : Length of aerial telephone lines (km), L_u : Length of underground telephone lines

a : Ratio of aerial lines and underground lines in electric lines; 0.55

Damage ratio of poles due to building collapse is calculated on the following formulae.

$$D_p = a * D_b$$

D_p : Damage ratio of poles, D_b : Damage ratio of buildings

A : Damage ratio: 0.17155

The calculation result of aerial telephone lines and poles is shown in Table 2.5.14.

Table 2.5.14 Damage of aerial telephone lines and poles

No.	District	Length of underground lines (km)	Length of aerial lines (km)	Damage of aerial lines (km)	Number of poles	Damaged poles due to building collapse	Damaged poles due to seismic intensity 9	Total number of damaged poles	Damage ratio (%)
1	Ajapnyak	27.3	15.0	0.065	4,645	258	3	261	5.6
2	Avan	14.3	7.9	0.185	1,490	116	1	117	7.9
3	Arabkir	30.2	16.6	0.183	3,868	202	2	204	5.3
4	Davtashen	7.2	4.0	0.035	1,710	100	1	101	5.9
5	Erebuni	35.7	19.6	0.337	8,898	486	5	491	5.5
6	Kentron	62.9	34.6	0.306	5,930	293	3	296	5.0
7	Malatia-Sebastia	31.6	17.4	0.060	5,815	211	3	214	3.7
8	Nor Nork	25.7	14.1	0.276	3,328	107	2	109	3.3
9	Nork-Marash	7.8	4.3	0.053	1,218	63	1	64	5.3
10	Nubarashen	3.8	2.1	0.036	2,005	76	1	77	3.8
11	Shengavit	36.8	20.2	0.169	6,878	252	4	256	3.7
12	Kanaker-Zeytun	18.2	10.0	0.160	2,970	208	2	210	7.1
Total			301.5	1.865	48,755	2,372	28	2,400	4.9

2.5.9 Death toll

Calculation result indicates that death toll is 31,100 for GF2 and 10,900 for GF3 as shown in Table 2.5.15. Other calculation results are available as shown in Table 2.5.16.

Considering safety factor in planning for important item (death toll), death toll for planning is determined to be 150,000.

Table 2.5.15 Calculated death toll on GF2 and GF3

No	District	Population	GF2 Scenario		GF3 Scenario	
			Death		Death	
1	Ajapnyak	108,200	1,900	1.8%	500	0.5%
2	Avan	51,000	2,100	4.2%	500	0.9%
3	Arabkir	130,800	4,400	3.3%	1,100	0.9%
4	Davtashen	41,100	200	0.5%	0	0.1%
5	Erebuni	121,900	3,800	3.1%	1,700	1.4%
6	Kentron	130,600	6,500	5.0%	2,600	2.0%
7	Malatia-Sebastia	141,800	1,300	0.9%	500	0.3%
8	Nor Nork	147,000	4,300	2.9%	1,100	0.8%
9	Nork-Marash	11,300	300	2.6%	100	0.9%
10	Nubarashen	9,700	100	1.5%	100	0.8%
11	Shengavit	146,500	4,300	2.9%	2,100	1.5%
12	Kanaker-Zeytun	79,300	1,900	2.4%	500	0.6%
Total		1,119,200	31,100	2.8%	10,900	1.0%

Table 2.5.16 Other calculation results on death toll

Scenario Earthquake	MSK-64 Intensity in Yerevan	Death Toll	Damage to Buildings (Category 4 and 5)		Source
Not specified	IX	76,500	Residential	2,000	The Team
			Multi-story	27,000	
Garni	VII	162,243	Category 4	8,839	Government decision N919
			Category 5	15,296	

2.5.10 Injured

Calculation result indicates that number of the injured is 75,000 for GF2 and 30,300 for GF3 as shown in Table 2.5.17. Another calculated number of the injured is shown in the government decision N 919 is shown in Table 2.5.18.

On the calculation of number of injured, the following formula was used in this study.

$$N_i = 8.2297 \cdot (N_d)^{0.8494} \quad (N_i: \text{Number of the injured, } N_d: \text{Death toll})$$

In case that death toll is 150,000 as mentioned in the previous clause, number of the injured is calculated to be 205,000.

Standing on a safety side, injured of 205,000 is used for planning.

Table 2.5.17 Calculated number of the injured*

No	District	Population	GF2 Scenario		GF3 Scenario	
			Injured		Injured	
1	Ajapnyak	108,200	5,100	4.7%	1,700	1.6%
2	Avan	51,000	5,500	10.8%	1,500	2.9%
3	Arabkir	130,800	10,200	7.8%	3,300	2.5%
4	Davtashen	41,100	700	1.7%	200	0.5%
5	Erebuni	121,900	8,900	7.3%	4,600	3.8%
6	Kentron	130,600	14,300	10.9%	6,500	5.0%
7	Malatia-Sebastia	141,800	3,700	2.6%	1,500	1.1%
8	Nor Nork	147,000	10,000	6.8%	3,200	2.2%
9	Nork-Marash	11,300	1,000	9.0%	400	3.8%
10	Nubarashen	9,700	600	5.7%	300	3.4%
11	Shengavit	146,500	10,100	6.9%	5,500	3.8%
12	Kanaker-Zeytun	79,300	5,000	6.3%	1,500	1.9%
Total		1,119,200	75,000	6.7%	30,300	2.7%

Injured *: moderately injured and hospitalized

Table 2.5.18 Number of the injured on government decision N919

Category	Number of injured	Remarks
Heavily	60,562	Garni scenario earthquake MSK-64 intensity XII in Yervan
Moderately	32,488	
Slightly	27,162	
Total	120,212	

2.5.11 Evacuee

Number of evacuees is calculated on the following condition, and the calculation result is shown in Table 2.5.19.

- All residents of collapsed and heavily damaged residential buildings are forced to evacuate.
- Half number of moderately damaged residential buildings is forced to evacuate.
- Half number of residents who suffered with water inability is forced to evacuated.

Table 2.5.19 Calculated number of evacuees

No	district	Population	Immediately after	One day after	Four days after	One month after
1	Ajapnyak	108,200	51,420	57,297	55,534	52,007
2	Avan	51,000	30,219	35,336	33,801	30,731
3	Arabkir	130,800	68,586	82,376	78,239	69,965
4	Davtashen	41,100	11,899	15,786	14,620	12,288
5	Erebuni	121,900	69,716	78,899	76,144	70,634
6	Kentron	130,600	83,722	90,607	88,542	84,410
7	Malatia-Sebastia	141,800	55,776	62,430	60,433	56,441
8	Nor-Nork	147,000	70,211	88,049	82,697	71,995
9	Nork-Marash	11,300	7,318	8,174	7,917	7,403
10	Nubarashen	9,700	5,021	6,163	5,820	5,135
11	Shengavit	146,500	75,825	85,035	82,272	76,746
12	Kanaker-Zeytun	79,300	39,819	50,135	47,040	40,851
Total		1,119,200	569,531	660,286	633,060	578,607

Among the evacuees, someone may not stay in evacuation points, since they may go to their relatives' houses or stay in hotels or other accommodation facilities, which they keep by themselves. Number of evacuees who stay in evacuation points is calculated on the following experimental formula as shown in Table 2.5.20.

$N_s = N_e \times 0.65$ (Ns: Number of who stay in evacuation points, Ne: Number of evacuees)

Table 2.5.20 Calculated number of evacuees who stay in evacuation points

No	district	Population	Immediately after	One day after	Four days after	One month after
1	Ajapnyak	108,200	33,423	37,243	36,097	33,805
2	Avan	51,000	19,643	22,969	21,971	19,975
3	Arabkir	130,800	44,581	53,544	50,855	45,477
4	Davtashen	41,100	7,734	10,261	9,503	7,987
5	Erebuni	121,900	45,315	51,284	49,493	45,912
6	Kentron	130,600	54,419	58,895	57,552	54,867
7	Malatia-Sebastia	141,800	36,254	40,579	39,282	36,687
8	Nor-Nork	147,000	45,637	57,232	53,753	46,797
9	Nork-Marash	11,300	4,757	5,313	5,146	4,812
10	Nubarashen	9,700	3,263	4,006	3,783	3,338
11	Shengavit	146,500	49,286	55,273	53,477	49,885
12	Kanaker-Zeytun	79,300	25,883	32,587	30,576	26,553
Total		1,119,200	370,195	429,186	411,489	376,094

2.6 Evaluation of urban vulnerability

In Yerevan City, roads, parks/ green areas, etc. are well planned and allocated. Except for the areas where old individual dwellings are densely built, land usage such as residential areas and industrial areas is functionally divided and allocated, and accordingly, the city is well-developed in terms of urban planning. Although the vulnerability of the city can be small in the

above-mentioned viewpoint, it is considered that the vulnerability is increasing due to aging of many buildings, rapid urbanization, and so on. When creating much stronger Yerevan City against earthquakes, the following vulnerable factors should be in consideration.

(1) Vulnerability of the present urban foundations

Layout of road network and road width

In Yerevan City, roads of two lanes each way are designed, like ring roads, surrounding the center; Kentron district. Crossing the ring roads, radial roads towards the out of city are designed as shown in Figure 2.6.1. The above-mentioned main road network should be completed immediately, so that those ring roads and radial roads can be functioning as evacuation roads at the time of earthquake. In Ajapnyak and Nork-Marash districts, where narrow roads of 6 m wide or less are dominant due to geographical strain, it is foreseen that there is difficulty in rescue activities after the occurrence of disasters.



Figure 2.6.1 Road network and the future plan (Yerevan City Master Plan)

Area of parks and green per person

The area of park per person, calculated based on the area of park/green area and the present population shown in Yerevan City Master Plan and data in Yerevan City office, is shown in Table 2.6.1. There is much open space that can be used as evacuation or rescue operation site, but not in all district. In the northeast part of the city, there are few parks or green spaces which are well-accessible and available in disaster time due to the large sloping land. At collective houses in the densely populated urban area, most open spaces are occupied with private stockyard and parking, so this area will not serve as buffer area. Open spaces surrounded by collective houses are not adequate location for evacuation since the mid-to-high-rise houses around them can collapse or disperse debris such as shattered glass after a quake.

Table 2.6.1 Area of park and green areas for general purpose in Yerevan City (Year 2003)

No.	district	Area of park and green area	
		Area (ha)	Area per person (m ² /person)
1	Ajapnyak	12.0	1.12
2	Avan	10.5	2.10
3	Arabkir	122.3	9.30
4	Davtashen	7.8	1.90
5	Erebuni	18.5	1.55
6	Kentron	128.0	9.85
7	Malatia-Sebastia	60.5	4.30
8	Nor-Nork	49.5	3.46
9	Nork-Marash	0.0	0.00
10	Nubarashen	3.1	3.30
11	Shengavit	32.6	2.30
12	Kanaker-Zeytun	95.5	12.25
Total		540.3	4.90

(2) Vulnerability in terms of distribution of buildings

Building of collective houses

According to damage estimation on collective houses (GF2 scenario earthquake), much damage is foreseen in Yerebuni and Shengavit districts, because many old buildings are in the districts. Much damage is also foreseen in the central urban areas in Avan, Nor-Nork, and Arabkir districts.

Buildings of individual houses

According to damage estimation on individual houses (GF2 scenario earthquake), much damage is foreseen in Yerebuni, Atabkir, and Avan districts. Fire outbreak at the time of disaster is also estimated.

(3) Vulnerability on land use and others

Land use surrounding areas of rivers

Concerning land use along rivers in the city, measures against slope failures at the time of earthquakes are required for the steep slopes and surrounding residential areas, located along Frazdan and Nork valleys.

Land use in landslide areas

Measures against landslide at the time of earthquakes are required in Yerebuni district and the southeast area of Nubarashen district. Since there is no collective house and a few individual houses, damage to buildings is not estimated in this area. But, it is foreseen that some parts in this area may be isolated, in case of landslides are active.

(4) Issues in Terms of Redevelopment Projects

Issues in terms of redevelopment projects, identified through analysis of the present situations, are as follows.

- a) Most of redevelopment areas designated by the Master Plan have some topographical and geological restrictions, so these redevelopment projects need not only reconstruction of buildings but also the land reclamation work with countermeasures to the sloping lands and subsidence lands. In addition, redevelopment projects also require a harmonization with its surroundings area by an integrated development that combines improvement of roads (as an infrastructure) and reconstruction of buildings (see Figure 2.6.2).
- b) Progress of reconstruction work in the central part of the City may be a cause of excessive population concentration especially in Kentron district and its vicinity in the future. In order to avoid this situation, it would be expected to create a long-term plan so as to provide housing in the western part of the City (e.g. Adjapnyak district, Malatia Sebastia district and Shengavit district), where a housing land development is going to become popular.
- c) When implementing a redevelopment project, it is necessary not only to promote a reconstruction of buildings by leadership of the developer, but also to introduce public-works (such as parks, open spaces and widening roads, etc) by a subsidy of the City. An integrated project like this may be of a great advantage to urban environment and disaster mitigation

1. Benefits of urban redevelopment viewed from the view point of disaster management

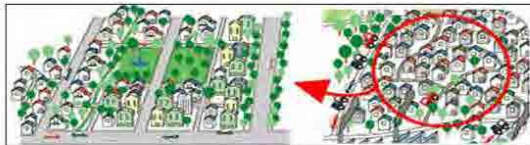
- Reduce the buildings vulnerable to earthquake
- Prevents fire from low-ceiling residential buildings in densely built areas
- Facilitate disaster recovery activities by proper placement and widening of road
- Use as an evacuation base of open space (parks, green space) created by redevelopment

2. Parks and green space created by urban redevelopment

Criteria of provision of public open space in developing activities (Urban Planning Law in Japan)

Development Area (Redevelopment Area)	Urbanized Area		Non-urbanized Area
	Private house	Apartment	
0.3ha - 1 ha	1 % >	2 % >	2 % >
1ha - 5ha	2 % >		4 % >
5ha - 20 ha		3 % >	6 % >
20ha -	3 % >		3 % >

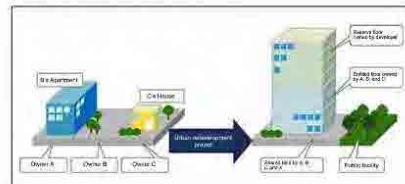
Note: % is a percentage of the development area.



3. How to proceed redevelopment of built-up areas in Japan

■ Urban redevelopment project (three-dimensional development)

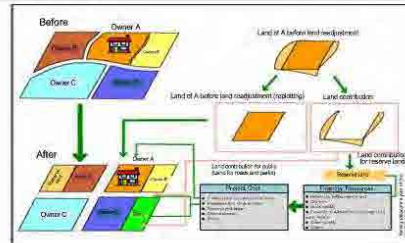
Developer (city or private entity) builds a redeveloped building with facial readjustment such as street, square, park, etc. Owners in the redevelopment area can get a right of the land and floor of redeveloped building that is the same appraised value of original land and building. This is called "right exchange".



Source: Practical Handbook for Urban Redevelopment (2007, Supervision by Ministry of Land, Infrastructure and Transport of Japan)

■ Land adjustment project (two-dimensional development)

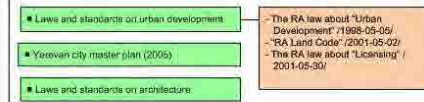
Developer (union or public entity) develops facial readjustment such as streets and parks. In order to create reserve land, parks and street in the land adjustment area, land of original land owner in the land adjustment area is reduced, though land owner can use land conveniently in the plotted land.



Source: Practical Handbook for Urban Redevelopment (2007, Supervision by Ministry of Land, Infrastructure and Transport of Japan)

4. Laws, standards and procedures on urban redevelopment in the republic of Armenia

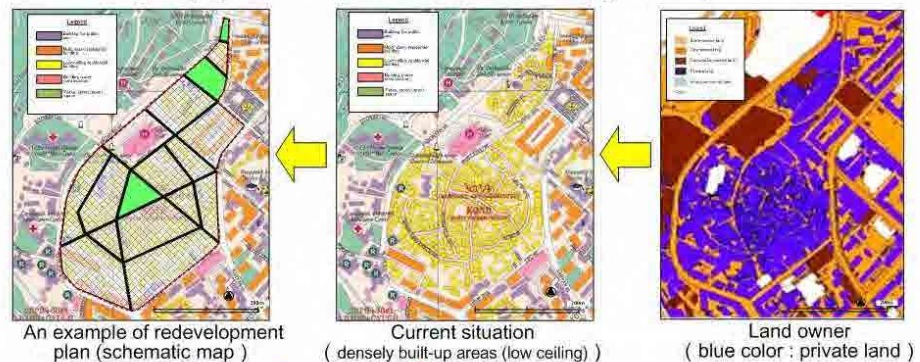
- Laws, standards and procedures on urban development in Armenia has been developed originally in the era of the former Soviet Union. Laws and its institutional framework including technical aspects have not changed essentially, its application has become difficult after independence.



5. Current status and Issues on urban redevelopment in the republic of Armenia

- Redevelopment area in the master plan of urban planning is to determine as mayor's decision that has a force for removal of residents.
- Plan of redevelopment project is elaborated by private developer, its procedures on application, examination and decision are executed based on laws and mayor's decision.
- Implementation of the redevelopment is depending on willingness to invest (profitability) by private developer, development of public facilities such as roads and parks that are harmonized with reconstruction of building.
- As a result of financial difficulties of the city, development of public infrastructure to promote redevelopment project executed by private investment is not improved smoothly, and most redevelopment projects have been delayed.

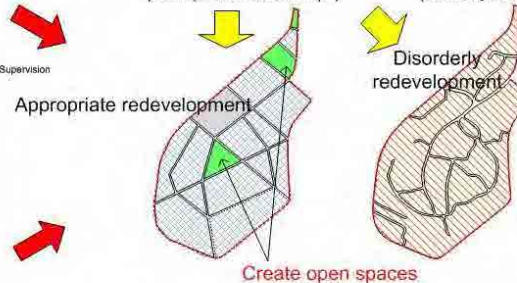
6. Redevelopment project in the area of KONDA, Kentron District (Approx. 7ha)



An example of redevelopment plan (schematic map)

Current situation (densely built-up areas (low ceiling))

Land owner (blue color : private land)



Appropriate redevelopment

Disorderly redevelopment

Create open spaces

- Benefits of appropriate urban redevelopment
 - ✓ Improvement of living environment by proper layout of streets.
 - ✓ Improvement of urban environment as a result of creation of parks and green spaces.
 - ✓ Prevention of disorderly reconstruction of building
 - ✓ Increase of asset value as a result of integral development such as street and development of infrastructure.
 - ✓ Secure open spaces and evacuation road for evacuation activities and recovery work in a time of disaster.

Current Status and Issues on Land Use / Urban Planning in Yerevan City

- Improvement of urban redevelopment for disaster management -

Figure 2.6.2 Issues on Urban Redevelopment of Yerevan City

Chapter 3 Basic responsibilities of risk management entities

3.1 Fundamental principles

Disaster risk management is carried out in three levels; individual, community, and government levels.

In order to reduce risks of earthquake disaster, each of residents shall engage self-help activities under the awareness of “You should protect your life and properties.” The community (community groups in companies and schools) shall engage in mutual-help activities under the concept of “You should be responsible for protecting your community.” City and republican governments shall implement measures, including support/ promotion of self-help and mutual-help activities, in order “to create much stronger Yerevan City against earthquakes.”

The three-level of entities should fulfill activities shown in this Plan, under which all of them play the chief of role, toward achieving goal mentioned in Chapter 1.

3.2 Responsibilities of governments

In order to create much stronger Yerevan City, the city and republican governments should disseminate the contents of measures shown in this Plan to residents and related organizations, and then, implement/promote activities for mitigation and preparedness, allocating necessary budget.

In case of occurrence of earthquake disaster, the governments should carry out emergency response such as rescue, evacuation, medical care, so that damage should be minimized.

After suffering earthquake damages, the governments should prepare detailed plans for rehabilitation and reconstruction, according to the actual damage situations, based on the outlines on the planning mentioned in this Plan. In accordance with the detailed plans, rehabilitation activities will be done for prompt recovery to the situation before the earthquake disaster, and then, reconstruction activities to be done in order “to create much stronger Yerevan City.”

The governments also promote and support disaster management activities by communities for “protecting their communities” and by residents for “protecting their life and property.”

3.3 Responsibilities of communities

In this Plan, a community means all building and constructions in the range of 500m around school. Units of communities established in this plan, and organizations related to disaster management are included in community based disaster management activities Residents’ associations for operation and maintenance of collective houses are expected to be community units for promoting disaster management activities.

Each community has staffs such as responsible personnel of evacuation unit (the head of evacuation supporting group in each school, approved in Mayor’s decision on “plan of evacuation of population of Yerevan City in case of a severe earthquake), authorized persons of residential buildings, heads of organizations in each community, and other officials of responsible official organizations.

For smooth implementation of disaster management activities in ordinary time and emergency situation, it is necessary create sub-groups for overall coordination, building safety inspection, disaster education, transfer of information, education, rescuing and first medical aid in each community.

Communities should create internal organizational framework for implementation of important measures, such as communication with parents, measures for provision of security of pupils, provision of security of roads between school and pupils' home, provision of security of evacuation routes, primary rescue and anti-fire measures, medical aid, provision of security of residents and their property, etc. The tasks, responsibility, and activities of communities are defined in this plan.

In the present situations, few associations carry out operation and maintenance activities efficiently. Therefore, it seems difficult that the residents' association to be bases of disaster management activities in communities. It is recommendable that the residents' associations to be reinforced in terms of activities, and disaster management activities to be involved as a part of the activities.

Each community should autonomously carry out earthquake disaster management activities, under the concept of "You should be responsible for protecting your community", in accordance with disaster management plan of the community approved by city's government, through receiving guidance and support from city and republican governments.

In case of occurrence of earthquake disaster, firstly, individual residents protect their life and properties, and then, the residents should protect the life and properties of the members of the community, so that damage in the community to be minimized. After suffering earthquake damage, the communities should autonomously contribute to formulating plans for rehabilitation/reconstruction, and then, carry out autonomously rehabilitation/ reconstruction activities in order "to create much stronger Yerevan City."

3.4 Responsibilities of residents

Just after an earthquake disaster, it is not possible to expect to have assistant activities of the governments, such as rescue and initial fire fighting. It is also considered that most of all victims can not receive sufficient assistance, even passing certain time after the disaster. Therefore, it is necessary for each resident to secure own safety firstly, under the awareness of "You should protect your life and properties."

After suffering earthquake disaster, residents should recognize his/her responsibility as a member of community and cooperate with community members, thinking much of mutual-help, in order to recover/stabilize his/her daily life cycle and reconstruction of urban cycle.

Residents should collaborate to formulate disaster management measures which governments and related organizations carry out, in order "to create much stronger Yerevan City." and then, contribute to implementing the measures, such as participating autonomously the activities for the implementation.

3.5 Responsibilities of related organizations

Related organizations mentioned in Government Decision N919 (2010) and Mayor's Decision N940A (2010) are shown in Table 3.5.1. Those organizations should carry out disaster management activities to fulfil the allocated tasks, in cooperation with city and republican governments.

Table 3.5.1 Major Related Organizations

Government Decision N919 (2010)	Mayor's Decision N940A (2010)
<ul style="list-style-type: none">- All 18 Ministries of RA- National Security Service under RA- Police of RA- State Committee of Real Estate Cadaster under RA- State Revenue Committee under RA- General Department of Civil Aviation under RA- Administrations of Marzes and Yerevan City- Council of Public TV-Radio Company of RA- Local (district) administrations in Marzes and Erevan City	<ul style="list-style-type: none">- 20 departments and sections in Yerevan City- 12 district offices in Yerevan City- Chief Architect of Yerevan City- Yerevan Garrison- Yerevan City Department of Police of RA- National Security Service of Yerevan City- "Yerevan Gas" CJSC- State Hygene and Anti-epidemiological Inspection of M. of Health- "Yerevan City Light" CJSC- "Yerevan Djur" CJSC- "Electrical Networks of Armenia" CJSC- "High VoltageElectrical Networks" CJSC

Part 2 Mitigation Plan

Chapter 4 The city's governance related to implementation of mitigation measures

4.1 Role of the city

Mitigation measures, such as seismic reinforcement of buildings etc. are very effective for the reduction of the earthquake damage. At present different measures are taken in Yerevan City for the reduction of possible damage of the earthquake, such as observation of earthquakes, seismic reinforcement of buildings, conduct of exercises and courses and so on. For further reduction of possible damage of the earthquake in Yerevan City the following is recommended.

- a) The city manages its implementation of each of the planned items shown from Chapters 11 to 22. It assigns departments and organizations to implementation of the plan. Then, the assigned departments and organizations formulate detailed annual plans, secure budget and assign personnel.
- b) The city appoints its staff as emergency response managers, who monitor the progress of each of the detailed plans and provide instructions and assistance for smooth implementation. Also, it makes necessary coordination/ directions based on reports from the managers.
- c) Upon receiving reports on the progress of the detailed plans from the emergency response managers, the city assesses the results, and incorporates them into planning and target setting for the next fiscal year.

4.2 The city's governance for implementation/ assistance of measures and the principles of activities

The present plan is put into action after being approved by the Mayor of Yerevan City. Yerevan Rescue Department of RS of Ministry of Emergency Situations is responsible for the implementation of certain parts of the Plan and fulfills the following functions as a coordination center.

- a) Provision of assistance to the staffs of Yerevan City in checking of detailed plans and budgets, distribution of the staff of corresponding bodies and organizations, coordination of measures taken by the plans of reduction of possible consequences of the earthquake, discussion of plans and delegation of orders for the revision of plans.
- b) Observation of intermediate results of implementation of detailed plans and summarizing to provide assistance to Yerevan City for the preparation of relevant instructions.
- c) Observation of the results of implementation of the detailed plans after the end of reporting period and summarizing for the evaluation the results and inclusion in the plans of the next year by the city aimed at providing assistance in designation of new measures.

For steady implementation of measures, organizations in charge should be clarified. The organizations in charge are classified into three categories as shown in Table 4.2.1.

Table 4.2.1 Classification of organizations and divisions relating to mitigation plan

Supervising divisions	The departments of Yerevan City which are responsible for the realization of detailed plans and carry out relevant supervision and coordination
Main implementing divisions/organizations	Division/ organizations direct implement detailed plans. The implementation should be carried out based on clear sharing of roles and cooperation.
Supporting divisions and bodies	Cooperating divisions and bodies providing assistance to divisions/organizations which are the main implementation of plans.

Chapter 5 Quake-resistant human development

Provision of reliable human potential under the circumstances of natural disasters is a task of Yerevan City, which needs implementation of measures aimed at deliberate approach of servants of the city's administration and population to response for prevention of emergency situations and elimination of consequences and improvement of their capabilities during practical trainings in case of emergency situations.

5.1 Role of residents

It is necessary to secure corresponding preparedness of population for avoiding disastrous consequences of earthquake based on delivery of distinct knowledge on action without panic during emergency situations and behavior in case of earthquake, based on the principle of "You should protect your life and properties".

Therefore, the population needs to previously implement measures by own initiation aimed at minimization of the scales of disaster and securing own preparedness for actions in case of ES as shown in Table 5.1.1.

Table 5.1.1 Mitigation/ preparedness activities by residents

Mitigation	<ul style="list-style-type: none"> 1. Creating associations of residents' in collective houses 2. Securing earthquake-resistance and fire security in houses 3. Fire prevention 4. Fixation of furniture, shelves, wardrobes, protection of glasses of windows 5. Prophylactic inspection and fixation of walls, securing security of facing of buildings 6. Participation in works of creation of systems of mutual assistance by schools, condominiums and other organizations in the frames of local administrative areas 7. Expansion of availability of knowledge and information on measures of prevention of emergency situations and elimination of consequences
Preparedness	<ul style="list-style-type: none"> 8. Provision of fire extinguishers and other firefighting tools in advance 9. Provision of reserves of food, water, mobile radio station, pocket lanterns, medicine and other staples (for at least 3 days) 10. Allotment of duties among family members in case of ES in advance; making decision of gathering place, communication means, order and routes of evacuation 11. Active participation in trainings and other measures, organized by municipal authorities and local communities 12. Provision of information to condominiums and other local bodies about those members of family, who need a special care

Detail description of measures aimed at reduction of damage is given in Clause 5.2, and measures of preparedness to emergency situations in Clauses 11.1 and 11.2.

5.2 Promotion of autonomous disaster management activities of residents

5.2.1 Creating associations of residents' in collective houses

Total number of private houses of Yerevan City is approximately 42,630 with population of approximately 170 thousand (data of 2007).

Proposals on activation of mitigation activities at the individual level are separately stated in this plan, named "Plan of preparedness to possible earthquakes for administrative areas". It is necessary to note that the "local community" conception is limited in administrative areas, economic entities and general educational institutions, except the unions of residents. The activity

of staffs of existing districts is completely aimed at solution of communal tasks, such as waste disposal of subordinate areas and does not include collective measures of any other group. Besides, currently waste disposal of subordinate areas in initially existing 12 districts is continued in no more than half of them. Participation of population in organization of measures of preparedness to emergency situations is possible only, if new kind of unions are created according to territorial principle.

Regional subdivisions of Ministry of Emergency Situations should organize measures in such condition for transforming the existing structures to associations of collective preparedness during emergency situations, under assistance of Ministry of Emergency Situations and communal services.

5.2.2 Securing seismic and fire security in houses

Main causes of human losses in case of earthquake disasters are first of all death under fragments of buildings and constructions and death because of fire. Concerning the above-mentioned circumstances, the most efficient method of reduction of deaths is the increase of seismic and fire stability of buildings and constructions. Currently most part of the housing stock is a private property of population, which transfers the implementation of measures for securing seismic and fire stability to the field of personal responsibility of owner of the apartment. Centralized implementation of necessary works in case of multi-apartment buildings is difficult, which is conditioned by the necessity of receiving agreement of each resident as a full member of condominium. Thus, distinct understanding of “You should protect your life and properties” principle is important through implementation of securing seismic and fire security of personal apartments, and also participation in corresponding measures, organized by condominium.

The Ministry of Urban Development should support the population regarding the works of reinforcement of apartments and should provide necessary technical data for implementation of those works. Concrete proposals, regarding concrete measures in mentioned directions, are stated in Clauses 8.1 and 8.2.

5.2.3 Fire prevention

Besides the direct damage caused by seismic motions during earthquake, there is a concern about increase of scales of secondary damages by fires. Most part of housing stock is equipped with individual heating systems and is supplied with gas, which generally shows the high level of risk of fires. Electric heating devices and gas stoves, which are being used by population, should also be considered as potential causes of considerable fires.

The task of MES is the development of projects aimed at increase of knowledge of population in the field of fire security through corresponding theoretical and practical studies (see Table 5.2.1) with participation of employees of state inspection of fire security.

Table 5.2.1 Items for fire prevention to be instructed to residents

Preparedness for fire prevention
1. Equipment of apartments by anti-fire sensors
2. Compulsory equipment by fire extinguishers; provision of permanent resources of water (by possible pots)
3. Equipment of apartments by automatic devices for firefighting, electricity shutdown and gas stoppage in case of leakage
4. Compulsory fixation of unstable electronic devices towards vibrations
5. Securing fire-proof covering in those areas, where open fire is used
6. Equipping apartments with anti-fire curtains and other technical means
7. Securing control of processing of inflammable and dangerous materials and items
Education and training for fire prevention
8. Earthquake imitator: usage of training equipments
9. Making the habit of turning off the fire to automatic performance even during weak vibrations
10. Notifying the population about three most important periods of shutting down the electricity and gas: during weak vibrations, after main vibrations and in case of fire
11. Notifying population about necessity of completely stopping the power and closing gas valves during short term
12. Notifying population about measures of securing security of usage of alternative heating systems regarding the termination of activity of power supply system
13. Notifying population about danger of fire during recovery of activity of power supply system

5.2.4 Fixation of furniture, shelves, protection of glasses of windows

Absence of signs of external destructions during earthquake may also lead to human losses, regarding the falling of furniture or its separate parts and break of glasses. Therefore, the population should secure preventive measures: fix the televisions, furniture and its parts, avoid big size furniture items in bedrooms, fix the glasses of windows by protective membranes.

5.2.5 Prophylactic inspection and fixation of walls, securing security of facing of buildings

Strengthening of external walls of residential buildings is important for prevention of collapses and damages of residents and passersby during vibrations. Necessity of securing of sufficient strength of walls of external balconies and deformed rooms should be separately stated.

5.2.6 Participation in works of creation of mutual assistance systems, conducted by schools, condominiums and other organizations in the frames of administrative areas

Practical implementation of measures of securing preparedness of emergency situations, stated in sixth chapter, is impossible without active participation of residents. Securing active involvement of residents in the works of creation of local mutual assistance systems is important, which will be the base of preparedness of administrative areas to possible disasters.

5.2.7 Expansion of availability of knowledge and information on measures of prevention of emergency situations and elimination of consequence

Self-willed aspiration of population for receiving practical knowledge and information based on educational programs on measures of prevention of emergency situations and elimination of consequences, organized by MES (see Clause 5.3.2), condominiums and mass media (see Clause 6.6), is important.

5.3 Raising awareness of disaster management and dissemination of disaster information

5.3.1 Curriculum for staffs of administration

The most important task of the city is the protection of life, health and property of population during emergency situations, which requires provision of corresponding education of staffs of administration by executive bodies, aimed at increase of their awareness on measures of prevention of emergency situations and elimination of consequences and capability of confident action during emergency situations and making substantiate decisions.

The staffs of administration, involved in the field of emergency situations and civil defense, should pass theoretical and practical studies by 15 hours education programs in Crisis Management Academy of Ministry of Emergency Situations, including 9 hours of general lessons and 6 hours of lessons of specialization. The staffs of other sections of administration should participate in collective educational programs, periodically organized in administration, aimed at not only studying the main materials of measures of prevention of emergency situations and elimination of consequences, but also at familiarization of staffs with the order of organization of works of each section during emergency situations, duties of each staffs and possible models of behavior during abnormal situations.

Educational guidelines on the contents shown in Table 5.3.1 are carried out by the Crisis Management Academy of Ministry of Emergency Situations.

Table 5.3.1 The contents of disaster education for officials

- | |
|--|
| <ol style="list-style-type: none">1. Basic knowledge of occurrence mechanisms and movement of earthquakes.2. Knowledge of earthquake measures currently implemented3. Daily preparations for earthquakes4. Notification of evacuation shelters and evacuation methods in time of earthquake5. Rescue / first aid methods |
|--|

5.3.2 Dissemination of information among population on measures of securing preparedness during emergency situations

Emergency situations and civil defense section, by support of Crisis Management Academy, should organize works of increase of awareness and deliberate approach of population on securing preparedness to possible disasters through organization of distribution of propagandistic sheets, workshops, topical exhibition-fairs, together with active usage of potential of mass media. At the same time, it is necessary to pay special attention to the groups of vulnerable people, who have problems related to accessibility of information.

(1) Methods of dissemination of information

It is recommended to organize dissemination of information by the method given in Table 5.3.2.

Table 5.3.2 Methods of dissemination of information on measures of securing preparedness to emergency situations among population

1. Meetings in administrative areas
2. Instruction and provision of methodical assistance to persons and organizations, working at schools, condominiums and other entities
3. Familiarizing population with hazard and risk maps
4. Preparation and distribution of educational sheets, documentary films and other propagandistic materials
5. Usage of potential of all kinds of mass media
6. Organization of workshops, exhibition-fairs, installation of propagandistic boards

(2) The contents of information

It is suggested to disseminate information among population with the following content.

a) Information on nature of earthquake

Simple and accessible explanations on mechanisms of occurrence of earthquakes, nature of spreading of seismic waves, vibrations of earth's crust. Familiarization with hazard and risk maps.

b) On-going works of ES bodies for securing preparedness to earthquake

Familiarization of population with functions, implemented by MES and other bodies, which are involved in works of prevention of earthquake and elimination of consequences.

c) Preventive measures of securing personal security

Familiarization with measures of reduction of damages of possible disaster and securing personal preparedness to earthquake (see Clauses 5.1., 5.2., 11.1. and 11.2).

d) Installation of gathering points of population and shelters: evacuation order

Works of Ministry of Emergency Situations for familiarizing population on gathering points of population and shelters, evacuation order by the use of evacuation maps, composed according to residential areas, and secure routes.

e) Order of traffic control in the city in case of earthquake: rules of behavior of drivers

Works, conducted by Ministry of Emergency Situations and public order service for familiarization with the rules of behavior of population (drivers, passengers) during earthquake (see Table 5.3.3).

Table 5.3.3 Rules of behavior of drivers during earthquake

1. Maintenance of security measures and rules, when sensing underground vibrations
2. Collection of data about the state of traffic
3. Execution of instructions of road police
4. Blocking of evacuation by transport vehicles
5. Parking order of transport vehicles in case of evacuation

f) Process of rescue and first medical aid

Education of methods of providing independent urgent medical aid (recovery of cardiac performance and breathing, stoppage of acute bleeding) of population by Ministry of Emergency Situations and Ministry of Healthcare. Thus, securing reduction of number of

irrevocable losses in case of emergency situations.

Chapter 6 Quake-resistant Community Development

6.1 Role of Community

In the past severe earthquake disasters, many people's lives were saved with the autonomous efforts of people in communities, such as initial fire extinguishing, rescue, first aid, evacuation. Communities (Resident's associations, companies, and schools) should establish organizational framework for preparation against disasters, collaborating each other, under the concept of "You should be responsible for protecting your community." In order to enhance awareness and capacity on disaster management in the community as well as individual community members, all member should carry out activities for mitigation and preparedness against earthquake disasters, mentioned in Table 6.1.1. The detailed description/ explanation of the activities is on Clause 6.2 for mitigation and Chapter 11 for preparedness.

Table 6.1.1 Mitigation/ preparedness activities by communities

Mitigation	<ol style="list-style-type: none">1. Creation and enhancement of autonomous groups on disaster management2. Formulation of a disaster management plan for each community3. Promotion of aseismic reinforcement of buildings and facilities (retrofitting and renewal)4. Promotion of measures, preventing turn-down of furniture, fall-down of window glass, etc.5. Preparation of disaster education materials and promotion of disaster management education6. Fire protection and safety for hazardous materials
Preparedness	<ol style="list-style-type: none">7. Stockpile of water, food, and daily necessities and stockpile/ maintenance/ regular inspection of disaster management equipment8. Creation of a list of community members (residents, employees, teachers / pupils), a list of people needing assistance, a contact list of disaster management organizations.9. Creation of a disaster management map, preparation and notification of assistance facilities such as evacuation shelters10. Preparation for protection/ assistance of community members and residents11. Improving the response capacity and giving advice on what to do in time of earthquake disaster by disaster drills and seminars

6.1.1 Role of residents' associations of collective houses

Since many people stay in collective houses in the center of Yerevan, it is recommendable that the residents in the same building or same entrance establish autonomously a group for disaster management. The group will establish organizational framework for cooperation among the members and carry out activities mentioned in Table 6.1.1.

6.1.2 Role of enterprises

Companies should play a role in society on disaster management, as a member of local society.

For the role, enterprises should secure safety of the facilities and employees/ visitors, maintain economic activities, and contribute to local society. Enterprises should autonomously carry out activities shown in Table 6.1.1 with their own expense basically.

6.1.3 Role of schools

In schools, it is indispensable to carry out regular disaster management activities in order to secure safety of pupils at the time of disaster. Particularly, disaster education to young generation is

efficient, and promotion of the education is an important role of schools. Schools should carry out activities shown in Table 6.1.1, aiming at cultivating practical capacity on disaster management.

6.2 Creation and enhancement of autonomous groups on disaster management

(1) Creation of the groups in residents' associations

It is recommendable to create an autonomous group on disaster management in each community. In a group, sub-group should be established to share important tasks such as fire-fighting, rescue, first aid, information transfer, disaster education, support of daily life, sanitation, support of vulnerable people, safety inspection, security, repairing of facilities. Since it is necessary to carry out shared activities on routine basis for smooth operation of emergency response, activities to be carried out on routine basis should be defined for each sub-group. Based on lessons obtained through the routine activities such as training, the defined activities should be reviewed and updated, and organizational framework should be adjusted to the local situations.

(2) Enhancement of the groups in enterprises

In each important company (such as large-scale enterprises and enterprises in which many people gather), a group for civil defense has been established and a responsible staff has been appointed. The group should promote increase knowledge and technique of staffs for disaster management through conducting training and lectures.

In case of disaster/accident in enterprises which deal with dangerous or fiery materials shown in Table 6.8.1, it is foreseeable that the surrounding areas suffer serious influence. Accordingly, the enterprises should enhance the capacities for disaster management, such as increase of knowledge and technique for safety, betterment of equipment and materials for disaster management, reinforcement of cooperation among enterprises and related organizations.

(3) Enhancement of the groups in schools

In each school, a group for civil defense has been established and a responsible staff has been appointed. For smooth activities for disaster management in ordinary time and emergency situation, it is necessary to establish sub-groups having tasks on general coordination, safety inspection of facilities, disaster education, information transfer, training, rescue, and first aid. The group should establish internal organizational framework for the fulfilling important measures, such as communication with parents, safety securing measures of pupils, securing safe route between the school and houses of pupils.

6.3 Formulation of a disaster management plan of community

Each community should prepare own disaster management by itself, aiming at reinforcing their capacity on disaster management, considering particular situation of each community. In the plan, organizational framework and financial sources should be clarified, in order to secure continual implementation of the measures mentioned in the plan.

(1) Formulation of a disaster management plan for each residents' association

Residents' associations of collective houses should prepare own disaster management plan, regardless the scale of the associations. The associations regularly review and update the plan, based on information/ lessons, obtained through their activities such as training. Contents to be covered in the plan are shown in Table 6.3.1.

Table 6.3.1 Contents to be covered in a disaster management plan for residents' associations

1. Purpose of the plan
2. Basic concept
3. Outline of the association (population, number of buildings, structures of buildings, land use in surrounding areas, etc.)
4. Characteristics of the result of damage estimation
5. Internal organizational framework and tasks of the internal organizations
6. List of equipment/ materials to be prepared for disaster management and location of the storehouse
7. Disaster management map, including list of evacuation points, particular risks in the community, disaster management resources
8. Characteristics of buildings, issues on disaster management, and evacuation route
9. Preparation for disaster management by community members
10. Action plan and financial plan
11. Contact addresses of local organizations related to disaster management

(2) Formulation of a disaster management plan for each company

Enterprises should a disaster management plan for each company, which includes the contents shown in Table 6.3.2, regardless its kind of works and scale. In addition, enterprises should prepare a manual for rehabilitation/ reconstruction.

Table 6.3.2 Contents to be covered in a disaster management plan for enterprises

1. Purpose of the plan
2. Outline of the company
3. Basic concept on business continuity
4. Responsible staffs and their tasks on business continuity plan (BCP)
5. Characteristics of the result of damage estimation
6. Core business items and target timing of the rehabilitation
7. Action plan and financial plan for measures for business continuity
8. Plan of education and training for familiarization of BCP
9. Emergency measures against foreseeable situation of disaster
10. Contribution plan to surrounding local communities

(3) Formulation of a disaster management plan for each school

Schools should prepare a disaster management plan for each school for securing safety of pupils and teachers, and then, carry out preparative activities properly. Contents to be covered in the plan are shown in Table 6.3.3.

Table 6.3.3 Contents to be covered in a disaster management plan for schools

1. Purpose of the plan
2. Organizational framework in the school both in ordinary time and emergency and task sharing
3. Measures for aseismic reinforcing and safety of facilities and equipment
4. Forms of inspection sheets for equipment and materials
5. Emergency response plan in chronological order (including safety confirmation and recording form of the injured)
6. Manual for handover pupils to the parents or relatives
7. Quick re-open plan of school activity and its financial plan
8. A plan for responding inquiry from the outside
9. A plan for opening an evacuation point in the school (for designated school)

6.4 Promotion of aseismic reinforcement of buildings and facilities

The most important measures on earthquake disaster management is aseismic reinforcement of buildings. Communities should take following actions or measures.

(1) Promotion of aseismic reinforcement of collective houses by residents' groups

Residents' groups of collective houses should conduct seismic diagnosis of collective houses to clarify aseismic capacity of the buildings. According to the result of the diagnosis, if required, measure on aseismic reinforcement (retrofitting, new construction, etc.) should be taken.

For the promotion of aseismic reinforcement of collective houses, the residents' groups should make consensus of residents, collect money, seek official fund assistance, carry out other office procedures, etc.

(2) Promotion of aseismic reinforcement of buildings and facilities in enterprises

In case that buildings and facilities are suffered with damage by earthquakes, staffs and visitors in the enterprises are endangered, and the enterprises will be in difficulty in business continuity and fulfilling functions to support local societies. In addition, serious secondary disasters such as fire breakout or explosion may occur due to damage to facilities of dangerous and fiery materials. In order to reduce those risks, enterprises should promote aseismic reinforcement of buildings and facilities by their own responsibility.

(3) Promotion of aseismic reinforcement of buildings and facilities in schools

In order to secure safety of pupils and teachers, it is very important to reinforce buildings and facilities in schools. Some schools are designated to be evacuation points. Therefore, aseismic reinforcement in schools should be done immediately as the most important issue, with guidance of city and republican governments.

6.5 Promotion of measures, preventing turn-down of furniture, fall-down of window glass, etc.

(1) Promotion of measures for preventing turn-over of furniture/ shelves, fall-down of window glass, etc by residents' associations of collective houses

Residents' associations of collective houses should promote for prevention on furniture and window glass of the properties of individual families which should be done by residents, through organizing seminars, distribution of educational materials. For the areas which the associations manage, the prevention measures should be taken with the responsibility of the associations.

(2) Promotion of measures for preventing turn-down of furniture, fall-down of window glass, etc.

Enterprises should take measures for preventing turn-down of shelves, turn-down of window glass, etc. in order to fulfill functions and tasks such as reducing human damages to the staffs, business continuity, support to local communities, etc. Since turn-down of storage shelves of dangerous materials and fall-down of the containers of dangerous materials cause serious secondary disasters such as fire and explosion, sufficient prevention measure should be taken.

(3) Promotion of measures for preventing turn-down of shelves, fall-down of window glass, etc.

Schools should take measures such as fixing shelves, sticking plastic films on window glass for preventing fly-apart of broken pieces, safety storage of dangerous materials for laboratory use, installing protecting tools against fall-down of equipment and educational materials, etc.

6.6 Development of disaster education materials and promotion of disaster education

Crisis Management Academy, RS prepares of disaster education materials. Communities should proactively participate the preparation works, and carry out disaster education to the community members, using the prepared education materials. The purpose of the disaster education is mentioned in Table 6.6.1.

Table 6.6.1 Purpose of disaster education in communities

1. Understanding basic points on earthquake disaster and its management
2. Raising awareness on disaster management
3. Developing ability for proper judgment and action against earthquake disasters
4. Developing ability to contribute assisting other affected areas

(1) Promotion of disaster education in communities

It is recommendable to establish system that Crisis Management State Academy carry out disaster management education to leaders of residents' associations of collective houses (training of teachers), and then, the educated leaders carry out disaster education to community members on the purpose of dissemination of knowledge on disaster management (see clause 5.3.2). In the disaster education in communities, the leaders should carry out education to the members for raising awareness and leaning basic knowledge. In addition, specialized knowledge should be introduced by specialists invited. Sources of information on disaster management such as TV programs, web pages, magazines, etc. should be introduced in the education.

(2) Promotion of disaster education in enterprises

Crisis Management State Academy should carry out regular disaster education to staffs being in charge of disaster management in enterprises that deal with dangerous and fiery materials. In the enterprises, the educated staffs should carry out disaster education to all staffs. The education should include a content for obtaining special knowledge of disaster management on dangerous/flammable materials, equipment, etc. that used in the enterprises.

(3) Promotion of disaster education in schools

In schools, organizational framework for promotion of disaster education should be established, which mainly consists of members of sub-group for disaster education (see clause 6.3 (3)). The sub-group for disaster education should prepare a plan of annual disaster education which covers all contents of the education, in cooperation with related organizations, considering age of pupils and characteristics of local situation. There is an obligatory curriculum for disaster education; one class in a week, for higher-age pupils in schools. The contents on disaster education in the class should be enhanced. Education materials that are prepared in Crisis Management State Academy, should be vivid and impressive ones and possible for learning through doing (see clause 6.10 (5)).

6.7 Prevention of fire outbreak

Communities should take measures for preventing fire outbreak, such as reinforcement of buildings which may cause fire outbreak, introducing less flammable facilities, preparing/ preventive materials (see Table 6.7.1) for fire fighting, raising awareness of members for the prevention, etc. In addition to the above-mentioned measures, communities should take following measures. Measures in enterprises, which deal with flammable materials, are a particularly important issue.

Table 6.7.1 Materials to be prepared by communities for prevention of fire

For individuals
1. Helmet
2. Wear and shoes for fire-fighting
3. Portable lighting tool
4. Warning and signal transmission tool such as a whistle
For communities
5. Fire extinguishers
6. Tools of dismantling
7. Loudspeakers
8. Rescue equipment and First Aid Kits
9. Communication devices
10. Dust masks

(1) Safety of facilities and equipment using fire

Communities, especially enterprises using fire, should take safety measures such as fixing facilities/ equipment using fire, securing space around the facilities/ equipment, attaching automatic extinguishing tools to the facilities/ equipment, etc. In order to secure proper function, communities should carry out maintenance and inspection of the facilities and equipment.

(2) Prevention of fire in facilities, storing/ using fiery materials such as gasoline

Communities, especially enterprises, using/storing fiery materials such as gasoline, should take measures for reinforcing facilities and preventing fire.

(3) Prevention of fire in facilities, storing/ using explosive materials such as gas

Communities should take measures to prevent gas fire, such as installation of alarm system for gas leakage, installation of emergency shut-down devices, etc. Further measures for preventing fire by gas leakage should be taken, such as fixing of gas containers, strengthening of gas pipes, etc.

(4) Prevention of fire in facilities, storing explosive materials

Enterprises are required by regulation to store explosive into safe storage, and strict safety and technical standards have been applied. Concerned enterprises should take measures, in accordance with the regulation.

(5) Prevention of fire from chemical products and electric facilities

a) Prevention fire from chemicals

Schools, hospitals, institutes, which use chemicals, should take measures, based on the result of evaluation on possibility of fire, due to mixing of chemicals.

b) Prevention of fire from electric facilities

Electric enterprises should follow the regulation for prevention of fire of electric facilities such as facilities for power generation, transmission, and distribution. The facilities should be inspected and maintained by trained engineers. In addition, the enterprises should promote to install aseismic and anti-fire facilities.

c) Prevention of fire from electric devices

Electric enterprises should promote to develop and disseminate reliable safety shutdown system, for fire outbreak from electric devices and electric wires at the time of earthquakes.

(6) Prevention of fire where many people gather

Managers of facilities where many people gather, such as restaurants, shopping centers, and hospitals, should prepare manual for the employees for emergency response in case of fire. The managers should take fire prevention measures, such as installation of tools for preventing turn-down of facilities/ equipment, using fire.

6.8 Safety measures on dangerous materials

In facilities which store/ transport/ use dangerous materials, damage to storage tanks, pipelines, distribution facilities is foreseeable. Due to the damage, leakage/ contamination/ spreading of poisonous or pollution materials occur, and serious influence in wide areas is foreseen. Enterprises, dealing with dangerous materials, should promote measures for increasing aseismic capacity and safety of the facilities.

(1) Intended dangerous materials for measures

Dangerous materials, requiring to take safety measure in the facilities of storage and transport at the time of earthquake, are shown in Table 6.8.1.

Table 6.8.1 Dangerous materials, requiring to take safety measures

1. Harmful chemicals (Ammonia, chlorine, etc.)
2. Harmful biological substances (Bacteria, disease germ, virus, etc.)
3. Radioactive materials (Cobalt, strontium, cesium, etc.)
4. Petroleum
5. Explosives
6. High-pressure gas, explosive gas, etc.
7. Poisons, etc.
8. Dangerous or poisonous animals and plants

(2) Disaster management in enterprises, dealing with dangerous materials

Ministry of Emergency Situations supervises disaster management issues of enterprises, dealing with dangerous materials. Under the guidance and instruction of Ministry of Emergency Situations, enterprises should prepare a safety management plan and take safety measures on dangerous facilities, considering influence by earthquakes.

(3) Safety measures for dangerous facilities

Enterprises, dealing with dangerous materials should take following safety measures.

- a) Companies should prepare a safety rule and disaster management plan, in accordance with regulations and standards for the approval of Ministry of Emergency Situations. The plan should be based on the estimation of affected area and influence to residents, incase that the facilities are damaged due to an earthquake.
- b) Organization for urgent damage investigation, communication, and response at the time of the accident, should be clarified beforehand.
- c) Inspection by Ministry of Emergency Situations should be done for verification of proper implementation of safety measures, in accordance with regulations and plan.
- d) For new facilities, completion inspection and regular safety inspection of the facilities should be done. For existing facilities, seismic diagnosis should be done to clarify the seismic resistance, and necessary aseismic measures should be taken, according to the result of the diagnosis.
- e) According to the disaster management plan, training and seminars should be done for verification of effectiveness of the measures, learning technique on safety, confirming proper way of safety inspection, acquiring ability on emergency response. The plan should be updated, based on the lessons obtained through the training.

(4) Safety measures on transportation of dangerous materials

Transportation companies of dangerous materials should carry out the work in accordance with regulation and standards. In order to minimize the damage by a earthquake during transportation, as well as to secure safety in transportation of dangerous materials necessary for disaster response, the enterprises should take the following safety measures, under the guidance and inspection of Ministry of Emergency Situations, Police, and Ministry of Communication and Transport.

- a) For smooth and proper management in ordinary time and emergency response, the enterprises should strengthen the internal organization and communication system with related organizations.
- b) The enterprises should prepare a safety operation plan. In addition, the enterprises should prepare manuals to provide important information for emergency response during transportation, such as characteristics of transporting dangerous materials, degree of poisonous to human, response method against accidents, fire extinguishing method, communication way to related organizations, repairing method of vehicles.
- c) The enterprises should carry out training and education to the employees, especially drivers, for their understanding of the contents of the plan and manuals as well as raising awareness and enhancing ability on emergency response.
- d) The enterprises should prepare transportation plan for each delivering, which includes description on safety devices and tools, equipped with the vehicles, etc. The contents of the transportation plan should be well-informed to drivers and operators to secure the safety of transportation.
- e) The manufacturers, providers, and transporters of dangerous materials should establish a safety joint committee, and promote autonomous measures to respond disaster during transportation.

6.9 Measures for assisting vulnerable people in disaster

Vulnerable people requiring assistance during disaster includes residents in social welfare facilities/hospitals, persons in need of regular nursing care, disability persons, aged persons, expectant mothers, small babies, foreigners, and travelers. The vulnerable people are in difficulty in quick evacuation as well as living after disasters. For untroubled living of the vulnerable people and their families, following measures should be taken.

6.9.1 Measure for assisting vulnerable people, except foreigners and travelers

(1) Role of social welfare facilities and residents

a) Role of social welfare facilities

- 1. Promotion of safety measures in social welfare facilities
 - Taking measures to prevent turn-down of shelves and fall-down of equipment, etc.
 - Regular inspection by managers to ensure applied safety measures
- 2. Prompt establishing of emergency response system
 - Preparation of emergency response manual, and dissemination of the manual to staffs for well-understanding of the contents
 - Training and education to staffs on disaster management on a periodic basis
 - Expanding of storage of materials and equipment for disaster management
- 3. Enhancement of collaboration with local society
 - Execution of agreement with neighboring communities on support to vulnerable people at the time of disaster

- Development of regional supporting system to vulnerable people

b) Role of residents

- Participation to activities for promotion of measures on vulnerable people, under the support and guidance of Ministry of Emergency Situations
- Regular communication with vulnerable people in their houses, so that they can make effort to enhance capability of evacuation.

(2) Proactive measures for support to vulnerable people

a) Promoting activities to protect vulnerable people from disaster in family and community

- Popularization of mind of autonomous disaster management

Residents' associations of collective houses should encourage residents' mind on autonomous disaster management "protect vulnerable people from disaster", using opportunities such as announcement and guidance on support to vulnerable people, organized by Ministry of Emergency Situations, etc. The associations should also promote measures for safety of vulnerable people in disaster.

- Establishment of organizational framework to "protect vulnerable people from disaster" in community

Sub-group for support of vulnerable people in residents' association of collective houses (see clause 6.3 (1)) should promote activities of members, such as regular communication with vulnerable people, in order to protect vulnerable people from disaster.

b) Development of system for prompt supporting activities for vulnerable people

- Popularization of the operation manner of emergency measures for vulnerable people in disaster

The sub-group for support of vulnerable people should distribute "Emergency response manual for vulnerable people" to be prepared by Ministry of Emergency Situations, and popularize the operation manner on safety confirmation of vulnerable people at the time of emergency and other activities to be done as emergency response.

- Preparation of the list of vulnerable people

Residents' associations should prepare the list of vulnerable people in order to utilize at the time of disaster, and update the list on a periodic basis.

- Collaboration between social welfare providers and governments

Providers of social welfare should conclude agreement with city and republican governments beforehand for smooth operation of assistant activities in disaster, such as safety confirmation, transportation of vulnerable people, provision of welfare equipment, support to evacuated vulnerable people.

c) Securing evacuation spaces for vulnerable people

- Securing space in evacuation points for vulnerable people

Since vulnerable people require special care on safety and health, it is necessary to secure space for the vulnerable people, assistants, and equipment for the care.

- Designation of special evacuation points for vulnerable people

Providers of social welfare should prepare for use the facilities of welfare managed by them to use as special evacuation points for vulnerable people who are in difficulty in stay in normal evacuation points, under the direction and guidance of Ministry of Emergency Situations and Ministry of Healthcare.

6.9.2 Measures for assisting foreigners and travelers

Measures for assisting foreigners and travelers in disaster, for their safety and early recovery of living conditions are as follows.

(1) Raising awareness on disaster management of foreigners and travelers

Residents' associations of collective houses should identify foreigners who stay in the managed collective houses, and introduce them the disaster information and response method, shown in homepage of Ministry of Emergency Situations. The associations should also recommend to members of associations to legislate for volunteers for assisting foreigners.

(2) Providing information on assistant to foreigners and travelers

Residents' associations should check information such as official announcement about disasters in foreign languages and communication way to foreign embassies in Armenia, and provide those information to foreigners, as required.

6.10 Assistance for promotion of community-based disaster management activities

6.10.1 Items of assistance for the promotion of community-based disaster management activities

For the promotion of community-based disaster management activities, assistance by city and republican governments is indispensable as shown in Table 6.10.1.

Table 6.10.1 Assistance to communities done by governments

	Item of action	Major assistant organization
Mitigation	1 Creation and enhancement of autonomous groups on disaster management	Ministry of Emergency Situations (ARS) and city government
	2 Formulation of a disaster management plan for each community	Ministry of Emergency Situations (ARS)
	3 Promotion of aseismic reinforcement of buildings and facilities (retrofitting and renewal)	Ministry of Emergency Situations and city government
	4 Promotion of measures, preventing turn-down of furniture, fall-down of window glass, etc.	Ministry of Emergency Situations (ARS) and city government
	5 Preparation of disaster education materials and promotion of disaster management education	Ministry of Emergency Situations (Crisis Management State Academy) and city government
	6 Fire protection and safety for hazardous materials	Ministry of Emergency Situations and city government
Preparedness	7 Stockpile of water/ food/ commodities and stockpile/ maintenance/ regular inspection of disaster management equipment/ materials	Ministry of Emergency Situations
	8 Preparation of a list of community members (residents, employees, teachers/ pupils), a list of people who need assistance, a contact list of disaster management organizations	Ministry of Emergency Situations (ARS)
	9 Creation of a disaster management map, preparation and notification of assistance facilities such as evacuation points	Ministry of Emergency Situations and city government
	10 Preparation for protection/ assistance of community members and residents	Ministry of Emergency Situations and city government
	11 Improving response capacity and giving advice on what to do in time of earthquake disaster by disaster drills and seminars	Ministry of Emergency Situations (ARS and Crisis Management State Academy) and city government

6.10.2 Assistance and guidance of governments to communities

(1) Assistance and guidance on formulation of disaster management plan for communities

Ministry of Emergency Situations AR, and Yerevan Rescue Department assists and guides on the following issues.

a) Provision of a form and sample of disaster management plan

A form and sample of earthquake disaster management plan should be provided to residents' associations, enterprises, and schools, so that each entity can prepare the plan.

b) Establishing specialists dispatching system

A system to dispatch specialists on disaster management should be established for assistance to community-based activities such as the formulation of disaster management plan, campaign for raising awareness, etc.

c) Control of formulated disaster management plans

Yerevan Rescue Department should review the formulated plans, so that all necessary contents are covered. RS should store the plans for clarification of progress of measures and guidance on implementation of the measures,

(2) **Assistance and guidance on establishment and reinforcement of autonomous groups on disaster management**

Although leaders on civil defense are appointed in schools and important enterprises, functional sub-groups for fire-fighting, rescue, first aid, information transfer, disaster education, support of daily life, sanitation, support of vulnerable people, safety inspection, security, repairing of facilities are not clearly defined in many cases. In addition, leaders for disaster management are not appointed among residents in many collective houses.

RS, together with its district branch offices, should assist establishing and reinforcing autonomous groups for disaster management as shown in Table 6.10.2.

Table 6.10.2 Assistance and guidance for establishing and reinforcing autonomous groups for disaster management

1. Guidance for establishing the groups
2. Clarifying task sharing among sub-groups in a group
3. Reinforcing collaboration through field exercise

(3) **Assistance and guidance for aseismic reinforcement of buildings and facilities**

This matter is described in clauses 8.1 and 8.2.

(4) **Assistance and guidance for promotion of preventive measures of turn-down of furniture and shelves, fall-down of window glass, etc.**

This matter is described in clauses 8.3 and 8.7.

(5) **Assistance and guidance for the preparation of disaster education materials and promotion of disaster education**

Crisis Management State Academy should carry out assistance and guidance for the preparation of the education materials, and Ministry of Emergency Situations should manage the implementation, progress, result of disaster education. Items of the assistance and guidance are shown in Table 6.10.3.

Table 6.10.3 Items of assistance and guidance for the preparation of education materials and promotion of disaster education

Preparation of education materials	1. Preparation of materials for raising awareness on disaster management
	2. Preparation of vivid education materials and materials for leaning through doing, relating to response to earthquake disasters
	3. Preparation of contents for training centre on disaster management
Promotion of disaster education	4. Organizing events on disaster management
	5. Cultivation of facilitators for workshops on disaster management
	6. Organizing training for teachers and leader on disaster management
	7. Dissemination of information on disaster management through TV/ radio programs
	8. Activities for raising awareness and knowledge transmission on disaster management in training centre

(6) Assistance and guidance for prevention of fire outbreak

Concerned sections in ARS on fire-fighting and rescue and gas and electric companies have carried out assistance and guidance for prevention of fire. ARS should carry out assistance and guidance shown in Table 6.10.4 for enhancing activities for earthquake disaster management.

Table 6.10.4 Items of assistance and guidance for the prevention of fire-outbreak

1. Guidance on checking/ adjustment/ safety of facilities/ equipment, using fire
2. Inspection for confirmation of implementation of safety measures on the facilities and equipment
3. Technical guidance on storage manner for the prevention of fire outbreak from chemicals, etc.
4. Guidance on measures for the prevention of fire outbreak from electric devices
5. Technical guidance to electric companies on development of devices to prevent fire outbreak from electric devices
6. Instruction to conduct training on fire extinguishing and guidance on the contents of the training
7. Inspection of facilities where many people gather, for checking implementation of measures and guidance for improvement

(7) Assistance and guidance on safety measures of dangerous materials

ARS has conducted assistance and guidance on safety measures of dangerous materials. RS should carry out assistance and guidance shown in Table 6.10.5 for further promotion of measures.

Table 6.10.5 Items of assistance and guidance for safety measures of dangerous materials

1. Instruction and confirmation of preparation of disaster management plans of companies
2. Guidance on checking/ adjustment/ safety of facilities and equipment of dangerous materials
3. Inspection for confirmation of implementation of safety measures on facilities and equipment of dangerous materials
4. Instruction and guidance on seismic diagnosis and aseismic measures of facilities of dangerous materials
5. Instruction for implementation of training for response to disasters of dangerous materials and guidance on the contents of the training
6. Inspection of vehicles of transportation of dangerous materials and inspection on the safety at track terminals
7. Implementation of training on accident of transportation vehicles of dangerous materials
8. Guidance for establishment of companies associations for each kind of dangerous materials and guidance for promotion of prevention measures of disasters of dangerous materials

(8) Assistance and guidance on support to vulnerable people

Ministry of Emergency Situations and Ministry of Healthcare should carry out assistance and guidance for support of vulnerable people in disasters as shown in Table 6.10.6.

Table 6.10.6 Items of assistance and guidance for support to vulnerable people

<p>General issues on vulnerable people in disasters</p> <ol style="list-style-type: none"> 1. Promotion of concluding agreement about the use of existing social welfare facilities for special evacuation points for support of vulnerable people who are in difficulty in living in evacuation points 2. Assistance for reinforcement of collaboration between related organizations and operators of facilities, so that smooth implementation of supporting activities to vulnerable people in disasters 3. Guidance and introduction of measures for supporting vulnerable people in disasters and assistance for holding seminars in communities for the supporting 4. Guidance for preparation of “Manual on support to vulnerable people in emergency”, which define the method of safety confirmation of vulnerable people and the way of response activities 5. Guidance to residents' associations to prepare a list of vulnerable people in disasters 6. Guidance to secure special space in evacuation points for vulnerable people <p>Particular issues on foreigners</p> <ol style="list-style-type: none"> 7. Creation of homepage of disaster information in foreign languages and guidance for distributing booklets and displaying posters for raising awareness in foreign languages 8. Guidance for registration of volunteers for supporting foreigners and introduction of contents of the support 9. Guidance for field excises, which foreigner can be attended 10. Guidance for creating system for dissemination of disaster information in foreign languages through media 11. Guidance for creating system for dispatching volunteers who can speak in foreign languages 12. Guidance for reinforcement of information exchange with foreign diplomatic missions and gateway for the inquiry of foreign media
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6.11 Collaboration between governments and communities

One of important issues in earthquake disaster management is to promote collaboration between governments and communities. By promoting regular intercommunication, the governments and communities should deepen their collaboration.

6.11.1 Creating quake-resistant city with mutual collaboration

Governments, enterprises, schools, NGOs, etc. should exchange information on measures which have done individually, and shear the tasks and collaborate for promoting creation of quake-resistant city.

For understanding and raising awareness on this issue, Ministry of Emergency Situations should promote the following measures.

- a) Preparing occasion for the governments, residents' associations, enterprises, schools, NGOs, etc. to discuss about mutual assistance
- b) Preparing guidelines and manuals for the mutual assistance, popularization of the contents, and promotion of the understanding the necessity
- c) Organizing symposiums and lectures regarding creation of quake-resistant city

6.11.2 Establishing local organizational framework for collaboration in disaster management

For protecting residents and local society from earthquake disasters, it is necessary to enhance collaboration system among autonomous groups for disaster management in residents' associations, enterprises, schools, etc. and implement measures in united system in a local society. For this purpose, Ministry of Emergency Situations should take following measures.

- a) Establishing a joint consociation among residents' associations, enterprises, schools,

NGOs, etc. for mutual collaboration as well as establishment of communication system among them.

- b) Promoting participation of residents for the creation of quake-resistant city, through reinforcement of organizational framework and activation of the disaster management activities of residents' associations
- c) Organizing joint training on disaster management, with autonomous participating of residents, for the purpose of the promotion of collaboration among groups of volunteers and residents
- d) Promoting collaboration activities through dissemination of good examples of collaborated activities among residents' association, enterprises, schools, etc. as well as introduction of enterprises that contribute to local society in disaster management activities

6.12 Preparation for reconstruction of economy and industry

6.12.1 Establishing and organizing a consociation in each kind of industry for information exchange for disaster management

Ministry of Emergency Situations should promote establishing and organizing a consociation in each kind of industry for information exchange in disaster management, for the acceleration of preparation against disaster in industrial field as well as for securing prompt reconstruction/ life support/ job opportunity after disasters.

6.12.2 Preparation of manuals on industrial disaster management for mid- to small-scale enterprises

Ministry of Emergency Situations should prepare manuals on industrial disaster management in each kind of industry, mainly for mid- to small-scale enterprises.

6.12.3 Installing industrial one-stop service centre

For assisting smooth recovery of businesses, Ministry of Emergency Situations should prepare for installing industrial one-stop service centers, which provide several services in one place such as provision of related information, consultation, administrative procedures, etc.

Chapter 7 Quake-resistant Urban Development

In order to promote to create quake-resistant city, the following considerations is required.

- a) To promote quake-resistant urban infrastructure which was built during the Soviet era
- b) To mitigate damage to the residents and prevention of road closure by increasing the quake-resistant buildings (in particular, reinforcement of hospitals and schools is important)
- c) To promote redevelopment at densely built-up areas of old individual buildings, where evacuation and rescue will be in difficulty
- d) To secure open space that can be available for use as evacuation place in the event of a disaster (utilizing elementary school ground with quake-resistant school, large-scale factory site, and open space in the urbanized area)
- e) To develop wide area network of roads (including elimination of through traffic from the city center), and development of outer ring road surrounding the city center
- f) To increase quake-resistant houses in the landslide protection area in the southeastern part of the city, and in the sloping land along the Hrazdan gorge and Nork valley

7.1 Basic ideas for urban planning

In case of development and construction activities in the city, it needs to confirm to the law on “Urban Development (1998-05-05)” and building standards (building norms and rules, the Republic of Armenia II-6.02-2006, seismic-stable construction, norms in draft). In addition, when implementing a redevelopment projects, it needs to be compliant with the Yerevan Master Plan., and to secure open space as a public space which was built during the former Soviet era.

7.2 Promotion of redevelopment projects

Redevelopment projects complied with the Yerevan Master Plan should be implemented step by step and strategically. In order to realize redevelopment projects, it needs to proceed with land negotiations and consensus of landowners under the appropriate management by related departments of the city such as the department of architecture and urban development and the department of urban development and land control. Generally, residents can purchase a new house by the funds obtained by selling the rights of former land and buildings to the developer. Since residents of the redevelopment area are generally composed of low-income earners, and a compensation of the residents for redevelopment is not always enough to live in the same place with the new redevelopment houses. Therefore, it should be considered a supply of public housing and rental housing based on the initiative of the city, so that residents with annual income can continue to live in the same place of redevelopment area without confliction. For strengthening of individual buildings, following tasks will be proposed.

(1) Reconstruction projects

According to the Master Plan, buildings required reconstruction were built before 1989 (mainly the 1960s -1970s). Promoting reconstruction of individual houses, and processing the consensus building between residents and developer, reconstructing work should be implemented using following manners.

- a) To promote a reconstruction by reducing the costs by construction of high-and medium-rise buildings with increasing of the floor area
- b) To promote redevelopment project with a new collective house in the area of low ceiling houses by conversion of the land to the apartment's floors
- c) By supplying of rental housings, to promote reconstruction of deteriorated houses where low-income earner lives

(2) Seismic reinforcement projects

Based on the seismic diagnosis for buildings classified "public buildings, historical and cultural buildings" in the master of Yerevan City, quake-resistant work will be conducted. In particular, With respect to hospitals and schools that play an important role in earthquake disaster, quake-resistance work for them will be a priority.

7.3 Securing open spaces

(1) Securing open spaces in the urban area

As result of overlaying GIS data of the Master Plan, information about the population distribution and others, the following points became clear (see Table 7.3.1).

- a) Parks and green spaces are scattered throughout the city, and open-space ratio of the outer edge of the city is relatively high.
- b) While parks and green space are relatively dense in the central part of the city such as Kentron district and Arabkir district as a residential area, no such place exists in the Nork-Marash district.
- c) According to Yerevan City master plan, it is planned to increase green spaces and parks as more than 10m² /person in 2020.

Table 7.3.1 Future Plan of Green Space by District (Unit: ha)

No	District	Year 2005 (data in 2003)		Year 2020	
		area	Area per person	Area	Area per person
1	Ajapnyak	12.0	1.12	243.0	16.40
2	Avan	10.5	2.10	70.5	12.70
3	Arabkir	122.3	9.30	216.8	16.60
4	Davtashen	7.8	1.90	97.8	21.60
5	Erebuni	18.5	1.55	372.0	30.04
6	Kentron	128.0	9.85	148.0	11.60
7	Malatia-Sebastia	60.5	4.30	360.5	22.40
8	Nor-Nork	49.5	3.46	261.5	18.00
9	Nork-Marash	0.0	0.00	51.0	39.20
10	Nubarashen	3.1	3.30	101.1	68.30
11	Shengavit	32.6	2.30	334.6	20.80
12	Kanaker-Zeytun	540.3	12.25	125.5	16.40
	Total	540.3	4.90	2,382.3	19.85

When a disaster occurs, it is necessary to secure the primary evaluation place specified by the city such as a school ground (with primary schools and secondary schools), hospitals and governmental buildings (facilities). Furthermore, an existing park in the urban area and an open space on the outskirts of the city will be used for the secondary evacuation place. Because a lack of open space in the highly dense residential area composed of individual residential houses, considering

prevention of the spread of fire prevention, additional work such as a buffer tree planting in a private land and a setback at the time of reconstruction should be promoted.

(2) **Designation and development of disaster management parks**

Existing park should be specified as a disaster management park, and developed not only for use of temporary evacuation but for a base of operation in a time of rescue and relief, where an area needs to be more than 10-20 ha of scale at least. Considering an accessible road for evacuation and a result of damage estimation in a time of earthquake, it would be desirable to deploy several disaster management parks at key points in the city.

(3) **Decision of city plan**

Individual residential houses have been built on the site of large-scale park in a part of the city. In addition, some interrupted pedestrian replaced by private land can be seen in urban area. The reason of this is that public spaces such as roads, parks and private land have not been completely divided so far, and the use of public space has been determined based on an individual development application (permission) respectively. In order to ensure the continuity of use of parks and green spaces as a public open space, specification to the public open space by decision of city plans is necessary.

7.4 **Road improvement**

(1) **Road network**

Development of a highway should take a step-by-step approach according to the Yerevan Master Plan. For ensuring a smooth evacuation and rescue and relief at the time of earthquake disaster, construction work of some undeveloped sections of the outer ring roads should be launched promptly so as to access to the destinations by the shortest route from center of the city.

(2) **Parking areas**

Parking spaces along the road in the urban area is generally under the control of the city. Requiring parking restrictions to the specified emergency road for evacuation, and rescue and relief at the time of the earthquake, it is necessary to develop additional parking area along the specified emergency road. Since back yards of collective houses have been used as a garage in general, at the time of the earthquake, the garage will interfere with the evacuation, rescue and relief, and further, it brings a possibility of secondary disaster as a fire caused by ignition of gasoline. Also consider that risk of garage has been pointed out from the residents, so as not to interfere with activities in the event of a disaster, its proper maintenance or limitation of use should be proposed.

(3) **Public transportation**

During disasters, use of private car will be limited except a emergency vehicle, people uses a public transportation in general. Without interfering with movement by emergency vehicles, in order to facilitate the movement of private cars as much as possible, administration of the city public transport and road rail transporting companies should improve quake-resistant infrastructure such as a telephone pole in the transmission line during normal time. In addition, in order to ensure

pedestrian line at the time of disaster, it would be recommended administration of city public transport and the bus company to improve quake-strengthening bus stop. For suppress use of private car in times of disaster, it is also recommended to develop extension of metro which has been managed and operated by the city (with a further extension plan).

7.5 Land use in time of disaster

In the time of disaster, as well as school, hospital and administrative office which should be specified as primary evacuation place by Ministry of Emergency Situations, active use of parks, green space and other open space (private land) as secondary evacuation place should be considered. Before use of secondary evacuation place, it will be necessary to conclude an agreement on permission to land use between Yerevan City and land owner. For parks and green space, assuming the aggressive use of refuge in times of disaster, it is recommended to introduce guide sign (for notifying the specified evacuation place), emergency toilet, emergency light, and stockpiling base.

Chapter 8 Aseismic reinforcement of buildings, constructions, etc.

8.1 Clarification of seismic stability and aseismic reconstruction of existing buildings and constructions

The prevailing majority of buildings existing in Yerevan City were designed and constructed before 1988 and the seismic strength takes as a base for the designing was less than the expected one. The evidence of this is the new seismic zoning map of the Republic of Armenia prepared and approved by the «Survey of National Protection» (hereinafter referred to as SSP) of Ministry of Emergency Situations in 1988. Since the design earthquake-resistance of all the buildings and constructions in Yerevan City constructed before 1988 was intended for intensity 7-8 by MSK scale and the territory of Yerevan City is located in the third seismic zone by seismic zoning map of the territory of the Republic of Armenia with the expected maximum acceleration of 0.4g ($A_{max}=0.4g$) (9 and more intensity by MSK scale), it becomes obvious that during the possible severe earthquake in the region (magnitude $M>5,5$) a number of buildings or their separate parts will be collapsed resulting in a big number of victims and huge material losses. Tectonic faults are passing through the territory of Yerevan City and, besides, the epicenter of Parakar earthquake, which is active, is in the administrative territory of Yerevan City.

It is necessary to direct the tendencies in urban development projects to the implementation of works aimed at assessment of seismic vulnerability of facilities of special importance and assessment of seismic risk and risk of infrastructures from the point of view of seismic protection in Yerevan.

Seismic activity of the Republic of Armenia and Yerevan City are specified by the Scientific-research Institute of Geology of National Academy of Science, SSP of Ministry of Emergency Situations and other design institutes. The minimal seismic activity of the territory of Yerevan City is intensity 7 and the maximum seismic activity is intensity 10, according to implemented research works.

8.1.1 Implementation of plans of aseismic works

The Ministry of Urban Development and corresponding design making organizations in the field should work out the measures of enhancement of seismic stability of buildings and constructions.

8.1.2 Enhancement of stability of Ministerial buildings securing disaster management from the point of view of seismic protection

First of all it is necessary to assess and strengthen the level of seismic vulnerability of the following facilities: administrative building of National Assembly, the buildings №1, №2 and №3 of Government house, administrative building of the Police under the Government of RA, administrative building of the Ministry of Emergency Situations, administrative building of the Ministry of Transport and Communication, buildings of Yerevan City and all the other facilities which should manage the response, evacuation and urgent operations during the disaster.

8.1.3 Enhancement of seismic stability of schools and hospitals

Relevant republican and urban structures should accelerate the permanently implemented works of enhancement of seismic stability of the buildings of schools and hospitals taking into account the circumstance that the buildings of schools and hospitals must be used as places for the provision of urgent assistance to the residents of the city and temporary distribution places.

8.1.4 Enhancement of seismic stability of multi-storey residential buildings of Yerevan City

An important issue of enhancement of seismic stability is the assessment of the factual technical condition of multi-storey residential buildings, the study of their volume-layout and constructive solutions, assessment of the level of factual seismic vulnerability taking into account the consequences of the last earthquakes and the accumulated experience. It is necessary to classify the multi-storey residential buildings which have different volume-layout and constructive solutions and are constructed on different grounds by seismic features.

Based on the huge database of buildings and constructions as well as the results of a number of primarily studies, the facilities of special importance in Yerevan City can be classified 4 groups:

- a) group 1 – 2-4 storied buildings with stone walls constructed before 1960s. They were constructed by individual designs and many of them have architectural importance. About 30% of facilities of special importance existing in Yerevan City belong to this group. During Spitak earthquake the buildings mentioned in this point mainly received severe damages, deformations and many of them collapsed. The buildings of the mentioned group have the following main volume-layout and constructive characteristics:
 1. complex layout solution, non-proportionate distribution of stiffness and masses according to main geometric axis and height of building;
 2. lack of requirements of modern designing norms of seismic stable construction;
 3. lack of seismic protective systems;
 4. openings in windows and doors in bearing walls with the sizes bigger than is allowed;
 5. roofs made from wooden constructions;
- b) group 2 – 3-5 storied buildings with internal reinforced concrete frame and enclosed longitudinal and latitudinal bearing stone walls. About 45% of facilities of special importance existing in Yerevan City belong to this group. Some of them were built by typical design and in the plan they are mainly in the form of rectangle. In the buildings of this group there are a number of discrepancies with the requirement of modern norms of designing of seismic stable construction. During Spitak earthquake the buildings mentioned in this point received severe damages, deformations, part of them collapsed and the other part was subject to reconstruction.
- c) group 3 – 9-12 storied large-panel buildings made from precast reinforced concrete constructions. About 15% of facilities of special importance existing in Yerevan City belong to this group. During Spitak earthquake this type of buildings received moderate damages, deformations, but did not collapse and they were subject to reconstruction.
- d) group 4 – 6-9 storied frame buildings made from precast reinforced concrete constructions. About 10% of facilities of special importance existing in Yerevan City belong to this group. During Spitak earthquake the main part of this type of buildings was collapsed since in

frame buildings the connection joints of precast reinforced concrete constructive elements were in the zone of maximum stresses and the works are carried out with low quality while the seismic stability mainly depends on the place and quality of the junction if these joints.

The works of enhancement of seismic stability of all the above-mentioned groups should be carried out with technical and organization assistance of the Ministry of Urban Development, Ministry of Emergency Situations, city and community authorities.

Survey of earthquake-resistance of apartment buildings of Yerevan City was done by SSP agency of Ministry of Emergency Situations after Spitak earthquake. According to the survey, earthquake-resistance of overwhelming majority of apartment buildings of Yerevan City does not correspond to seismic activity of the territory: it is less than the seismic activity of the territory. Besides, the design earthquake-resistance of the buildings is reduced at least one point as a result of building deterioration and deformations, made by residents.

Requirement for ensuring at least intensity 9 earthquake-resistance for buildings and constructions, being built after 1988 Spitak earthquake, is defined and currently the earthquake-resistance of designed buildings is intensity 9. The designs undergo professional expertise, seismic assessment, and after that construction is implemented. Specialized organizations have received licenses from the Government of RA for control over construction quality (for example, “Scientific-research institute of earthquake-resistant construction and structure protection” CJSC, SSP agency of MES RA, etc.)

Currently (as of July 2012) there are 95 apartment buildings with 2nd degree of damage, 82 apartment buildings with 3rd degree of damage and 7 apartment buildings with 4th degree of damage.

The apartment buildings with 2nd and 3rd degree of damage should be repaired, and the buildings with 4th degree of damage should be demolished. The residents of those building must be resettled. Works for demolishing of buildings with 4th degree of damage and resettlement of residents are being executed by the Government of RA.

A technology of reinforcement of apartment buildings without resettlement of residents was proposed by Armenian scientists (architect, academician Mkrtumyan) after Spitak earthquake, which underwent appropriate expertise. However, currently reinforcement works of buildings with low earthquake-resistance are not being implemented, because of absence of finances. About 4 bln. USD is necessary for reinforcement of apartment buildings (by the use of academician Mkrtumyan’s technology), located in Armenia, according to calculations. It is necessary to develop and adopt a state project for implementation of reinforcement works of apartment buildings, located in Yerevan City and other settlements by the Government. Serious financial assistance of international donor organizations will be needed for its implementation.

8.1.5 Enhancement of earthquake-resistance of buildings along the roads of strategic importance

Ministries of Urban Development, Transport and Communication, Emergency Situations, Municipality together with their relevant structures should carry out enhancement of seismic retrofitting of buildings the collapse of which during the earthquake can block the traffic.

8.1.6 Provision of earthquake-resistance of newly built buildings

It is recommended to work out sanctions clearly formulated and available for the public that can be applied towards designers and constructors who will violate the acting RACN II-6.02-2006.

The City and all the interested bodies should take necessary means and steps to keep earthquake-resistance norms and to apply sanctions in case of their violations.

8.1.7 Development of Legislative field

Seismic risk reduction is under the attention of the Government of the Republic of Armenia.

The law about the “Seismic Protection” was adopted on June 12, 2002.

A number of Government decisions were adopted aimed at the execution of state complex projects of seismic risk reduction of the territory of the Republic of Armenia and Yerevan City (decisions N 392 of the RA Government dated on June 7, 1999 and N 429 dated on June 10, 1999 about “Approving the project of assessment of seismic vulnerability of facilities of special importance in Yerevan City from the point of view of seismic protection and the implementation schedule”).

It is recommended to develop the legislative field which will contribute to the application of aseismic measures of multi-storey residential buildings paying attention to the expansion of administrative and methodical works with condominiums.

8.1.8 Prevention of fall of things and turn-over of furniture, provision of the security of elevators

During the earthquake there can be big human losses in the streets due to falling of glasses, advertisement panels and other things and inside the buildings due to turn-over of the furniture.

Departments of Urban Development and Communal Exploitation of Yerevan City, together with other related organizations should carry out checking of things and equipment installed inside and outside the buildings which can become a reason for loss during the earthquake and carry out measures ensuring the security.

For preventing the falling of glasses and other things during the earthquake it is necessary to check the buildings along the evacuation routes and in case there is a risk of falling relevant instructions should be given to carry out repairing works.

It is expected that human losses will occur due to the falling of external advertisement panels. Based on the mentioned it is necessary to instruct the organizations installing such panels about keeping the procedures of installation permission and carrying out strict exploitation maintenance after the installation.

The external walls of the majority of existing multi-storey residential reinforced concrete buildings are covered with stone plates. In this regards it is necessary to work out the issues aimed at prevention of their falling and give instructions about implementing reconstruction works.

8.1.9 Prevention of turn-over of furniture

For reducing the loss due to the turn-over of furniture the departments of urban development and communal service of the Municipality, together with other interested organizations, should carry out explanatory works particularly with the residents of multi-storey residential buildings on the following issues:

The security of residential areas can be ensured:

- a) Ensure the security of residential areas, particularly not to place high furniture in bedrooms
- b) It is necessary to work out the issues aimed at optimum installation and fixing of furniture for ensuring security of residential areas.

The methods of ensuring the security at household level are:

- a) Reduce the quantity of furniture in the room where aged people, invalids and children are living;
- b) Arrange the things in the furniture in such a way that the center of gravity is possibly low to prevent the turn-over of furniture;
- c) Arrange the furniture in such a way as to avoid damages and blocking of evacuation exits even in case of turn-over;
- d) Take measures against spread of pieces of glass to prevent damages;

4. The methods of ensuring the security through fixing the furniture are:

- a) Check the strength of walls and ceiling when fixing the furniture by all means;
- b) Fix the furniture onto the walls by metallic angle pieces;
- c) Fill in the open space between the furniture and ceiling tightly to prevent the turn-over of the furniture.
- d) Take measures against falling of electric devices.

8.1.10 Ensuring the security of elevators

Department of Communal Service of Yerevan City, together with other related organizations, should establish systems of blocking the elevators during electricity vibrations in case of an earthquake and the take the confined people out. Mechanisms of rapid recovery of the operability of elevators should be worked out.

- a) For preventing the people getting confined in elevators, it is necessary to menace the security of elevator of buildings of public importance placing devices that prevent the closing (with the functions of continuing the movement and stopping at the floor in case of outage of electricity). Such measures should be taken first in medical institutions and multi-storey residential buildings.
- b) The establishment of the system of implementation of rescue operations is stipulated by the idea that during the earthquake it is necessary to carry out rescue operations in a number of

sites. It is necessary that, besides the specialists of exploitation of elevators and members of rescue subdivisions, the employees of the services of building exploitation are also able to de-blocking works of elevators. It is recommended to strengthen the cooperation between organizations of technical maintenance of elevators, building exploitation services and rescue subdivisions as well as to install systems checking the existence of people in elevators and for remote control of elevators.

- c) Taking into account the limited number of specialists of elevator exploitation, first of all, it is necessary to install systems of automatic diagnosis of elevators in important facilities which will allow to recover the work of elevators.

8.2 Enhancement of earthquake-resistance of lifeline facilities and infrastructures

Enhancement of earthquake-resistance of lifeline facilities is the base of normal activity of the city. The deterioration of lifeline infrastructures due to the earthquake is full of serious consequences.

Enhancement of earthquake-resistance of lifeline infrastructures of Yerevan City is very important for ensuring efficient implementation of life-support of population, provision of assistance to affected population, receipt of correct and timely information on current situation, warning of population, implementation of rescue and urgent accident-recovery works and other vitally important tasks in case of possible destructive earthquake.

Disaster management bodies should recheck the data already created by the State Committee of Real Estate Cadastre for 10 administrative districts out of 12 of Yerevan City and continue the updating of the data.

8.2.1 Water supply, water discharge and sewerage systems

The provision of population with drinking water and that for extinguishing the fire is an important task in terms of reduction of damages from the secondary hazards of the earthquake.

City authorities should have worked out plan-scenarios to be able to separate the damaged parts of water supply pipelines from the general network.

Making the water supply system earthquake resistant is of higher priority compared with the sewerage. In case of disaster mobile toilets can be installed as temporary means till the recovery of sewerage though it can bring to sanitary problems.

The ensuring of earthquake resistance of water lines of hospitals and facilities of public importance is another priority since they have a very big importance in case of emergency situations.

The prevailing part of water lines and sewerage is too exhausted and does not meet the necessary requirements of earthquake-resistance.

Water supply of Yerevan City is implemented from 24 water supply capitations, most part of which is gravity flow. Water supply and sewerage system of Yerevan is managed by “Yerevan-Djur” CJSC, which is a state company and is given for concession management to a French company.

Water supply and water discharge system of Yerevan was built starting from middle of the last century until the early 1990s. Currently repair works of water supply and discharge lines are being implemented. There is necessity to assess the earthquake-resistance of capitations and daily regulatory reservoirs and implementation of reinforcements. There is a necessity of securing

infallible and reliable water supply and discharge of vitally important facilities (hospitals, polyclinics, food entities, technically hazardous facilities, etc) by increasing the earthquake-resistance of water supply facilities and lines.

Upper Artashat Canal and Hrazdan Canal pass through the administrative territory of Yerevan City, which provide irrigation water to Ararat lowland. The canals are built in the middle of past century and there is a necessity of assessment of earthquake-resistance of canals and their stability in case of severe earthquake. The canals are under the management of State Water Committee of Ministry of Territorial Administration.

8.2.2 Power supply system

It is necessary to check the earthquake-resistance of high-voltage power supply poles and substations of low-voltage distribution network and carry-out reinforcement works for implementation of power supply as infallible as possible.

The distribution systems high-voltage electricity should be made earthquake resistant since all the facilities are worn out and can be highly affected during the severe earthquake. As for the low-voltage distribution lines it will be effective to have them buried in the ground due to which the possibility of earthquake influence on them will reduce. The target of urgent accident-recovery works should be distribution networks made of electricity poles and on-ground and underground lines. The urgent accident-recovery works of these facilities should include the installation of temporary electricity poles and air lines as well as building of underground or along-road cables. If electricity outage takes place due to the damage caused to distribution system, but the distribution networks are still functioning, urgent recovery can include power supply from the coverage area of the adjacent distribution sub-station. It is necessary to carry out reinforcement works in the electricity networks that will be identified as of not enough earthquake-resistance. Lifeline facilities should be supplied by autonomous power supply systems with the necessary minimal fuel reserve to operate them as infallible as possible in case of earthquake.

It is also necessary to implement survey of earthquake-resistance and secure seismic stability of reservoir and water supply system of Qanaqer HPP and Yerevan-1 HPP, which are located in administrative territory of Yerevan City.

8.2.3 Gas-supply system

During the earthquake the gas pipelines can go out of the order due to failure of pipelines, tearing as well as dislocation of the joints of the pipelines. In contrast to water supply and sewerage pipelines, slight damage of gas pipelines can cause a major accident.

Gas-supply of the Republic of Armenia is implemented by “ArmRusGasProm” CJSC. Underground gas pipelines comprise 6% of the gas pipelines of Yerevan City, but they should be given a priority and their earthquake-resistance ensured since the role of major pipelines is very big. As for the on-ground gas pipelines, which comprise about 94% of the gas pipelines of Yerevan City, it will be effective to reinforce the joints and poles in terms of making the pipelines more earthquake-resistant.

There is a spread gas-supply network in Yerevan City. Pipelines with high, middle and low pressure are passing through the territory of the city, most parts of which are on-ground. Low pressure pipeline network, which is envisaged for gas-supply to population is also on-ground and is passing near the residential buildings and constructions. In case of severe earthquake the on-ground gas-supply low pressure pipeline network may go under the ruins and receive damages in many parts. Besides, the gas-pipe poles may also be turned over and cause a gas leakage. It is necessary to check the strength of gas-pipe poles.

The gas-supply of affected areas is terminated in case of severe earthquake to prevent explosions, fires and poisoning of population, which will be possible in case of infallible operation of gas-supply distribution points. It is necessary to check the conformity of places of location of gas distribution points with existing norms (must be at certain distance from residential buildings and construction).

There are many high pressure vehicle gas charging points in Yerevan City, which are located directly near residential buildings, constructions, roads and other infrastructures. It is necessary to check the earthquake-resistance of facilities of vehicle gas charging points and implement reinforcement in case of necessity.

One should realize that the time required for recovery works of gas supply system will depend on the time required for the recovery of buildings since the new gas pipelines will be built after the construction of buildings. It is necessary to install automatic switch-off systems gas leakage in gasified buildings and constructions.

8.2.4 Communication system

The communication system in Yerevan consists of cable and mobile telephone connections. Cable telephone connection is implemented by means of digitized automatic telephone stations, which are installed in corresponding buildings constructed during Soviet era.

The failure of communication systems in case of the earthquake will have a very bad influence and will hamper the in-time response. Based on this, it is necessary to have alternative means of communication. To provide the unfailing operation of communication system in emergency situations the devices should have the system of prevention of overload of channels. For the works of communication systems during the earthquake it is necessary to ensure the earthquake-resistance of their tower poles and buildings.

8.3 Enhancement of earthquake-resistance of transport infrastructures

8.3.1 Bridges

For the implementation of rescue works and in the procedures of evacuation and damage identification the provision of normal operation of transport is an important condition.

The damage and collapse of buildings will lead to irreversible consequences of transport, therefore reinforcement of bridges is of special importance.

Later on, during the construction of new bridges and repair of existing bridges it is necessary to reduce the seismic risk taking into account the conclusions given by the experts for each bridge.

Besides, it is necessary to carry out detailed survey and comparative analysis of technical solutions aiming reinforcement of bridges.

For more reliable earthquake-resistant designing it is necessary to adopt corresponding norms of seismic stability.

8.3.2 Railway

“South-Caucasian railroads” CJSC, which manages the railway of the Republic of Armenia, including Yerevan, should ensure the earthquake-resistance of office buildings, stations and other constructions, as well as lines, electric contact lines and auxiliary structures under its supervision.

It is necessary to carry out the checking of seismic stability phase by phase starting from important structures with a high level of exhaustion taking into account the period of their exploitation and, in case of necessity, carry out reinforcement activities.

8.4 Reinforcement of hydro-technical structures

Due to a severe earthquake it is possible that the dam of Yerevan lake will collapse, and accordingly Yerevan-Echmiadzin highway will be closed, and part of Shengavit administrative district will be covered with water.

To reduce such a risk it is necessary to check the reliability of water discharge and drainage systems of the dam of water reservoir and seismic stability and, in case of necessity, carry out works of their strengthening and recovery.

8.5 Prevention of collapse of walls

Design and construction of walls is carried out according to GOST – 26815-86 standard. In terms of existing walls the below mentioned organizations should carry out close study of walls under their supervision for identifying cracks and other shortcomings, compile a catalog of walls and check their earthquake-resistance and the level of exhaustion.

- 1) Walls of rivers – Department of Urban development of the Municipality,
- 2) Walls of roads - Department of Urban development of the Municipality, traffic police, traffic section,
- 3) Constructive walls - Department of Urban development of the Municipality, territorial subdivision of state inspection of cadastre.

During the earthquake the collapse of barriers become a cause for the death of pedestrians as well as make rescue operations, evacuation and clarification of damage size difficult. For the barriers of industrial territories it is required to use heavy concrete and that condition should be followed during the construction.

It is recommended to demolish the existing panel barriers, except for industrial territories, and replace with light and more earthquake-resistant structures. But it is impossible to demand demolishing of existing panel barriers. Taking into account that circumstance, as an intermediate measure, Department of Urban Development of the city is recommended to work out a methodology of strengthening of panel barriers. A catalog of these barriers is compiled in each

administrative district and each responsible organization carries out reinforcement works of barriers under their supervision according to the methodology. In future the construction of such barriers should be banned except in the territories of industrial companies and those of special nature.

8.6 Reinforcement of cultural values

It is necessary to carry out reinforcement of cultural values according to the Law of Armenia about “Principles of cultural legislation”.

It is necessary to carry out checking of reinforcement of cultural values and further works of reinforcement.

During the earthquake the person responsible for historical-cultural values has to take urgent measures aimed at their protection according to the instructions of the committee of emergency situations. Department of Culture of Yerevan City makes the list, recovery plan of those values and submits it to the Ministry of Culture and carries out recovery works by budgetary means.

8.7 Prevention of landslides and mudslides

The steep slopes widely developed around Yerevan creating foreseeable conditions for the occurrence of hazardous geological phenomena. The landslide-hazardous parts of the city are in Erebuni and Kentron districts.

These risky zones of the city will be much unstable due to earthquakes. City and district authorities should carry out permanent monitoring and implement technical measures.

At the same time, together with technical decisions, it is necessary to carry out the following measures of organizational-institutional nature:

- a) Collection and summarization of information about landslide-hazardous phenomena and assessment of risk,
- b) Regulation of the legislative field,
- c) Public awareness about hazardous slopes, observation, transfer of information and arrangement (adjustment) of evacuation systems and so on.

It is necessary to initiate measures of organizational-institutional nature – clarify the borders of mudslide-hazardous territories, population awareness about possible risks, the issues of population evacuation and so on.

Chapter 9 Seismic study and research

9.1 Study and research on scenario earthquakes

Further study should be conducted on scenario earthquakes, set up in this project, and in parallel, study on possibility of other scenario earthquakes to be considered.

(1) Study of historical earthquakes

In Yerevan City the following two historical earthquakes have been popular:

- a) Garni earthquake ($M=7.0$) that took place on June 4, 1679 – the epicenter is 20 km to the east from Yerevan. The estimated maximum seismic intensity is ‘X’ by MSK-64 scale. It is said that the fortress and at least 12 churches and 2 bridges were collapsed and 1,228 people died in the Northern part of the present Yerevan City. In total 7,600 people died including the adjacent territories.
- b) the earthquake of January 7, 1937 ($M=5.2$) – It is considered to be a local earthquake near Yerevan City. Estimated seismic intensity in the city was ‘VII’ by MSK-64 scale. Cracks appeared on several hundreds of houses in the city. There are no records on the casualties.

(2) Study of active faults

The main active faults in Armenia are Pambak-Sevan-Syunik fault (PSSF), Mrav fault, Akhuryan fault, Garni fault (GF) and Yerevan fault (YF). PSSF, which is the longest active fault in Armenia (~410 km), is a right lateral fault with reverse component and shows specific geomorphic features for a right lateral fault. Trench investigation was carried out along PSSF in three sites (Philip et al., 2001). The recurrence period of the PSSF is inferred to be 3000-4000 years. However, the PSSF did not generate the large earthquake with magnitude more than $M_w 7.0$ in the last 2000 years. PSSF is one of the active faults with high risk of future earthquake occurrence in Armenia.

The Mrav Fault is a reverse fault inclined to the north. The 1139 $M 7.5$ earthquake was generated by this fault.

The Akhourian Fault is a left-lateral fault. The historic earthquakes with magnitude of $M 6.5$ to 7.0 occurred along this fault. The Garni Fault passes from Nakhijevan, Azerbaijan, via the east of Yerevan City, and merges into the PSSF. The length is ~200 km. According to Karakhanian et al. (2004) and Georisk report on the Garni Fault, the GF is divided into 5 segments. Four large to moderate historic earthquakes have occurred along the GF, namely the 906 earthquake ($M 7.0$), the 1679 Garni earthquake ($M 7.0$), the 1828 earthquake ($M 7.0$), and the 1988 Spitak earthquake ($M_s 6.9$). Historic earthquakes seem to be shifted from south to north.

The Yerevan Fault is a blind fault which is inferred on the south of Yerevan City based on the gravity anomaly data (Georisk report on the Yerevan Fault). However, a low-angle reverse fault (thrust) overlying the Mesozoic sediments on the unconsolidated Gravel was confirmed by the pilot trench at Nor Ughi that was performed for this project. The part of the YF may reach to the surface, though more detailed trench survey is necessary. According to the mechanism analysis of small to moderate earthquakes, the prevailing type of motion observed within 30km from Yerevan is a reverse one (Tovmasyan, 2008). The 893 Dvin earthquake is well-known as Dvin of the

ancient capital in Armenia has suffered severe damages. Dvin is located near the YF. However, the detailed epicenter of the 893 earthquake is not clarified. There is another opinion that the GF generated this earthquake (Georisk report on the Yerevan Fault). Besides, according to another opinion, Dvin earthquake occurred twice for AD 863 and AD 893 (Guidoboni, 1997).

9.2 Scientific research activities on disasters caused by earthquakes

Concerning damage assessment on natural disasters caused by earthquakes, expanded study should be done, based on the results of this project.

Existence of the data base of grounds is one of the important issues during the estimation of seismicity.

The outline of lithological structure in Yerevan can be understood by means of geological, geophysical and geotechnical investigations. For collecting the data of these parameters 10 drillings were newly conducted in Yerevan. The drilling points are mainly selected in the area which are covered with Quaternary deposits because they are effective for the amplification of the earthquake motion by the ground and liquefaction potential. In the 10 new drilling points PS logging was carried out which is a method of geophysical investigation by means of which S wave velocity of the soil layer is calculated by receiving the surface generated waves using the borehole receiver. The S wave velocity is calculated by the ratio of the distance between the wave generator to the receiver and the time difference between generation and receiving of the wave.

Surface wave exploration is carried out at the 60 points in Yerevan City. By means of surface wave exploration S wave velocity structure of the soil layers is received using the artificially generated surface wave or the natural microtremor. The surface wave is observed by the several geophones at ground surface simultaneously and analyzed.

Microtremor survey is carried out at the same places as the surface wave exploration points. The microtremor is the phenomenon of very small vibration of the ground surface as a result of a complex stacking process of various vibrations propagating from remote man-made vibration sources caused by traffic systems or machinery in industrial plants, and from natural vibration caused by tidal or volcanic activities. Microtremor can be observed anywhere on or below the ground surface. The observed microtremor reflects the physical properties of the ground over the clear contrast of S wave velocity. The spectrum of the observed microtremor wave indicates the S wave velocity structure. The H/V (Horizontal/Vertical) spectral ratio sometimes show better result than the horizontal spectra and used widely. The H/V spectrum are calculated and used to confirm the S wave velocity structure by surface wave exploration method in this study.

Part 3 Preparedness Plan

Chapter 10 Process for preparedness and assistance by the city

10.1 Role of the city

Together with mitigation measures, emergency measures should also be prepared beforehand in order to minimize disaster damage and chaos after an earthquake.

An emergency situation management point has been created in Yerevan, which should serve as Crisis management Center (CMC). Being led by CMC, Yerevan City Emergency Situations Committees and districts, services of quick response, Yerevan Rescue Department of RS should take their roles in case of emergency situations in order to implement urgent measures. General role of the city is following.

- a) The city controls implementation of different sections of the plan, which is mentioned in Chapters 11 to 22. The city decides sections as well as the realization and implementation based on theses of basic plan, develops yearly detailed plans and receives necessary financing and allocate it to correspondent staff.
- b) The city decides correspondent responsible persons, who should control and monitor separate plans and give instructions for urgent implementation of plans. The city receives reports from responsible persons based on which it realizes coordination of activity and makes commands.
- c) The city receives reports from the responsible persons by the end of the year on realization of the plans and evaluates the results and makes new goals and tasks for the next year.

10.2 Framework of promotion/ support and activities of the city

The city carries out measures on preparedness within the process, which is similar to the one devised for emergency response. However, CMC and others that are convened after an earthquake are included in the preparedness process.

The city mayor is responsible for the plan. Yerevan Rescue Department of RS realizes role of coordinator, as mentioned in Clause 4.2.

Emergency Situations Committees and, Evacuation Committee of the city, the heads of districts, Yerevan Rescue Department, evacuation committees of organizations in the city coordinate implementation process in the city and districts.

The correspondent subdivisions in districts of Yerevan Rescue Department of RS are responsible for realization of measurements in particular districts.

Disaster management of Yerevan City is realized by Yerevan City Emergency Situations Committee, the structure of which is equal to the city management structure: Mayor, deputies of Mayor, the heads of all departments and sections of Yerevan City, heads of districts of Yerevan City. In case of huge disasters, Yerevan City Emergency Situations Committees is included in Republican disaster management system.

It is very difficult to manage all quick response services, thus taking into consideration that all activities should be controlled during mitigation and response to seismic disaster consequences. For the management of quick response services and control of input of management and control

system mentioned in Figure 10.2.1 is recommended. As it is shown on the picture the system consists of levels and groups, and for different sections of detailed plan responsible sections (organizations) are determined as shown in Table 10.2.1.

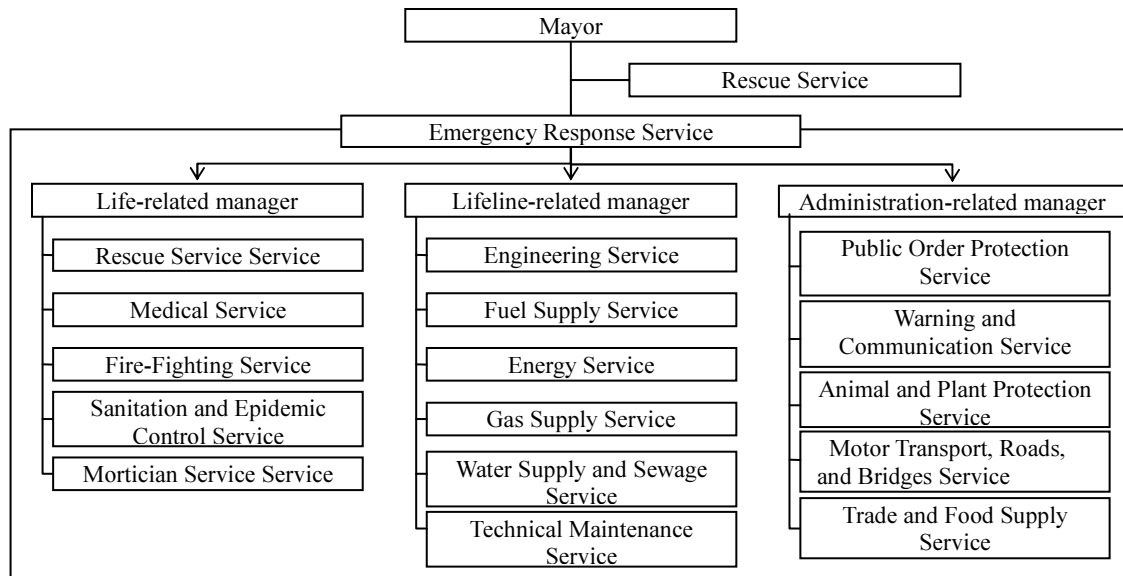


Figure 10.2.1 System of preparatory activities implemented by emergency response services

Table 10.2.1 Sections and organizations responsible for implementation of preparatory activities plan

Plan section	Responsible person or body	Main implementing sections (bodies)
Measurements in the residential and condominium level	Yerevan rescue department	Yerevan rescue department
Preparatory activities on development of ES response methods	Yerevan rescue department	Yerevan rescue department
Preparatory activities on communication system and information transfer	Responsible for control	Communication and warning service Public order securing service
Preparatory activities on fires and dangerous objects (things)	Responsible for guaranteeing of people's life	Firefighting service
Preparatory activities on organization of rescue works and evacuation	Responsible for guaranteeing of people's life	Rescue service
Preparatory activities of emergency cargo transportation	Responsible for control	Transportation service, Public order securing service, Technical service
Preparatory activities on provision of urgent medical aid	Responsible for guaranteeing of people's life	Health service, Hygienic and epidemiological inspection, Service of nature and environment protection
Preparatory activities on issues of lost and dead people	Responsible for guaranteeing of people's life	Rescue service, Service of special facilitation
Preparatory activities on water and food stock provision	Responsible for control	Communal service, Trade and food provision service
Preparatory activities on infrastructure rehabilitation	Responsible for infrastructure	Service of energetic, «Yerevan gas» CJSC, <Yerevan Djur> CJSC, Communication and warning service
Preparatory activities on utilization of garbage and wastes of life activities as well as cleaning of collapses	Responsible for infrastructures	Hygienic epidemiological inspection

Chapter 11 Preparedness by residents and communities

Based on the past experience of huge disasters, it is obvious that city government can not make proper response, with its own capacity only, to a disaster affecting overall city. The capacity of disaster management can be increase by means of task shearing and collaboration among residents and communities (residents' associations, schools, and enterprises) as well as city government.

Relation among residents and understanding of issues on disaster management can be deepened through daily activities on preparation for emergency response. By means of accumulation of the daily activities, emergency response activities such as initial fire extinguishing, rescue, evacuation, etc. will be done smoothly and efficiently.

This chapter describes about activities for preparation of emergency response to be done by residents and communities for enhancing their capacity on emergency response.

11.1 Role of residents

Clause 3.4 mentions about "Responsibilities of residents", and Clause 5.1 mentions about mitigation/ preparedness activities to be done as "Role of residents" for quake-resistant human development as shown in Table 11.1.1.

Table 11.1.1 Mitigation/ preparedness activities by residents

Mitigation	<ol style="list-style-type: none"> 1. Creating associations of residents' in collective houses 2. Securing earthquake-resistance and fire security in houses 3. Fire preventions 4. Fixation of furniture, shelves, wardrobes, protection of glasses of windows 5. Prophylactic inspection and fixation of walls, securing security of facing of buildings 6. Participation in works of creation of systems of mutual assistance by schools, condominiums and other organizations in the frames of local administrative areas 7. Expansion of availability of knowledge and information on measures of prevention of emergency situations and elimination of consequences
Preparedness	<ol style="list-style-type: none"> 8. Provision of fire extinguishers and other firefighting tools in advance 9. Provision of reserves of food, water, mobile radio station, pocket lanterns, medicine and other staples (for at least 3 days) 10. Allotment of duties among family members in case of ES in advance; making decision of gathering place, communication means, order and routes of evacuation 11. Active participation in trainings and other measures, organized by municipal authorities and local communities 12. Provision of information to condominiums and other local bodies about those members of family, who need a special care

Among the items of activities in Table 11.1.1, mitigation activities are explained in Clause 5.2. This chapter explains about preparedness activities to be done by residents.

11.2 Activities on preparedness by residents

Residents carry out the following preparedness activities. Yerevan Rescue Department of RS introduces residents about the activities and assists for promotion of preparedness activities to be done by residents.

(1) Preparation of tools for fire fighting

Residents prepare fire extinguishers and fire extinguishing sheets (against fire during cooking). With the help of Yerevan Rescue Department of RS, and fire-fighting detachment of RS, residents alleviate foreseeable difficulty and anxiety through prior confirmation of the issues.

(2) Preparation of emergency survival materials, including water/ food, portable radio, electric torch, first aid kits for three days

Residents prepare emergency survival materials necessary for survival for at least three days for all members of family, and keep the materials at a place where quick take-out is available. Since difficulty of residents may be bigger in multi-story buildings due to outage of lifeline such as outage of elevators, residents' association prepare stockpile, in addition to individual stockpile, for survival in the multi-story buildings.

Yerevan Rescue Department of RS prepares a list of recommendable stockpile and emergency survival materials and distributes the list for promotion of residents' activities.

(3) Prior confirmation of task sharing among family, evacuation point, way of communication, etc.

Just after earthquake disasters, safety confirmation of family members is an important issue, together with securing own safety for each resident. In case of missing of family members, anxiety of other members is immense, and it is possible to cause bad influence, such as entry of dangerous areas to search the missing members, getting panic, etc.

Residents can alleviate foreseeable difficulty and anxiety through prior confirmation (see Table 11.2.1) against sudden attack of earthquake and quick/ proper response in time of earthquake disaster. The prior confirmation should be done in consideration of several possible cases.

Table 11.2.1 Matters to be confirmed in family beforehand

1. Evacuation route	What evacuation route to be used?
2. Evacuation point	Where is the evacuation points? Where is gathering point of family?
3. Process of evacuation	How to evacuate? Who gives care to elder persons and infants?
4. Way of communication	What is communication way with missing family?
5. Emergency survival materials	Who maintain the materials? Who take out the materials?
6. Confirmation of fire safety	How and who should do safety confirmation?
7. Closing main valves of gas, electricity, water, etc.	Who close the valves? Who confirm the closure?
8. Notification and assistance to neighbors	Who and how notify and assist?

(4) Vigorous participation in disaster drills conducted by the city or communities

Residents vigorously participate and cooperate in disaster drills. Through the activities, residents acquire knowledge and technology on initial fire-fighting, rescue, first aid, evacuation, etc. and enhance capacity on disaster management. In addition, residents understand dangerous points through preparation of a disaster map as well as self-learning, family meeting, training, using the map as preparation of proper response, avoiding danger in time of earthquake disasters.

(5) Provision and clarification of information on people who need assistance

Families, that have members who need assistance, provide information to communities or district branch of Yerevan Rescue Department, so that necessary assistance can be obtained in time of earthquake disasters. Families, that have no such members, maintain communication with neighbors on regular basis and be aware about such people needing assistance for giving assistance in time of earthquake disasters.

11.3 Role of communities

Clause 3.3 mentions about “Responsibilities of Communities”, and Clause 6.1 mentions about mitigation/ preparedness activities to be done as “Role of Communities” as shown in Table 11.3.1.

Table 11.3.1 Preparedness activities by communities

Mitigation	1. Establishment and reinforcement of autonomous groups on disaster management
	2. Formulation of a disaster management plan for each community
	3. Promotion of aseismic reinforcement of buildings and facilities (retrofitting and renewal)
	4. Promotion of measures, preventing turn-down of furniture, fall-down of window glass, etc.
	5. Preparation of disaster education materials and promotion of disaster management education
	6. Fire protection and safety for hazardous materials
Preparedness	7. Stockpile of water/ food/ commodities and stockpile/ maintenance/ regular inspection of disaster management equipment/ materials
	8. Preparation of a list of community members (residents, employees, teachers / pupils), a list of people needing assistance, a contact list of disaster management organizations.
	9. Creation of a disaster management map, preparation and notification of assistance facilities such as evacuation shelters
	10. Preparation for protection/ assistance of community members and residents
	11. Improving the response capacity and giving advice on what to do in time of earthquake disaster by disaster drills and seminars

Among the items of activities in Table 11.3.1, mitigation activities are explained in Clauses 6.2 to 6.9. Preparedness activities by residents are explained in Clauses 11.4 to 11.9 in this chapter.

Number of schools and communities in Yerevan City is shown in Table 11.3.2.

Table 11.3.2 Number of schools and communities in Yerevan City

	District	School	Kinder garden	Community
1	Avan	8	7	13
2	Arabkir	22	13	20
3	Ajapnyak	20	16	42
4	Davtashen	6	5	11
5	Erebuni	24	14	20
6	Kentron	34	20	2
7	Malatia-Sebastia	20	24	16
8	Nor Norq	23	22	20
9	Nubarashen	3	1	1
10	Norq Marash	6	4	0
11	Shengavit	31	22	30
12	Kanaker-Zeytun	17	15	20
	Total	214	163	195

11.4 Stockpile of water, food, and commodities, and stockpile/ maintenance/ inspection of disaster management equipment

Stockpile of water and food to be prepared by residents in each family is explained in Clause 11.2 (2). Considering worse case that the stockpile cannot be used due to collapse of buildings, etc., communities install storehouse at safer place and stockpile water, food, and commodities in the storehouse.

In addition, communities purchase/ stockpile disaster management equipment/ materials, prepare a list of the equipment/ materials, determine place of the storehouse and responsible person, disseminate the place of the storehouse, and conduct regular inspection. The responsible person of the storehouse carries out inspection and maintenance of the storehouse, once a year. In order to familiarize the usage of the equipment/ materials, community organizes training once a year. A list of equipment/ materials to be prepared by community is shown in Table 11.4.1.

Table 11.4.1 Equipment/ materials to be prepared by community

Purpose	Equipment/ materials
Communication	Loud speakers, portable walky-talkies
Fire fighting	Fire extinguishers, buckets, sand bags
Rescue	Steel bars, wooden bars, saws, ladders, axes, pickaxes, shovels, scissors, ropes, jacks, electric saws
First aid	Stretchers, first aid kits
Evacuation	Searchlights, arm bands, flags, ropes, generators, kitchen ranges, pots, water tanks, water filters, tents, plastic sheets, fuels, portable toilets, blankets, food, etc.

Basically, community has responsibility in maintenance and control of the equipment/ materials. Cost for purchasing is born by members of communities. The city provides some kinds of equipment or subsidy for the purchasing, in order to promote the stockpiling activities.

Enterprises are required, in their social responsibility, to contribute for safety of people and stability of social life, in case of disorder anxieties in provision of livelihood materials due to earthquake disasters. Enterprises prepare stockpile for emergency response through providing own equipment/ materials or livelihood materials, and through vigorous cooperation to emergency response activities.

11.5 Preparing a list of community members, a list of people needing assistance, a contact list of disaster management equipment

Communities prepare a list of members (residents, employees, pupils, teachers), a list of people who need assistance, and a list of communication to related organizations. In residents' associations, a leader of each residential building prepare a list of residents as shown in Table 11.5.1 and clarify structures of members, people who need assistance, and people who can provide support for organized activities. It is necessary to pay attention to secure privacy.

Table 11.5.1 Items and contents of a list to be prepared by community

Item	Content
Community	Number of families, Board members, Actual situation of activities such as straining, dangerous places, evacuation points, etc.
Family	Age, sex, contact address of each members of families
People who need assistance	People who need assistance, required kinds of assistance, people who provide assistance, etc.
Manpower	Specialists of emergency medical care, specialists for rehabilitation, etc.

11.6 Developing a disaster management map, preparation and notification of assistance facilities such as evacuation shelters

Communities understand dangerous places (risk) and resources of disaster management in the area through “town walking”, and prepare a disaster management map that includes collected information and evacuation points. If possible, three entities of disaster management cooperate to prepare the map. Matters and items to be observed and describe in the map are shown in Table 11.6.1.

Table 11.6.1 Matters and items to be observed and described in a disaster management map

Dangerous matters and materials	<ol style="list-style-type: none"> 1. Vulnerable buildings, walls/ balcony, air conditioners/ advertising display/ window glasses foreseeable to fall-down 2. Gas pipe network, gas pressure regulating facilities, filling stations, electric substations 3. Electric poles/ street lamps/ electric towers, electric lines 4. Garbage collecting points 5. Narrow streets, parking lots, walls/ trees foreseeable to fall-down 6. Factories, dealing with dangerous materials, pedestrian subway foreseeable to collapse
Disaster management resources	<ol style="list-style-type: none"> 7. City office, district offices, fire stations, police offices, schools, disaster management facilities (for direction, evacuation, assistance) 8. Parks, open spaces, evacuation points 9. Wide streets, bases of emergency vehicles/ trucks for transportation 10. Restaurants, shops, emergency water facilities (wells and springs), storehouses for disaster management 11. Emergency power generation/ lighting/ wireless communication facilities, public telephones 12. Fire hydrants, fire fighting vehicles, fire extinguishing devices/ equipment 13. Hospitals, pharmacies, storehouses of medicine/ stretchers, sanitary facilities 14. Construction vehicles, construction materials, storehouses of equipment/ materials for rehabilitation

Communities distribute the disaster management map to members and other people for understanding of dangerous places, disaster management resources, and issue on disaster management. In addition, communities notify and confirm the tasks of each community and process for response, utilizing the disaster management map in opportunities such as regular training and disaster education.

Schools designated to be evacuation points, prepare for establishing evacuation points (see Clause 15.3).

11.7 Preparation for protection/ assistance of community members and residents

In the time of earthquake disasters, members of communities provide care and assistance to victims and people who need assistance in the communities, after securing own safety.

People who need assistance in ordinary time, have further difficulty in evacuation and life in evacuation points. It is therefore necessary to determine the way of proper assistance and assistants in ordinary time. Communities determine contents/ places/ persons for assistance and describe them on a list of people who need assistance. Communities make an arrangement for transmission of information of disaster management to the members and people who need assistance. In addition, training for assistance of people who need assistance is required with participation of the people who need assistance. Communities also make plan and preparation on procedure of usage of evacuation points, such as securing spaces for easiness of people who need assistance in living and receiving assistance.

Communities make prior agreement with related enterprises for procurement of livelihood materials, food, etc for victims. Prior agreement on procedure and method for acceptance of volunteers should be made. Exchange of information and revision of plan will be made through regular meeting with volunteers' associations.

11.8 Improving response capacity and dissemination of mental preparedness in time of earthquake disaster through disaster drills and seminars

It is not efficient to consider how to response after occurrence an earthquake disaster. In order to carry out realistic and efficient emergency response, training and seminars are organized, based on the result of damage assessment. Through conducting training and seminars on disaster management, issues on emergency response are picked up and points to be improved are found in response measures. In addition, people who may suffer with damages can have images of response activities and experiences on collaboration. Although training and seminars have already been conducted, it is preferable to conduct much effective training on earthquake disaster management.

11.8.1 Dissemination of points on mental preparedness in time of earthquake disasters

Communities, with assistance of Yerevan Rescue Department, notify the community members about the result of damage assessment, and promote the members' understanding about increasing knowledge on disasters, mental preparedness, preparation on disaster management, through seminars, lectures, workshops, booklets, etc.

11.8.2 Enhancing capacity of response through disaster drills

Communities enhance their capacity of response to disasters through conducting regular earthquake disaster drills. Communities expand capacity through reinforcement of collaboration with related organizations on disaster management, other communities, and disaster volunteers.

Communities conduct regular disaster drills at least once a year, setting particular theme for each drill. In the drills, emergency response activities such as evacuation, information transmission, fire fighting, first aid, distribution of materials, field cooking, etc. will be done, based on the tasks of sub-groups in autonomous groups of residents for disaster management (see Clause 6.2). The following kinds of drills are carried out.

- a) Drills done by a community alone
- b) Joint drills done by communities

c) Comprehensive drills done by communities, official organizations, and residents

The comprehensive drills is conducted by related organizations in an integrated manner, including Yerevan Rescue Department RS, Emergency Situations Committee, Evacuation Committee, departments of the city office, other organization such as emergency management services, and communities. Aiming at enhancing comprehensive capacity on emergency response, wide-range drills are carried out on information exchange, evacuation, rescue, fire-fighting, debris clearance, rehabilitation of lifeline facilities, regional assistance, etc. The targets of the drills are clarification of efficient way of implementation of disaster management plan, enhancement of community groups on disaster management, and raising awareness and technology in autonomous activities on disaster management.

Communities submit a plan of drill beforehand and evaluation result of the drill afterward to Yerevan Rescue Department RS. With the guidance of Yerevan Rescue Department, communities make necessary revision of the plan of the next drills as well as disaster management plan of the communities. The mode and contents of drills are shown in Table 11.8.1.

Table 11.8.1 Mode and contents of drills

Mode of drills	Contents
Managemnt (administration)	Emergency gathering drill, Headquarters operation drills, Information transmission drills, Table-top drills, Information dissemination drills, etc.
Emergency response	Initial fire-fighting drills, Drills on opening and operation of evacuation points, Evacuation and guidance drills, Rescue and first aid drills, Debris clearance drills, Material transportation drills, Rehabilitation drills. Regional assistance drills, etc.

(1) Disaster drills by residents' associations

Capacity of emergency response of individual resident; a member of residents' association, is limited. Capacity on disaster management can be increased as a group, by means of giving responsibility to residents' association and promoting activities on disaster management such as conducting earthquake disaster drills.

(2) Disaster drills by enterprises

Enterprises conduct earthquake disaster drills once a year or more, with combined purposes among several purposes shown in Table 11.8.2.

Table 11.8.2 Purposes of drills by enterprises

Purpose	Contents
Information transmission	Clarification and reporting of disaster situations, Direction and information to employees, Information dissemination for avoiding confusion, Procedure of notification and information to Yerevan Rescue Department at the time of fire outbreak, etc.
Evacuation	Procedure of evacuation and its guidance, Handling process fire alarm system and rescue equipment
Fire safety	Procedure of shut-down of electric sources and fuel supply of fire-use facilities, Measures to prevent leakage of dangerous materials such as oil
Fire fighting	Operation of fire extinguishers, fire hydrants, small-scale pumps
Rescue	Transportation of injured and assistants, knotting of ropes, first aid such as treatment with triangular bandage

(3) Disaster drills in schools

Schools conduct disaster drills under the guidance of Ministry of Education and Science and Yerevan Rescue Department, in order to secure safety of pupils. The drills are conducted to be practical manner “real disaster mode”, so that pupils can easily participate in the drills and understand the contents. After the drills, evaluation should be done on method of directions and safety confirmation by teachers as well as behaviour of pupils, for improving subsequent drills. The contents of the drills are determined for enhancing collaboration with surrounding enterprises and residents’ associations. In addition, other measures are established/ confirmed through the drills, such as way of communication with parents in emergency, manner of protection of pupils, safety information on route to/from schools, etc. Schools designated to be evacuation points conduct drills on opening and operation of evacuation points. District branches of RS provide guidance and Yerevan Rescue Department RS manage the activities.

11.9 Framework of implementation of activities in communities

(1) Establishing disaster management community unit

By separating areas by the size of 1 to 2 sq km as a unit, Yerevan Rescue Department creates a disaster management coordination community consisting of several communities within a unit. In the areas, communities including residents’ association, enterprises, and schools work together to formulate a disaster management plan, and conduct joint exercises. Yerevan Rescue Department provides guidance for the formulation of the disaster management plan, such as utilization of heavy equipment of enterprises in residents’ associations and schools at the time of emergency. The entities in the areas work with one another to effectively utilize disaster management resources, and establish a comprehensive secure community-creating system within the areas (see Figure 11.9.1).

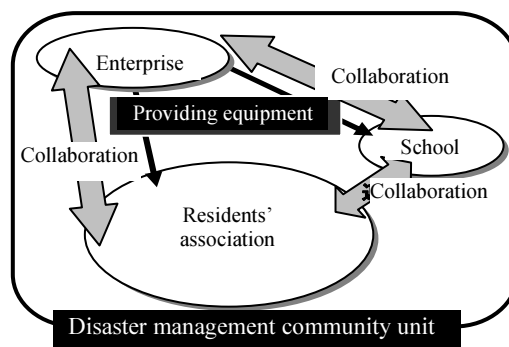


Figure 11.9.1 Concept of disaster management community unit

(2) Dispatching expert on disaster management

In order for a disaster management community unit to deliver assistance for disaster management activities, the National Academy of Crisis Management will send a disaster management expert. The expert is a facilitator, assisting workshops and other activities in community. The National Academy of Crisis Management carries out raining for the facilitator, and RS manages the activities. The facilitator has responsibility for leading a series of disaster management activities

and taking up opinions from the community members to arrange and consolidate them as shown below.

- a) Promoting awareness on disasters such as understanding of risks and estimated external force, through creating images of disasters
- b) Assisting for discussion on measures and preparation of disaster management plan,
- c) Promoting implementation and training, finally

In addition, the facilitator promotes for joint activities of each entities of disaster management in a disaster management community unit.

11.10 Assistance for community preparedness activities

(1) Stockpile of water/ food/ commodities and stockpile/ maintenance/ regular inspection of disaster management equipment/ materials

Basically, community has responsibility on stockpile of water/ food and stockpile/ maintenance of equipment/ materials for disaster management as mentioned in Clause 11.4. In order to promote the community activities, Yerevan Rescue Department provides assistance as shown in Table 11.10.1.

Table 11.10.1 Assistance by official organizations for stockpiling of community

Yerevan Rescue Department RS	Preparing official documents such as Mayor's decision for promoting stockpile
	Providing a list of stockpile materials, together with rough standard of quantities per day per person for promoting stockpile of water/ food/ commodities
	Providing a list of stockpile equipment/ materials, together with rough standard of quantities per member for promoting stockpile of equipment/ materials
	Clarifying situation of stockpile in community and instructing overall issues on promotion of stockpile
Ministry of Education and Science	Supervision on stockpile and maintenance in schools
	Financial support for purchasing stockpile materials in school

(2) Preparation of a list of community members, a list of people who need assistance, and a contact list of disaster management organizations

Community has responsibility for preparation/ storing/ updating of lists of community members, people who need assistance, contact address (see Clause 11.5). In order to promote the activities, Yerevan Rescue Department and Ministry of Education and Science provide assistance as shown in Table 11.10.2.

Table 11.10.2 Assistance by official organizations for preparation of lists

Yerevan Rescue Department RS	Preparing official documents such as Mayor's decision for promoting the preparation of the lists
	Providing items to be mentioned in the lists
	Providing general list of address of organizations related to disaster management
Ministry of Education and Science	Direct instruction and assistance for preparation of lists
District branches of RS	Monitoring of the activities of preparation of the lists
	Reporting the result of monitoring to Yerevan Rescue Department RS

(3) Creation of a disaster management map, preparation and notification of assistance facilities such as evacuation points

Yerevan Rescue Department, RS and Ministry of Education and Science provide assistance to community for promotion of town walking, clarification of dangerous places and disaster management resources, preparation/ utilization of disaster management map as shown in Table 11.10.3.

Table 11.10.3 Assistance by official organizations to community for preparation of a disaster management map, etc.

Yerevan Rescue Department RS	Preparing official documents such as Mayor's decision for promoting the preparation of a disaster management map, etc.
	Providing items to be shown on a disaster management map
	Providing information on dangerous facilities and disaster management resources in community
	Installing guidance boards, mentioning location of evacuation points and issues on preparedness
Ministry of Education and Science	Providing guidance and assistance directly on preparation and utilization of a disaster management map
District branches of RS	Dividing area into plots for preparation of a disaster management map
	Providing general guidance for preparation and utilization of a disaster management map
	Providing assistance for distribution of the disaster management map to members of community
	Providing guidance to community leaders and person in charge for utilization of disaster map
	Monitoring of preparation and utilization of the disaster management map
	Reporting the result of monitoring to Yerevan Rescue Department, RS

(4) Preparation for protection/ assistance of community members and residents

Yerevan Rescue Department, in cooperation with district offices, provides information on the contents of official assistance, care facilities, utilization of evacuation points to community for promotion of activities on protection/ assistance of community members and residents.

(5) Improving response capacity and giving advice on what to do in time of earthquake disaster by disaster drills and seminars

Yerevan Rescue Department, in cooperation with district branches of RS, prepare official documents such as Mayor's decision for realization of disaster drills at about 10 locations in community a year (in total 120 locations in the city), and assists/ guides the disaster drills in community.

National Academy of Crisis Management sends experts for instruction on fire-fighting and rescue at the time of disaster drills in community. National Academy of Crisis Management sends a facilitator for guidance in seminar or workshop held in community.

11.11 Collaboration/ co-working with volunteers

Yerevan City initiates collaboration and co-working with volunteers and NGOs for realizing efficient rescue operation for victims in time of earthquake disaster.

A disaster volunteer is an individual person or a group, providing its capacity or time autonomously after disaster for assisting life and self-sustainability of victims and for assisting emergency response done by official organizations and related organizations..

Disaster volunteers can be divided into the following categories.

- a) A volunteer who belongs to an organization or group such as NGO, NPO, an enterprise, religious group
- b) An individual volunteer who do not belong to any organization or group
- c) A volunteer who provides money, materials, etc. from outside, without doing activity in the damaged area

11.11.1 Activities of volunteers

Disaster volunteers are also divided into “specialized volunteers” who have specialized knowledge, ability, or particular licentiate, such as doctors, nurses, architects, and “general volunteers” who carry out cooking, sorting works which are not required particular knowledge, ability, or license. The positions of each category are shown in Table 11.11.1.

Table 11.11.1 Category and positions of volunteers

Specialized volunteer
<ul style="list-style-type: none"> • Doctor, Dentist, Pharmacist, Nurse, Health nurse, and other medical staffs • Architect who assess dangerous extent of buildings • Interpreter (foreign languages, finger language), Translator • Psychologist • Nursing care provider to elders and disability persons
General volunteer
<ul style="list-style-type: none"> • Cooperator for operation of evacuation points • Assistant for field cooking and distribution of food • Assistant for sorting and distribution of relief materials • Assistant for care of elders and disability persons • Cleaning person • Assistant for collection and transmission of safety information, information on daily life • Other workers for work on light duty

11.11.2 Process of assistance for volunteers' activities

Yerevan Rescue Department, RS should initiate prior discussions with NPOs such as Red Crescent Societies so as to effectively accept volunteer activities in time of disaster, and establish “Disaster management volunteer information center” and “Disaster volunteer local assistance center” in the secretariat of the Crisis Management Center.

(1) Information centre for disaster volunteers

After the occurrence of disaster, Yerevan Rescue Department establishes “Information centre for disaster volunteers” under the secretariat of Disaster Management Headquarters for wide provision of information on damage situations and needs of volunteers, etc.

The information centre makes communication, arrangement, and request for dispatching with nation-wide assisting organizations and volunteers' associations, and establishes function as base of

collecting/ receiving/ sending information on volunteers in city-level. The centre assists opening of “on-site assisting centre for disaster volunteers” and secures the staffs of the on-site assisting centre. The information centre carries out the works shown in Table 11.11.2.

Table 11.11.2 Major work of information centre for disaster volunteer

- | |
|---|
| <ol style="list-style-type: none">1. Collecting and providing disaster information in cooperation with Crisis Management Center2. Assisting for opening and operation of on-site assisting centre for disaster volunteers3. Communicating and arranging with nation-wide assisting organizations and volunteers' associations |
|---|

(2) On-site assisting centre for disaster volunteers

After the occurrence of disaster, Yerevan Rescue Department, in cooperation with district branches of RS, establishes “On-site assisting centre for disaster volunteers” under the secretariat of Disaster Management Headquarters. The assisting centre communicates with District Emergency Headquarters, secures necessary operation base and equipment/ materials, and requests for operation staffs. The assisting centre carries out the works shown in Table 11.11.3.

Table 11.11.3 Major work of on-site assisting centre for disaster volunteers

- | |
|---|
| <ol style="list-style-type: none">1. Collecting needs for volunteers and providing information on the needs2. Collaborating with the information centre for disaster volunteers such as request for dispatching staffs3. Receiving and registering volunteers4. Instruction course on activities of disaster volunteers (mode and contents of activities, accommodation, etc.)5. Summarizing and managing activities of volunteers6. Communicating and arranging with District Emergency Headquarters7. Formulation of network between NGO/ external volunteers’ association and local volunteers for arrangement of activities |
|---|

11.11.3 Training and education of volunteers

For efficient volunteers’ activities in time of large-scale disaster, environment for autonomous participation of residents to volunteer activities and assisting system for proactive operation of related organizations should be developed.

(1) Promotion of education on volunteer

Yerevan Rescue Department expands opportunity for children to interact and experience in communities and facilities, so that children take an interest in welfare and contribution to society.

(2) Human development for coordinators and training on activities in time of disasters

Yerevan Rescue Department of RS assists activities of volunteers, volunteers’ associations, and enterprises through National Academy of Crisis Management and develops specialized coordinators capable for establishing necessary operation system in accordance with situations in damaged areas, through coordinating for cooperation among official organizations and related services as well as organizing training on know-how on assistance.

Yerevan Rescue Department of RS also assists for cultivation of human resources and provides knowledge and technology necessary for establishing and expanding autonomous activities of volunteers' associations. For that purpose, advanced courses will be held in National Academy of Crisis Management for promotion of training of coordinators and leaders of volunteers.

Yerevan fire-fighting detachment of RS assists volunteers' associations, so that the associations can achieve their targets of activities in time of disaster, through providing opportunities to have knowledge and training necessary for initial response in time of disaster.

(3) Promotion for creating network among volunteers' associations

Yerevan Rescue Department of RS assists volunteers' associations, so that the associations can interact and work together in the area, and create network among the associations to reflect local situations, through liaison meeting and study group meeting. Yerevan Rescue Department also improves conditions for collaboration among the associations such as development areas of volunteers' activities, provision of information, etc., and assists operation of network which volunteers' associations, NPOs, and volunteers in enterprises can participate.

Chapter 12 Preparedness related to initial response

12.1 Maintenance of functioning official buildings

CMC, to be established in Yerevan City Emergency Situations Committee by Mayor's decision N 747-A Yerevan City, dated on April 13, 2007, operates in the management center of emergency situations of Yerevan City.

Based on the situation, alternative facilities can be used for the leading staff and forces of liquidation of consequences as bases for smooth implementation of urgent measures immediately after the earthquake.

According to the design documents, these buildings should resist not less than 9 intensity earthquakes, but taking into account the fact that the buildings were built long time ago, it is necessary to develop a system for checking the seismic stability of the buildings.

The facilities and stockpile of the buildings are prepared, in consideration of the points shown in Table 12.1.1.

Table 12.1.1 Preparation of facilities and stockpile in official buildings

No	Facilities and stockpile	Points to be considered in preparation
1.	Firefighting equipment	Firefighting equipment should be installed in the buildings. It is necessary to check the operability of the equipment permanently, so that they can be used at any moment.
2.	Windows and glass	It is necessary to strengthen the skeleton of windows and to coat the glasses with films for preventing falling –down glass during the earthquake to avoid injury and disturbance of operations.
3.	Emergency backup power supply system	Emergency backup power supply system should be installed in the buildings. Maintenance of the system and stockpile of fuel should be done, so that the system can be operated immediately after the outage of electricity and provide power to important sections at least for one day.
4.	Drinking water and water for other purposes	Drinking water should be stockpiled at least 9 lit. per person for three days (3 lit. per day per person). Water for toilet, hand washing and other purposes should also be stockpiled. It is necessary to keep water storages and supply pipes in proper condition to avoid any loss of water during earthquake.
5.	Food	Emergency food such as food without cooking or with long shelf life should be stockpiled. It is necessary to check the expiry date of the food.
6.	Others	Emergency heating devices and air purification devices should be stockpiled. It is necessary to check the operability of these systems. Potable box type toilets with tank capacity of 400 lit. should be stockpiled at least one toilet for 100 persons.

Considering case that access between home and office is not available, tools for sleeping such as portable beds or tentative sleeping space is arranged.

12.2 Formation of the Crisis Management Center

Emergency Situations Committee, which is the base of CMC, consist of the following members and managed by the head; Mayor of Yerevan City.

- a) The head of the committee is Mayor of Yerevan City

- b) The deputy heads are deputy mayor of Yerevan City and the head of Yerevan Rescue Department of RS.
- c) The heads of departments of the city office, the heads of districts, heads of republican government organizations, and the head of anti-epidemiological monitoring and delivering special services are the members of the committee.

12.3 Enhancing the initial response process

12.3.1 Gathering of members of Emergency Situations Committee

If a member of the committee feels an earthquake of the intensity of 4 or more in MSK-64 or be aware of damages caused by the earthquake, the member should use the operative communication to clarify the situation and confirm the task.

The staffs of the city and members of the emergency response service check the created situation according to the rules of communication. They should gather in their working places or definite gathering point, except for that situation is not serious.

12.3.2 Prior selection of substituting members of the committee

Considering cases that the members of the headquarters cannot communicate or cannot fulfill their obligations due to injuries or other reasons, substituting staffs should be assigned and the order of their replacement should be determined beforehand.

If communication with a member of the headquarters is not available from the headquarters, the substituting staff acts as the member of the headquarters. If communication between the member and the headquarters is available, the member directs the substituting staff to fulfill the obligation of the member of the headquarters.

12.3.3 Duty at Night and on non-working days

The duty officer of the management center of emergency situations receives calls from the residents on accidents. Communication and warning service warns the members of Emergency Situations Committee by using all the available means of communication – telephone lines, special radio communication lines etc.

12.4 Plan of deployment of supporting staffs

12.4.1 The main principles of plan of deployment of staffs

A plan of deployment of staffs is prepared with the following principle.

- a) All the staffs of City office and emergency response services should be deployed, basically.
- b) Deployed staffs are classified into staffs for the headquarters, staffs in ordinary working places, staffs dispatched to operation bases, and staffs for the nearest working places.
- c) The plan of deployment of the staffs should be updated every year and submitted to the head of Yerevan Rescue Department of RS. Yerevan Rescue Department makes necessary adjustment and submits the plan to Mayor for approval.

12.4.2 The content of the plan of deployment of staffs

Yerevan Rescue Department of RS works out a mobilization plan of staffs of the headquarters and a manual for smooth implementation. Corresponding services under Emergency Response Service and related departments of the city work out the own deployment plans of each organizations. The contents of the plan should be available to all the employees. In case of changes of staffs in services or departments, the plan should immediately be updated accordingly. The staffs, who are not subject to deployment, are staffs in the following situations, and approved by the head of the organizations.

- a) Sick and weak people, invalids
- b) Pregnant women or the ones who have a child of one year old or less
- c) Other staffs who have special reasons

The staffs of corresponding services or departments are divided into the following groups (see Clause 12.4.1), and the heads of the organizations allocate their staffs beforehand according to the scope of responsibility and inform the staffs about their appointment during mobilization.

- a) Staff for the headquarters: staffs of Crisis Management Center described in Clause 12.2
- b) Staffs in ordinary working places: Staff for the implementation of urgent measures in their ordinary working places
- c) Staffs dispatched to operation bases: Staff dispatched to evacuation points, medical points, and rehabilitation bases of infrastructures for providing aid
- d) Staff for the nearest working places: Staff who stays far from his/ her ordinary working place, requiring more than one hour to get to the place, and carries out the duty at the nearest base for assistance. As it is mention in Clause 12.3, the attached staff should reaches the designated place autonomously and should inform about it by stipulated means of communication.

12.5 Improving the collaboration among disaster management organizations

During severe earthquake, the immediate measures should be organized in such a way as to be able to use human resources and unaffected material means as efficiently as possible. Particularly, it is necessary to cooperate with surrounding areas and enterprises which have human resources and material means. In case a severe earthquake occurs in Yerevan City, all marzes of the country send assistance to Yerevan City. The content of the assistance sent from marzes is planned beforehand and those who receive the assistance (committee of immediate regulation) should be confident in their preparedness and compliance as well as decide the order of reception of assistance from corresponding marzes.

Taking into account that nowadays enterprises are mainly privatized, it is necessary to take measures beforehand to use the means of private enterprises under the guidance of the Emergency Response Service and Crisis Management Center. For that purpose, it is necessary to decide the means of private enterprises, conclude a relevant contract with them for the provision of technique and means during emergency situations. Corresponding services should conclude contracts with companies on the provision of construction technique, drivers, food, fresh water, and other assistance.

Chapter 13 Preparedness related to communication

In order to reduce consequences of disaster, it is necessary to clarify damage situations and inform the damage situations and instruction for response to related organizations, communities, and residents. To do so, it is necessary to create a confident communication and automated information transfer systems.

13.1 Improving the communication network for disaster management

One of the most important functions of official organizations in population protection and civil defense field in case of ES is the warning to management bodies and population. It is obvious that for effective and flexible management and warning it is necessary to have a modern unitary communication system.

A main telephone communication, internal telephone communication, mobile phone communication, direct telecommunication, special telecommunication and communication lines are used in subdivisions of the Ministry of Emergency situations of the RA, the services of which are provided by Armentel, Gh-Telecom and Orange Armenia CJSC. There are 458 main telephone connections, 96 mobile phone connections, 25 direct telecommunications, 68 special ones (from which 54 special 1-01, 4 special 1-12, and 10 special 9-11 telephone numbers), and 9 international communication lines (from which 5 are less than of 100km distance, 4 are more than of 100km distance) in the system of MES of the RA. There are 6 automated telephone stations in the system through which an internal telephone network was created.

There are about 750 unit short wave and ultra short wave type “Angara”, “R-143”, “Rakal”, “Kodan”, Aykom”, “Alinko”, “Motorolla”, “Kenwood”, “Hit-TA”, “Roger”, “Viola”, “Palma” and “Mayak” stationary, mobile and portable radio stations exploited in the subdivisions of Ministry of Emergency Situations.

Unlimited, limited, stationary and mobile communication services (Internet) are exploited in the subdivisions of Ministry of Emergency Situations, through which electronic correspondence, file transfer, audio video connections etc. are realized.

According to statistic data, in case of strong earthquake in Yerevan, Kapan and Spitak about 20 percent of mobile and municipal communication system used in the territory of the Republic of Armenia will become out of order. The subdivisions of Ministry of Emergency Situations should use radio communication for organization of communication during realization of rescuing works. Gh-Telecom CJSC for rehabilitation of communication in such cases uses mobile communication stations, which are developed as soon as reached the place and a three hour connection is organized.

13.2 Enhancing the communication/ information gathering process

Ministry of Emergency Situations has lists of contact telephone numbers in order to organize warning of republican government organizations, local government organizations and other organizations. In the same time, there are responsible persons assigned in government

organizations for organization emergency response in their department, but most of these persons have no experience to act in emergency situations.

To organize warning quickly and clearly in case of an earthquake, it is necessary to realize organizational measures for strengthening communication and information systems. For this purpose, it is necessary to check and update warning lists periodically, realize verification of contact numbers etc., as well as:

- a. development of 911 service
- b. improvement of databases, including information attracted on the maps
- c. development of crisis response procedures
- d. investment of computerized systems for situation evaluation in real time

13.3 Public relations and public hearing activities during normalcy

The following measures are implemented, in order to enhance understanding of residents about approaches and mitigation/preparedness measures taken by republican government and Yerevan City, as well as of contents of this plan and other plans.

- a) Promotion for raising awareness of communities and residents and autonomous disaster management activities
State aid was not provided in time and in whole volume to injured people in early times, which highly increased damage volume. Thus, it is necessary to increase consciousness level of society and population and promote self-dependence acts for disaster protection. For that it is necessary to inform population about real volume of possible disaster, volumes of state aid, as well as those acts which population should realize independently.
- b) Base for increase of official assistance
Increase of volumes of state support will require enlargement of state and local budgets, which can be done via increasing taxes. For that it is necessary to receive consent of population. This process (tax increase and distribution of amounts for ES response and elimination of consequences) will be eased if population receives real information about possible disaster, will realize small volume of existed state support and will wish to support in increasing the state aid volume.
- c) Promoting mutual cooperation among related organizations
There are many official organizations, which are related to emergency response with their functions. Those structures should implement verification of repeating of those functions, find out the shortcoming questions, and then should realize organization of mutual activities.
Thus, it is necessary for all organizations to share the contents of disaster management plan of each organization.
- d) enhancing a sense of safety and trust
One of important conditions on effective management in the field of disaster management is to enhance a sense of safety and trust of the government. In order to do so, the risk management plan and disaster management plan should be open to the public, so that residents can understand the process and results of planned measurements. It will promote more active implementation of operations by officers of republican and city governments.

For information dissemination, internet, mass media, newspapers and posters will be utilized. Staffs for disaster management as well as residents should be involved in this process through seminars, trainings, audio video programs. Additionally, an information service with free telephone numbers should be established in the responsible body in order to provide corresponding services, information.

Chapter 14 Preparedness for fire and hazardous materials

14.1 Enhancing initial fire-fighting process

(1) Guidance for proper setting-up of fire safety facilities

Fire-fighting Service instructs residents and enterprises to set up fire safety facilities properly against an earthquake, so that the facilities function properly in time of earthquake disaster for initial fire fighting.

(2) Technological improvement and validation on measures for initial fire fighting

Fire-fighting Service promote to install fire-alarm boxes, which have function to detect fire at early stage with warning sound, to all houses. For that purpose, introduction of obligatory rule for installation of the fire-alarm boxes or official assistance for the installation will be considered.

To securing proper function of fire-alarm boxes, the performance of the boxes on detecting smoke and on influence of cooking will be verified.

(3) Enhancing process of fire-fighting by residents and enterprises

a) Enhancement of capacity on activities for disaster management by residents

Fire-fighting Service, in cooperation with enterprises of gas and electricity, conducts investigation on awareness on disaster management of residents and actual situations on process of fire fighting, and promotes effective training, according to the results of the investigation.

In the training on disaster management for residents, basic process of fire fighting is included in the training menu. At the time of evacuation drills, training is done to experience advanced technique of fire fighting. On the training for autonomous groups in communities, practical training on fire fighting is done to promote cooperation/ collaboration among residents.

Furthermore, the cooperation in local areas is expanded and the capacity on activities for disaster management in the local areas is being enhanced, including assistance to vulnerable people in time of fire outbreak.

b) Enhancement of capacity on activities for disaster management by enterprises

Fire-fighting Service instructs all enterprises to prepare disaster management plan, including measures on fire fighting, and promote enhancement of capacity on fire fighting of autonomous groups for disaster management in enterprises, through organizing training, guidance, etc.

Fire-fighting Service also strengthens cooperation among enterprises as well as cooperation with other autonomous groups on disaster management as a part of the disaster management activities, improves equipment/ materials for disaster management, and promotes creation of cooperation system in the local areas.

14.2 Prevention of fire spread

14.2.1 Improvement and strengthening of framework of fire fighting activities

Fire-fighting Service prepares fire-fighting plan in time of earthquake disaster available for several cases of disasters, referring the estimation results of fire outbreak, for utilizing capacity of fire fighting in ordinary time, and establishes framework of fire fighting.

In order to respond fire outbreak with earthquake which occurs many places at a time in wide area, special vehicles and equipment effective for fire-fighting and rescue activities are improved, and capacity of fire fighting is enhanced and strengthened to meet urban structures and change of disaster situations.

(1) Development of mobile troops for fire fighting

Fire-fighting Service considers arranging heavy equipment and special fire-fighting vehicles such as the vehicles equipped with long-distance and big volume of water transfer devices, developing mobile rescue and fire-fighting teams of special trained staffs, and developing rescue and fire-fighting teams responding for special disasters such as chemical fire.

Fire-fighting also considers developing mobile rescue and fire-fighting teams, mainly for earthquake disasters, aiming at prevention of expansion of disaster in central part of the city, where degree of danger of building collapse and fire is high in large-scale earthquake disaster and huge damage is foreseen.

(2) Consideration of system of aviation fire-fighting activities by helicopters

Fire-fighting Service considers whole concept of airbase for aviation fire-fighting as well as agreement on assistance on aviation fire-fighting.

14.2.2 Arrangement of equipment and materials

Fire-fighting Service arranges equipment and materials for response to variable situations of earthquake disasters, so that regular capacity of fire-fighting can be utilized as efficiently as possible. The service reinforces system of mechanical assistance for immediate repairing of vehicles.

14.2.3 Reinforcement of communication system

(1) Reinforcement of communication system for fire-fighting

Fire-fighting Service reinforces operative function of rescue teams through promoting digitalization of wireless communication system of fire-fighting and rescue teams.

Installation of monitoring cameras on a high altitude, emergency information transmission system, and utilization of images of other organizations is considered for reinforcement of collecting and transmission system of information. Information of monitoring cameras, which mainly used for control of traffic and security, can be used for fire-fighting.

(2) Improvement of system for information collecting and processing of information

Fire-fighting Service promotes the following measures, aiming at improving system for information collecting and processing as well as increase of the reliability.

- a) Reinforcement of information collecting system and speed-up of activities of fire-fighting troops, through promoting in-car communication system
- b) Promotion of installation of terminal of communication system in emergency medical institutes
- c) Establishment of back-up of disaster rescue information system to increase reliability
- d) Other measures to increase aseismic stability, safety, and reliability

14.2.4 Improvement of fire-fighting water supply

(1) Measures to be promoted by Fire-fighting Service

- a) Promoting installation of fire-fighting water tanks with aseismic structure to the areas with high risk of fire spreading, important areas for implementation of earthquake disaster measures, in cooperation with related organizations.
- b) Installing fire-fighting facilities such as fire-fighting water tanks, at the time of construction of public facilities. For the construction of private sector, consultation for the installation of fire-fighting water tanks etc. will be done with the developers.
- c) Promoting development of fire-fighting water resources, utilizing all water resources such as river water and reservoirs, in cooperation with districts and related organizations.
- d) When Rescue Service sells or transfers land/ facilities for fire-fighting water resources, the water resources should be remained un-removed or alternative sources should be developed.
- e) Fire-fighting water supply is secured for efficient fire fighting activities, in cooperation with related organization, especially in the area of lack of the facilities.

(2) Measures to be promoted by the city

- a) When public facilities are constructed, fire-fighting facilities such as fire-fighting water tanks are installed in the facilities,.
- b) Regulation on installation of fire-fighting water tanks and the capacity is included in the section land development in the regulation on urban development master plan, based on local conditions.
- c) When the city sells or transfers land, existing fire-fighting tanks are remained un-removed or alternative tanks should be developed.

14.3 Improving the fire-fighting process

14.3.1 Developing and reinforcing fire fighting sub-groups in autonomous disaster management groups

For the promotion of disaster management activities in community, creation and reinforcement of fire fighting groups in autonomous disaster management groups are described in Clause 6.3. In addition, Clause 11.9 describes the establishment of framework for promotion of disaster

management activities through dividing into small areas of 1 km to 2 km square, in cooperation among community (residents' group, enterprises, and schools).

Fire-fighting Service considers to create "local fire-fighting troop" and to develop framework for education of residents in a unit of "local fire-fighting troop".

Fire-fighting Service considers organizing "local fire-fighting troop" for preparation for fire fighting with cooperation among communities in local areal units and enhances system of disaster education by the troops for residents.

14.3.2 Securing routes for fire-fighting activities

Fire-fighting service and Transportation Service secure routes necessary to fire-fighting activities, in addition to designation and improvement of strategic roads (see Clause 16.1). For this purpose, improvement of important roads is promoted as shown in Table 14.3.1, in addition to improvement of strategic roads.

Table 14.3.1 Items of improvement of roads necessary to fire-fighting activities

- | |
|---|
| <ol style="list-style-type: none">1. Widening of main roads necessary for fire-fighting activities2. Improving road network to open dead end3. Widening narrow roads4. Changing U-shape drains to be culverts5. Changing aerial electric lines to be underground lines6. Smoothing sharply turning corners |
|---|

Fire-fighting service installs fire-fighting vehicles of high capacity of driving uneven surface areas with debris removal function. Fire-fighting service, together with Transportation Service, establishes debris clearance process in consideration of fire-fighting.

14.3.3 Measures to eliminate difficult areas of fire fighting

Fire-fighting Service promotes improving fire-fighting water supply and mobile fire-fighting pumps, as well as enhancing "local fire-fighting troop" in order to eliminate difficulty in fire-fighting activities in time of earthquake disaster due to narrow roads and densely built-up.

Fire-fighting Service, together with Ministry of Urban Development, also makes effort to eliminate difficult areas in fire-fighting, utilizing results of analysis on hidden elements against fire-fighting activities and results of research/ study on fire expansion.

Chapter 15 Preparedness for rescue and evacuation

15.1 Improvement of evacuation plan

(1) Evacuation plan of Yerevan City at present

At present Yerevan Rescue Department of RS has developed evacuation plan of Yerevan City together with Evacuation Committee and other related organizations and districts provide assistance during evacuation.

“The evacuation plan of the city during severe earthquake” explains functional responsibilities of officials, assisting organizations, procedure of evacuation, issues, maps, charts, etc.

Besides the rules of behavior during earthquake, courses and seminars must also be conducted in the scope of annual exercises for the search and provision of food, clothes, fuel, items envisaged for preparing food in field conditions, implementation of works for opening the routes and activities for water provision.

If the scopes of emergency situations are bigger than the evacuation possibilities of the city relevant specialists and means should be provided at the expense of state means and with its assistance.

(2) Improvement of evacuation plan based on the prevision of possible damage

a) Review of evacuation points

Since the earthquake consequences, possible risks and damages were re-estimated within the project of “Seismic risk assessment and management planning in the Republic of Armenia” together with Japan International Cooperation Agency, the arrangement of evacuation points in districts should be revised taking into account the predicted number of distribution of the dead, the affected and the injured, the possibility of passability of routes towards the evacuation point, the capacity of the reception point, the level of security in the distribution point.

In case of such revision those evacuation points should become temporary distribution points for the short time placement of the envisaged population starting from several hours up to 3 days.

b) The order of accommodation of population in long-term settlement places

Long-term settlement places set up in Yerevan City are extremely insufficient for the distribution of homeless population. There are also dwellings in the form of tent towns envisaged which should be deployed in open areas which will bring to the increase of additional problems when the weather conditions are bad and will need additional corresponding equipment and means. That’s why it is preferable to use also the schools, educational institutions and other facilities of community importance as long-term settlement places. This will result in the enhancement of seismic stability of buildings and constructions of the given organizations in distribution places as well as improvement of corresponding specialists and logistical base.

c) Improvement of management system of population flow in evacuation routes

For smooth implementation of evacuation the following preparatory measures are implemented with the initiative of Evacuation Committee:

1. Elaboration of evacuation plan and related documents as shown in Attachment 4,
2. Registration of evacuees and definition of evacuation routes from hazardous zones in case of occurrence of emergency situations,
3. Planning and clarification of comprehensive life provision issues of population in case of occurrence of emergency situations,
4. Establishment of stable communication among Evacuation Points, Temporary Distribution Points, Long-Term Settlement Points and assisting organizations,
5. Conduct of real exercises to detect the shortcoming and its eliminaton.

Certain shortcomings can occur during the exercise in all the directions of evacuation provision:

1. transport
2. medical
3. maintenance of public order and security of traffic
4. engineering, etc.

That's to say the evacuation committee should cooperate with transport formations, Yerevan City department of Police of the Republic of Armenia for the organization of public order and safe traffic, guidance of arranged flows of motorcades and pedestrians and other issues.

15.2 Designation of evacuation points

As it is mentioned in the point 15.1 (2) the evacuation can be carried out by 3 stages (see Table 15.2.1). The supervising body - YRD - gives preference to territorial points as main points.

The directions of approval or rejection of distribution and distribution points should be given based on the corresponding checking and survey results.

Table 15.2.1 Evacuation stages

Process	Territorial point	Types	Time-period for the use of the settlement
1 st stage	Evacuation point	Temporary distribution points	Starting from several hours till 1 day
2 nd stage	Distribution points	Long-term settlement places, Shelters	Provided with permanent place of residence (up to 1 year)
Permanent place of residence	Main place of residence	(multi-storey residential buildings, private houses)	

The order of organization and implementation of evacuation measures, forces and means, possibilities and forms of provision are reflected in the "Population evacuation plan of Yerevan City in case of severe earthquake".

15.3 Conduct of exercises and lectures on evacuation

For eliminating disaster damages, Yerevan Rescue Department of RS conducts evacuation exercises with Yerevan City Evacuation Committee, and transportation organizations as well as at least once a year. The exercise should contain the followings.

- a) Staff exercises by maps
- b) Campaigns conducted all over the City
- c) Evacuation
- d) Provision of first aid
- e) Distribution of ready food
- f) Deployment of tent towns
- g) Provision of population with information by means of panels, etc.
- h) Firefighting and keeping the rules of fire security, etc.

For further effectiveness of evacuation measures relevant trainings and lectures should be conducted on being protected from the earthquake and keeping the rules of behavior.

Chapter 16 Preparedness for emergency transportation

16.1 Designating and developing emergency transport network

It is important to secure transportation system by minimizing transportation chaos in the time of earthquake for smooth implementation of emergency response, such as rescue, emergency medical care, fire fighting, and transportation of emergency materials/staffs/residents. Transportation Department of Yerevan City and Ministry of Transport and Communication should manage the transportation of personnel/ materials in a time of earthquake disaster, and maintenance of transportation facilities such as bridges.

RS, in cooperation with Transportation Department of Yerevan City, Ministry of Transport and Communication, and Yerevan Department of Armenia Police, designates strategic roads in order to secure traffic in a time of emergency as shown in Table 16.1.1.

Table 16.1.1 Category of strategic roads

Category	Purpose
Strategic road #1	Connecting between command sites inside Yerevan City and outside the city.
Strategic road #2	Connecting between rescue/ medical/ firefighting sites and the strategic roads #1.
Strategic road #3	Connecting between emergency resource transport sites and the strategic roads #1 and #2.

Rescue Service, Transportation Department of Yerevan City, and Ministry of Transport and Communication should prepare for strategic roads in ordinary time, as shown in Table 16.1.2.

Table 16.1.2 Preparation on strategic roads

Item	Content
Parking restriction	Parking on strategic roads should be prohibited, even in ordinary time, so that parking vehicles should not be obstacles at the time of emergency.
Obstacle clearance	Proper pruning of trees and reinforcement of advertising displays, in order to avoid hampering of traffic due to their breaking down during earthquake.
Aseismic reinforcement of road facilities	Seismic diagnosis and seismic reinforcement of structures on strategic roads (such as bridges and fences) should be done on the first priority.
Aseismic reinforcement of structures surrounding strategic roads	Seismic diagnosis and seismic reinforcement of buildings, facing to strategic roads and having possibility of blockage due to collapse, should be done on the first priority.
Dissemination	Traffic of ordinary vehicles will be prohibited and obstacles will be removed on the strategic roads. In order to minimize confusion due to those control, matters to be prohibited and to be responded should be well known by people through dissemination of such information beforehand.

16.2 Designating and developing emergency logistic base

Emergency transportation from outside to Yerevan City will be done with land transportation by vehicles and railway as well as air transportation by airplanes. Regional logistic bases of land transportation are located along radial road to the West and North from Yerevan City. The regional logistic bases are formulated for loading/unloading, temporary storage, feeding fuel, etc., and most of those facilities are operated by private sectors. RS should promote to secure areas and to improve facilities, which are needed for emergency transportation, in cooperation with the operators of the facilities.

Major railway stations and Zvartnots airport are also bases to receive assistant materials from outsides. Those facilities are operated by national companies. Rescue Service should confirm that necessary area and facilities for emergency transport are secured in the stations and airport.

There may be a case that some of assisting materials from outside will directly delivered to suffered areas, without transshipment of a regional transportation base. Rescue Service should develop necessary areas and facilities which is needed for command, evacuation, medical care in emergency, in cooperation with emergency situation committee and the heads of districts, such as designation of storage areas of assistant materials from outside and regional transportation bases which have space for establishment of accommodation facilities brought with assistant staffs from outside.

16.3 Processes for obstacle removal and traffic control on the strategic roads

Rescue Service, in cooperation with Transportation Department of Yerevan City and Ministry of Transport and Communication, should formulate a plan for quick removal of obstacles on the strategic roads. For efficient removal works, the plan should mention about framework of collaboration with Transportation Department of Yerevan City and Ministry of Transport and Communication as well as cooperation with companies which have heavy equipment, procedure to collect information on impassable roads, etc.

Yerevan Department of Armenia Police should confirm its operational framework such as the assignment of police persons for smooth operation of traffic control.

16.4 Prior registration of emergency vehicles and procurement of emergency transport vehicles

Vehicles which can pass through the strategic roads should be vehicles for fire fighting, police, rescue, military, and lifeline facilities. In addition, emergency vehicles allowed to pass through the strategic roads should have traffic permit. Vehicles subject to emergency vehicles are shown in Table 16.4.1.

Table 16.4.1 Vehicles subject to emergency vehicles

Vehicles needed during emergency for fire-fighting, police, gas, rescue (including PR) and military purposes, in addition to ones used during normalcy.
Vehicles needed for inspection and rapid recovery of lifelines including electricity/ hot water/ sewage and other public facilities
Vehicles needed for health/ sanitation such as cleaning and epidemic control
Vehicles needed for emergency transportation
Vehicles needed for other purposes that prevent spread of a disaster

A traffic permit will be preliminarily requested by each organization which have the emergency vehicles and issued by Emergency Situation Committee. At the time of emergency, emergency vehicle can pass through strategic roads with presenting the permit at an easily visible part of the vehicle.

Chapter 17 Preparedness for emergency medical care

Medical Service sets up processes on collection/ delivery of medical information, initial medical care, transportation of the injured, and medical logistics support for swift and proper emergency medical activities in time of disaster.

17.1 Collecting and delivering emergency medical information

For swift and proper collection/ delivery of medical information, it is necessary to collect information of the injured, damage to medical institutes, reception/ response of injured in available medical institutes, etc. and properly deliver the information to related organization such as medical institutes, Emergency Situation Committee as well as residents.

For this purpose, Medical Service will establish “Information Management Center for Emergency Medical Care”, so that medical institutes such as major hospitals, emergency medical posts, and medical vehicles, as well as related organizations such as Emergency Headquarters can smoothly collect and deliver information each other. Medical Service prepares the followings, relating with this issue.

- Set up a process within the Information Management Center for Emergency Medical Care to centrally manage information on human damage as well as status of damage and activities by medical institutions as shown in Figure 17.1.1.
- Prepare communication devices to enable disaster site hospitals and first-aid stations to quickly contact related organizations.
- Designate disaster site hospitals and first-aid stations beforehand to notify the residents.
- Conduct daily maintenance of announcement cars in case of an earthquake disaster.

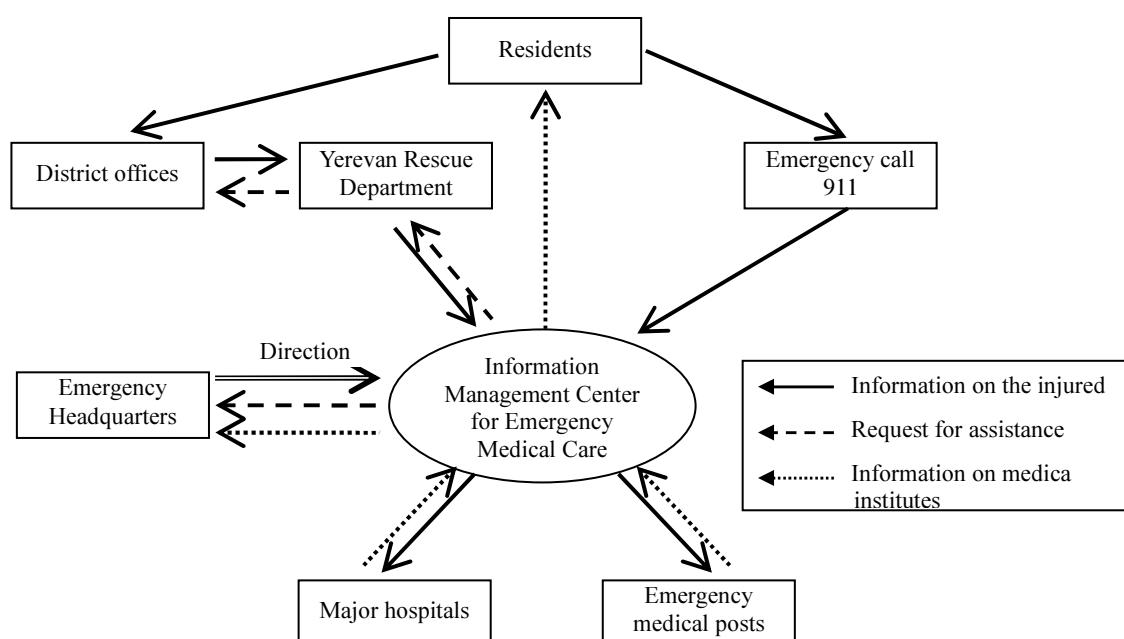


Figure 17.1.1 Flow of emergency medical information

17.2 Initial medical care

In order to prepare a process of providing emergency medical care in time of an earthquake disaster, it is important to establish emergency medical process immediately after the disaster. Medical Service will make preparations shown in Table 17.2.1. Specific measures for the respective items are also explained in this clause.

Table 17.2.1 Items to be prepared under the initial medical care process

Item	Overview
Emergency medical facilities	Role clarification/ designation and maintenance of first-aid stations and disaster site hospitals
Emergency medical functions	Role sharing and coordination/ enhancement of the mobile medical unit
Medical equipment	Enhancement of emergency medical equipment/ stockpile and procurement of medical supplies
Human resource recruitment / development	Recruitment and development of doctors / nurses, volunteers and cooperating individuals

17.2.1 Role, allocation, development of emergency medical institutes

In Yerevan City, emergency medical institutes are designated by Ministry of Healthcare. The designated medical institutes are hospitals or clinics, carrying out medical care in ordinary time, with doctors and medical devices, so that emergency medical care is available.

Medical Service prepares the followings, concerning emergency medical institutes.

- Reviewing the locations of the medical institutes, so that emergency medical care can be done near to the damaged areas, assuming disruption of transportation and communication networks.
- Promoting seismic reinforcement of emergency medical institutes, in order to increase capacity of reception of the injured.
- Storing medical tents and medical devices necessary for emergency medical care, carrying out periodic inspection for proper use, and updating the storage.

17.2.2 Task sharing/ collaboration and reinforcement of mobile medical teams

Tasks of medical staffs and process of mutual communication should be defined and clarified beforehand in emergency medical institutes, for smooth activities of medical staffs, including mobile medical teams.

Medical Service dispatches mobile medical teams for medical activities, in case that emergency medical assistance is required. For this purpose, Medical Service defines allocation and activities of mobile medical teams beforehand and inform to related organizations. Medical Service selects medical staffs of mobile medical teams from doctors and nurses in medical institutes other than designated institutes, based on the list of medical staffs submitted from the medical institutes.

Mobile medical teams are divided into two categories; emergency medical teams and special medical teams as shown in Table 17.2.2.

Table 17.2.2 Standard formation and task of mobile medical teams

Category	Standard formation		Task
Emergency medical team	Doctor: 1 Nurse: 3	30 teams	Medical examination, triage, treatment for minor injury
Special medical team	Doctors and nurse: 6	30 teams	Medical examination, triage, medical treatment, including operation

17.2.3 Enhancing emergency medical devices and storing/ securing medical supplies

Medical Service prepares a list of emergency medical devices to be installed in emergency medical institutes. Based on the list, emergency medical institutes check available medical devices and prepare a development plan of medical devices, with consultation of Medical Service.

Medical Service stores, maintains, and updates necessary materials for emergency medical institutes. Medical Service also arrange procurement process to obtain medical materials smoothly from association of pharmacist and suppliers of medicines/ medical materials, based on agreement made beforehand, considering situations of shortage of medical materials in huge earthquake disaster. Furthermore, process to obtain medical materials from other regions of Armenia and the World is developed, considering situations that medical materials provided within the city is not enough.

Medical Service, in cooperation with Transportation Service, secures transportation means, so that medical materials can be transferred smoothly in time of huge earthquake disaster.

Medical Service, in cooperation with Ministry of Education and Science, prepares medical devices and medicines in infirmaries in schools, designated to be evacuation points.

17.2.4 Ensuring and encouraging medical personnel for emergency medical care

For medical treatment to huge number of injured in time of earthquake disaster, number of doctors and nurses is not enough. Medical Service promotes the followings, to ensure and encourage medical personnel as much as possible in time of disaster.

- There is certain number of persons who has license of nurse but not work as nurse. Medical Service clarifies such potential doctors and nurses, based on lists of graduated students of medical schools.
- Medical Service, in cooperation with Ministry of Education and Science and Yerevan Rescue Department, encourages and promotes education system on emergency medical care for implementing smooth medical care in time of huge earthquake disaster.
- Medical Service ensures usage of triage tags for identification of degree of injury with color, in order to avoid confusion at initial response stage when many people are injured.
- Medical Service promote creating medical sub-groups in autonomous disaster management groups in communities and educating about first aid to the members of the sub-groups and residents in order to provide first aid to the injured by the members and residents.
- Medical Service develops system for legislating medical volunteers who can provide first aid, promotes for the legislation, and provides opportunities of training and education for the registered residents. Dispatching process of the medical volunteers in responding medical institutes also be established.

17.3 Causality transport process

17.3.1 Transportation of the injured

- a) In case the number of seriously injured is beyond the capacity of emergency medical institutes in the city, the injured should be transported to other hospitals outside the city. Medical Service makes agreement for the transportation with other hospitals and secures the route of the transportation beforehand.
- b) Seriously injured and patients of chronic disease who require continuous care for life maintenance should be transported to emergency medical institutes which sufficient and stable medical care is available.
- c) Ambulances and other emergency vehicles of other organizations are used for the transportation, considering condition and number of the injured. Medical Service organizes process of cooperation on the use of vehicles with related organizations.
- d) Medical Service secures medical institutes which accept injured in time of earthquake disaster through arrangement with partner cities beforehand.

17.3.2 Transportation of medical staffs

- a) Medical Service makes prior agreement to secure transportation means with related organizations through discussion/ arrangement, for prompt transportation of medical staffs to emergency medical institutes.
- b) Medical Service makes prior agreement with surrounding cities and related organizations on transportation of medical staffs, considering the case of lack of medical staffs for emergency medical care.

17.4 Medical logistics support process

Medical Service establishes medical logistics support to receive support in wide-area network through discussion for acceptance of seriously injured whom emergency medical institutes in the city can treat.

In case of many people are injured due to large-scale disaster, it is possible that number of medical staffs, medical devices, and medicine is not sufficient. Considering such situation, Medical Service establishes wide-area network for medical assistance through discussion with related organizations.

17.5 Prevention of infectious diseases

It is foreseeable that sanitary situation is worsening due to earthquake disaster, and secondary damage caused by infectious diseases spreads. To prevent such diseases, several measures are taken such as treatment of human waste, securing toilets (see Chapter 21), food provision to avoid nutrient shortage (see Chapter 19), securing heating system to evacuation points and accommodation (see Chapters 15 and 20), and anti-infection measures such as preparation of preventive materials and protective vaccination.

17.5.1 Procurement and storage of devices/ materials to prevent epidemics

Sanitation and Epidemic Service prepares the followings for procurement and storage of materials for sanitation and prevention of epidemics.

- a) Instructing to medical institutions for storing materials for smooth implementation of sanitation activities in time of earthquake disaster.
- b) Instructing to medical institutions and other facilities storing medicine for fixing shelves for the storing against earthquake, in order to prevent turn-down the shelves.
- c) Formulating procurement plan of materials for sanitation and anti-epidemic, and securing process of procurement in time of earthquake disasters such as making prior agreement with suppliers.

17.5.2 Preventive vaccination

Medical Service instructs residents for preventive vaccination, according to condition of epidemics.

17.6 Enhancing psychological care

Psychological care to victims is required, since victims are under big stress due to shock of earthquake and long-term evacuation. Medical Service, in cooperation with related organizations, takes following measures for psychological care of victims.

1) Support to research on psychological care

Medical Service supports research on trauma and PTSD (post traumatic stress disorder) and special study on psychological care caused by disaster. In addition, Medical Service collects presentation materials on psychological care and disseminate such information, together with result of research in universities and institutes in symposium or other opportunities.

2) Providing opportunity of education on psychological care

Development of human resources who can provide psychological care to victims, through providing “special training on psychological care in time of earthquake disaster” to medical staffs and “basic seminar on psychological care in time of earthquake disaster” to psychological counselors.

Chapter 18 Preparedness for missing person search/ body recovery

18.1 Searching process of missing people

Rescue Service, in cooperation with related organizations, clarifies process for smooth and proper implementation of information collection, search, and rescue of missing persons in time of earthquake disaster, including logistic support.

For this purpose, Rescue Service defines, arranges, and stores necessary equipment/ materials, referring to damage estimation results, and then, carries out training for the information collection, search, and rescue.

18.2 Searching and dealing process of dead bodies

Rescue Service and Special Service for Funeral cooperate each other and arrange process of search and treatment, from finding to laying in state.

Since the process includes finding of dead bodies, reporting, inspection, post mortem certification, placing in a coffin, checking background, and taking over to relatives, it is necessary to secure necessary charnel places, materials, and manpower. Training and discussion on this matter should be done with police and medical institutes.

18.3 Burial/ cremation process

Special Service for Funeral investigates common way of funeral and capacity of grave sites, and then, makes prior agreement with related services, considering capacities of the services, referring to the result of damage estimation.

Chapter 19 Procurement and supply of water and food

It is necessary to develop and put into action the plans of reduction of consequences of ES, related to lack of drinking water and food. Therefore, it is necessary to implement reinforcement in water supply facilities, inform the population to take drinking water for 3 day reserve and reserve of food. Besides, as assistance to population it is necessary to organize distribution of drinking water and food as a result of damage of water supply facilities and annihilation of reserves.

19.1 Basic principles for supply of drinking water

- a) Water supply to population is secured from water sources of Aparan in case of damage of water supply facilities.
- b) If the management centers, medical and evacuation points are located 2km far from water distribution points, then water supply of those facilities should be secured by means of tank trucks.
- c) It is necessary to deploy temporary points of water distribution in the areas with relatively less destructions, where water supply is terminated as a result of damage of water-pipes.
- d) It is necessary that secure water supply with minimal quantity of 3 liters per person (may be 10 liters per person in the plan).
- e) Water supply service secures temporary water supply points for management centers, medical points, TDPs and HTSs, responsibility of water supply of which is taken by corresponding governing body.

19.2 Deployment of water supply bases

Water supply service is offered to install water reservoirs 2km far from management center, medical point, TDPs and HTSs, together with corresponding services of municipality. The reservoirs should be enough earthquake-resistant, should have strong valves to avoid leakage of water in case of damage of water pipes.

19.3 Water supply process

Additional generators and pumping devices are necessary for pumping drinking water into tank trucks, and also for discharging (water supply) water especially to disaster zone.

Water supply service is offered to form an emergency water supply termination time, cooperating generally with corresponding services of municipality, to prepare necessary quantity of water pumps and generators and installing them in water distribution points and reservoirs.

Water supply of management, medical and evacuation points, which will be located near the reservoirs and water supply of which will not be implemented by tank trucks, will be implemented by not big reservoirs by water supply service together with medical and rescue service and other governing bodies, where corresponding generators and water pumps should be installed.

Water pumps and generators should be kept near the reservoirs, and the corresponding service staff should know how to operate and supply water to the place of emergency situation.

The device installing and operating staff should be included in the structure of water supply service. Education of employees will be implemented by water supply service.

19.4 Basic principles for supply of food and commodities

- a) Food and staple goods are provided to those people, who can't provide food and staple goods to themselves, and to those people, who will be involved in assistance work.
- b) The provision of assistance of food and staple goods for first 3 days after the ES is done without necessity of food processing. In case of consumption of food, envisaged for the first 3 days, a food is released from special separated points, which have necessary utensil and goods for preparation of food.
- c) It is necessary to consider the needs of old persons and children during distribution of food and other staples.
- d) The prices must be cheap for the part of population, who is able to pay and obtain food and staple goods.
- e) Food and trade service is responsible for delivery and provision of food and stale goods to management centers, medical and evacuation points.

19.5 Process for procurement and supply of food and commodities

Food and trade service is engaged in provision of reserves and distribution of food and staple goods, which is supervising the issues of production, transportation, purchase and selling of goods.

Food and trade service develops plans of collection and distribution of goods. Plans must envisage sizes of reserve of product types, its distribution system and sellers, which may be directly used in provision of humanitarian aid, and also measures for increase of those reserves must be envisaged within allowable limits in case of necessity.

It is necessary to note, that ES services of municipality and other organizations also have reserves of stale goods and other products. Therefore, issues of collection and distribution of reserves of other bodies and organizations should be considered during development of plans.

Food and trade service organizes preparatory works with manufacturers, distributors (specialist of product) and sellers, concludes agreements with them for provision of food and other products to immediately start allotment of food and other necessary products after earthquake according the order of the head of headquarter.

Supply of food and staple goods to governing bodies, medical services and evacuation points is implemented by personal transport vehicles of manufacturers, product specialists and sellers. Food and trade service should register abovementioned transport vehicles and provide corresponding passes.

Chapter 20 Preparedness for rehabilitation of lifeline, transportation, and communication facilities

As a result of destruction by disaster the electric utility, transport communication, telecommunication and anti-mudslide system leads to not only failure of activity of infrastructure facilities, but also to danger of spreading of secondary damage of seismic phenomena and essentially slows down the implementation of emergency response. Therefore, it is necessary to develop a system of measures for reduction of damages of abovementioned facilities (see Clauses 8.4 and 8.5), among which very important facilities, facilities unavailable for emergency recovery and facilities requiring provision of initially zero damage need to be emphasized. Those are mainly water dikes and water cleaning facilities, power stations and substations, gas storages and gas regulating stations, retranslation and communication retranslation and commutation stations, commutation communication stations, communication stations and hydrotechnical facilities. Besides, it is necessary to envisage various quickly implementable measures in case of failure of network facilities of telecommunication system.

20.1 Preparation for formation of Crisis Management Center and its affiliates

The recovery of activity of each facility will be handed over to corresponding specialized services in case of damage of electric utility, telecommunication and transport communication lines by severe earthquake. Those services are formed according to Table 20.1.1 (General headquarter (GH) of emergency response and its subdivisions). As a rule, specialized GHs are formed in case of earthquake stronger than intensity 5 or in case of large destructions. However, the specialized service have right to make corresponding decisions in case of shakes of earth's crust higher than intensity 4.

The order of gathering of specialized GHs in case of abovementioned conditions is directed to each member of headquarter by radio connection and other connection means. At the same time, it is necessary to deliver information on order of arrival after the shake of earth's crust or large destructions without corresponding order (which is conditioned by failure of communication system or other circumstances).

Table 20.1.1 Formation of specialized GHs and their subdivisions for recovery of electric utility, communication and transport communication lines

Field of activity	Corresponding formations	Name of headquarter	Service, which forms GH	GH subdivisions	Organization, participated in formation of GH subdivisions
Water supply, sewerage	Water Supply Service	GH for securing water supply and discharge	Yerevan-Djur	-	YWSS branch
Power supply	Energy Service	Electric and communal utility GH	ENA CJSC Sanitary cleaning Staff of Administrative region of municipality	Power supply subdivision	ENA CJSC branch
				Power Generation subdivision	APPA, TPP, HPP
				Heat supply subdivision	Boiler house
Gas supply	Gas Supply Service	Gas supply GH (subdivisions of facilities of gas distribution system)	ARMRUSGASPROM	Subdivisions, existing in the main points of gas distribution	YEREVANG AS
Communication	Communication and Warning Service	GH of facilities of securing communication	BEELINE VIVA CELL ORANGE	-	-
Transport communication	Transport Service (bridges and roads)	Transport communication GH (involving vehicle-road formation communication)	Transport department of municipality, Corresponding department of the ministry of communication and transportation, State revenue committee, public order maintenance service. Transportation of loads	Transport department	International airport
				Communication and transport department	
				State committee department	
				Public order service	
				Cargo transportation service	
Protection of agricultural plants	"Agrprotect" Service	GH of agricultural facilities	"Agrprotect" service of agricultural plants	-	-

The activity of profile headquarter of recovery of subordinate facilities will be based on instructions of central headquarter of ES and information, received from involved bodies, services and residents.

All profile services should previously ascertain the location of GH and its subdivisions, and also organizational and functional distribution of staff for securing works of subdivisions immediately after seismic disaster.

20.2 Securing bases for rehabilitation

Specialized services establish main rehabilitation bases in the area of important infrastructure facilities or around them as shown in Table 20.2.1.

Table 20.2.1 Rehabilitation bases

Field	Specialized services	Facilities
Water supply, Sewerage	Water supply service	Water protection, water cleaning
Power Plant and Heat Plant	Energy service	Electricity substations, heat utility
Gas supply	Gas supply service	Gas regulating blocks, gas storages
Communication	Communication and warning service	Retranslation, commutation stations
Transport communication	Transport service (road and bridge)	Bridges, railroad stations, airports
Agricultural technique	“Agrprotect” service	Hydrotechnical facilities (dikes, river regulating stations)

Deployment of recovery bases, shown in Table 20.2.2, will be implemented in disaster zone by corresponding field of each system through distribution of forces and means, depending on damage degree of facility. It is necessary to previously ascertain the locations of base recovery points for securing emergency response.

Table 20.2.2 Major network facilities of lifelines, transportation, communication, where rehabilitation bases to be established

Field	Specialized services	Quantity of facilities
Water supply, Sewerage	Water supply service	Water line/sewerage line system with pipelines, nearby reservoir and water pump stations
Power Plant	Energy service	Power supply and distribution (connect the line to electrical conduction) and small substations, pipeline system, heat utility and nearby water pump stations
Gas supply	Gas supply service	Gas pipeline system, gas regulation stations, blockage regulation system
Communication	Warning and communication service	Telephone lines, main lines of telecommunication, small antennas in communication system
Transportation	Transport service (road and bridge)	Vehicle roads, railroads, substations and other sources of conduction of electricity

Recovery of the field of municipal lifeline will be implemented in case of existence of significant amount of forces and means of other republican units, as a result of which there will be a necessity of efficient distribution of human, material and technical resources among base and recovery points in disaster zone, and decision location of reception and collection points of incoming aid.

20.3 Setting up an inspection/ damage assessment process

Professional examination and presentation of sizes of accidents during ES will be implemented by technical staff of corresponding subdivisions by control of professional services, which are usually implementing similar control. Responsible subdivision independently goes to facility in case of earthquake stronger than intensity 4 or in case of reception of information on large destructions in the given facility. It is necessary to consider the possibility of multiple damages in various places of subordinate area and previously decide the places of gathering of staff, distribution of forces and implementation of works, and secure readiness of procedure of provision of certificates on examination and state of facility. As a rule, the examination work in registered facilities is executed separately in each facility. Submission of size of damage of structural facilities requires inspection of main joints and general inspection by previously decided route.

20.4 Setting up an information collection/ communication process

On-time and proper provision of accident-recovery works in each direction requires provision of distinct instructions from specialized GHs and their subdivisions on the basis of accurate operative information on process of works of elimination of consequences of collapses and disaster to groups, which are implementing repair works on-site. Exchange of information among specialized GH and central headquarter of ES is also important for organization of accident-recovery works and coordination of actions of all acting bodies and organizations. Unfailing and distinct information exchange system, including the mentioned aspects, should be developed in advance.

The results of reconnoitering of facilities and certificates are being sent to corresponding services of specialized GH by responsible persons by means of departmental radio connection adopted in the organization and municipal telephone lines of general use. Reception of information by specialized GH from population and other sources will also be implemented by special radio connection and municipal telephone connection by means of regional subdivision and dispatching points of each service.

20.5 Procurement of equipment/ materials for rehabilitation

Mass destructions may require big amount of material and technical reserves for repair works for possibility of immediate provision of forces of municipal specialized services. In connection with that, it is necessary to cooperate with neighboring regional services regarding the provision of necessary material and technical means, which in turn requires development of corresponding detail plan by each municipal service on the basis of prediction of sizes of possible damage, mentioning the nomination and quantity of material and technical means.

20.6 Priority of rehabilitation works

The efficiency of recovery works is secured by decision of order of primary implementation of primary fields of lifeline of the city and measures of each field. The order of implementation of concrete measures is ascertained on the basis of operative data about the real size of damage in case of emergency situations based on the order given in Table 20.6.1.

Table 20.6.1 Priority of rehabilitation of lifelines, transportation, and communication facilities

Field	Facilities
Water supply, sewerage	<ol style="list-style-type: none"> 1. Main facilities of water collection, water cleaning, water supply, water discharge, water distribution and management 2. Main lines and relating facilities 3. Water discharge lines, adjacent facilities, connecting main lines to management points, shelters, medical aid points 4. Part of network, including adjunct facilities, which are able to essentially reduce the quantity of residential areas (regions), deprived of water supply 5. Other lines, adjunct facilities
Power supply	<ol style="list-style-type: none"> 1. Main facilities of power production, transformation, transmission and distribution 2. Electricity transmission cables and adjunct technical facilities 3. Local cables, providing electricity to management points, shelters, medical institutions and adjacent technical facilities 4. Electricity transmission cables and adjunct technical facilities, which are able to essentially reduce the quantity of residential areas (regions), deprived of power supply 5. Other cables and adjacent facilities of power supply
Gas supply	<ol style="list-style-type: none"> 1. Main facilities: regulating stations, large storages 2. Main lines and adjacent technical facilities 3. Branches of local network of gas supply, adjacent technical facilities, connecting management points, shelters, medical aid points to main lines 4. Main and local network branches and adjacent technical facilities, which are able to essentially reduce the quantity of residential areas (regions), deprived of gas supply 5. Other networks and adjacent facilities of gas supply
Communication	<ol style="list-style-type: none"> 1. Main facilities of communication 2. Segments of telecommunication network and adjacent technical facilities 3. Channel, providing information flow during emergency situations and adjacent technical facilities 4. Segments of local network and adjacent facilities, which are able to essentially reduce the quantity of residential areas (regions), separated from municipal communication lines 5. Other segments and adjacent facilities of telecommunication network
Transport communication	<ol style="list-style-type: none"> 1. Roads, bridges, railroads and adjacent facilities, securing transport communication by first class roads, air transport facilities (runways), securing air communication 2. Roads and bridges, securing transport communication by second class roads 3. Roads and bridges, securing transport communication by third class roads 4. Roads and bridges, which are able to essentially reduce the quantity of residential areas (regions), separated from transport communication 5. Other facilities of transport communication
Mudslide protection	<ol style="list-style-type: none"> 1. Large hydro-technical structures (dams, dikes) 2. Regulating structures along main rivers 3. Other mudslide protection facilities

20.7 Confirmation/ agreement on assistance

It is necessary to immediately secure foreign aid in case of emergency situations, under the condition of having previously agreement of corresponding regional services on issues of providing human, material and technical aid and concluding work contracts, mentioning nominations, staff and quantitative characteristics of forces and means.

Chapter 21 Preparedness for handling of debris and other issues on environmental and social considerations

21.1 Handling of debris and garbage

(1) Framework of management and operation

Responsible organization for debris management is Department of Architecture and Urban Construction and Department of Urban Development and Land Inspection of Yerevan City. Transportation of debris to disposal sites is done by construction companies instructed and contracted by a licensed company.

Responsible organization for waste management is Department of Communal Service of Yerevan City. Collection and transportation of waste to a final disposal site in Nubarashen district is done by a companies, sublet by each of 12 districts through tendering. The management of the final disposal site in Nubarashen district is done by a waste management company of Erebuni district.

(2) Estimation of amount of debris and waste due to earthquake disaster

The estimation of amount of debris and waste due to earthquake disaster has been done, based on the result of damage estimation in the scenario earthquake GF2 (see Table 21.1.1). Conditions for the estimation are as follows.

- Floor area in a building (due to Cadastro)
 - Multi-story apartment: 4,568 m²
 - Individual house: 232 m²
- Amount of debris and waste per m² (actual data of Kobe Earthquake)
 - Combustible: 0.120 ton/m² (Debris)
 - Non-combustible: 0.987 ton/m² (Waste)

As a result, the amount of debris and waste in Yerevan City are estimated to be 5,887,478 ton and 715,803 ton, respectively as shown in Table 21.1.2.

Table 21.1.1 Number of buildings completely destroyed in scenario earthquake GF2

District	Inventory			Completely destroyed					
	Apart	House	Unit	Apart	%	House	%	Unit	%
1 Ajapnyak	390	3,058	26,655	39	10	906	30	3,033	11
2 Avan	230	1,224	12,712	51	22	557	45	3,346	26
3 Arabkir	580	3,324	34,734	100	17	972	29	6,168	18
4 Davtashen	170	783	9,781	3	2	265	34	424	4
5 Erebuni	220	10,642	22,832	42	19	3,202	30	5,729	25
6 Kentron	710	5,509	36,445	207	29	1,295	24	8,547	23
7 Malatia-Sebastia	570	4,529	34,610	26	5	860	19	2,213	6
8 Nor Nork	640	176	36,907	86	14	46	26	5,952	16
9 Nork-Marash	0	2,398	2,445	0	19	693	29	702	29
10 Nubarashen	30	549	1,628	7	21	118	22	349	21
11 Shengavit	550	7,197	29,831	121	22	1,364	19	6,101	20
12 Kanaker-Zeytun	290	3,244	16,348	38	13	1,277	39	3,078	19
Total	4,370	42,633	264,928	719	16	11,554	27	45,643	17

Table 21.1.2 Estimated amount of debris and waste due to scenario earthquake GF2

District	Multi-story Apartment		Individual House	
	Combustible Waste	Non-Combustible waste	Combustible Waste	Non-Combustible Waste
1 Ajapnyak	21,274	174,979	25,212	207,372
2 Avan	27,688	227,730	15,503	127,512
3 Arabkir	54,772	450,501	27,051	222,492
4 Davtashen	1,469	12,083	7,380	60,701
5 Erebuni	23,039	189,497	89,151	733,264
6 Kentron	113,316	932,021	36,044	296,466
7 Malatia-Sebastia	14,351	118,036	23,945	196,951
8 Nor Nork	47,273	388,823	1,272	10,465
9 Nork-Marash	104	857	19,299	158,736
10 Nubarashen	3,640	29,937	3,298	27,130
11 Shengavit	66,207	544,551	37,967	312,277
12 Kanaker-Zeytun	21,000	172,725	35,547	292,371
Total	394,133	3,241,740	321,670	2,645,738

(3) Transportation of debris and waste

Transportation of debris and waste after an earthquake disaster will be done with dump trucks and compactor trucks, respectively. Both dump trucks and compactor trucks are in operation in the city for collecting garbage at the present. Required days for the transportation are estimated as follows.

Number of days necessary for debris transportation is estimated on the following conditions.

- Amount of debris to be disposed: 5,887,478 ton
- Number of available dump trucks: 200 (151 are in operation and 49 will be added immediately)
- Load capacity of a dump truck: 4 ton

- Number of transportation: 10 round trip

Number of days necessary for debris transportation is calculated as follows.

$$\begin{aligned}\text{Number of days} &= 5,887,478 \text{ (ton)} / 200 \text{ (trucks)} / 4 \text{ (ton/trucks/round trip)} / 10 \text{ (round trip/day)} \\ &= 736 \text{ days}\end{aligned}$$

Number of days necessary for waste transportation is estimated on the following conditions.

- Amount of waste to be disposed: 715,803 ton
- Number of available compactor trucks: 85 (same number of the trucks in operation)
- Load capacity of a dump truck: 4 ton
- Number of transportation: 10 round trip

Number of days necessary for waste transportation is calculated as follows.

$$\begin{aligned}\text{Number of days} &= 715,803 \text{ (ton)} / 85 \text{ (trucks)} / 4 \text{ (ton/trucks/round trip)} / 10 \text{ (round trip/day)} \\ &= 211 \text{ days}\end{aligned}$$

However, it is necessary to consider that number of available trucks may be reduced, because of the following reasons.

- On the damage estimation with scenario earthquake GF2, half of population may stay in undamaged residential buildings. Compactor trucks for ordinary waste transportation cannot be used for the transportation of waste generated with the earthquake disaster.
- Some of the trucks will be damaged and un-operational, due to earthquake disaster,

Department of Architecture and Urban Construction, Department of Urban Development and Land Inspection, and Department of Communal Service of Yerevan City should pursue collaboration with neighboring Marzes and transportation companies, so that number of trucks can be increased in accordance with amount of debris and waste actually generated with earthquake disaster as well as the target number of days for disposal.

(4) Disposal of debris and waste

Debris disposal

In Yerevan City, vacant lots of quarry sites of basalt stone materials are used as debris disposal. A disposal site in Ajapnyak district (10 ha, A1 in Table 21.1.3) can be used as a debris disposal site in a time of earthquake disaster. Furthermore, disposal sites in another disposal site in Ajapnyak district (1 ha, A2), disposal sites in Nor Nork district (15 ha, N1), and one in Erebuni district (6 ha, E1) can be used as shown in Table 21.1.3 and Figure 21.1.1. Total capacity of those disposal sites is 7,750,000 m³.

Table 21.1.3 Candidates of debris disposal sites

No	Tentative Name	District	Area (ha)	Depth (m)	Capacity (1,000 m ³)
1	A1	Ajapnyak	10	40	4,000
2	A2	Ajapnyak	1	60	600
3	N1	Nor Nork	15	15	2,250
4	E1	Erebuni	6	15	900
Total					7,750



Figure 21.1.1 Candidates of debris disposal sites

Volume of debris to be disposed is calculated as follows, using unit weight of debris; 1.2 ton/ m³.

$$\begin{aligned}\text{Volume of debris to be disposed} &= 5,887,478 \text{ (ton)} / 1.2 \text{ (ton/ m}^3\text{)} = 4,906,232 \text{ m}^3 \\ &= \text{about } 5,000,000 \text{ m}^3\end{aligned}$$

At present, debris disposal sites available in Yerevan City have enough capacity to dispose debris, which is estimated to be generated in scenario earthquake GF2. Department of Architecture and Urban Construction and Department of Urban Development and Land Inspection in Yerevan City should secure further 5,000,000 m³ of disposal sites in future, when the capacity of the above-mentioned sites will be reduced.

Waste disposal

In Yerevan City, waste is transported and disposed in landfill in disposal sites, since incineration of waste has not been introduced. In the operating disposal site in Nubarashen district, available area for waste disposal still remains to be 20 ha, out of total area of 52.3 ha.

Volume of waste to be disposed is calculated, using unit weight of waste; 1.2ton/ m³. Required area for waste disposal is calculated on the condition that the thickness of landfill is 5 m, which is the same as the present one.

$$\text{Volume of waste to be disposed} = 715,803 \text{ (ton)} / 1.2 \text{ (ton/ m}^3\text{)} = 596,503 \text{ m}^3$$

$$\text{Required area of disposal area} = 596,502 \text{ m}^3 / 5 \text{ m} = 119,301 = \text{about } 12 \text{ ha}$$

At the operating disposal site in Nubarashen district, waste generated with scenario earthquake GF2 can be disposed. Department of Communal Service of Yerevan City should secure further 600,000 m³ of disposal sites in future, when the capacity of the above-mentioned site will be reduced.

(5) Measures against asbestos, relating to debris disposal

Use of asbestos has not been prohibited in Armenia. Therefore, there is possibility that asbestos is included in debris.

Department of Architecture and Urban Construction and Department of Urban Development and Land Inspection in Yerevan City should notify to the companies of debris transportation and disposal about necessity of asbestos measures, such as wearing dusk masks during asbestos disposal works, wetting asbestos-containing materials at the time of the works, indication of storage of asbestos with sign boards, etc.

21.2 Disposal of human waste and securing toilets

(1) Treatment facility of human waste

The human waste discharged from toilets in Yerevan City is collected mixed with living sewage into Charbark Wastewater Treatment Facility in Shengavit through pipeline network. However, the sewage is directly flowing to river without sterilization since the treatment facility does not function. Consequently, there is low possibility of worsening of river water quality due to damage to the treatment facilities, comparing with the present condition.

(2) Estimation of required number of toilets

It is important to secure toilets for maintaining sanitary conditions in evacuation points, etc. It is desired to secure one toilet for 100 evacuees. However, it seems difficult to prepare 1,500 toilets beforehand for the estimated evacuees of 150,000. Therefore, the way of procurement of toilet should be clarified beforehand, together with the promotion of stockpiling portable toilets. In addition, the measure on handling human waste should be promoted as mentioned in the next clause.

(3) Measures on handling human waste

a) Portable toilet without flushing water (see Figure 21.2.1)

In case that flush toilets do not function due to outage of water supply, the toilet can be used as portable toilet without flushing water, by means of covering toilet bowl with a plastic bag. After using the toilet, the plastic bag can be disposed as general waste.

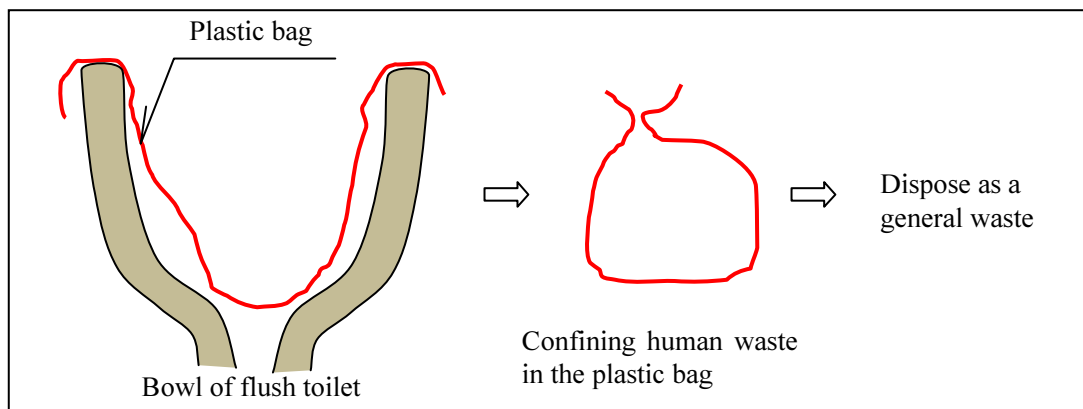


Figure 21.2.1 Portable toilet without flushing water

b) Temporary toilets, utilizing manholes (see Figure 21.2.2)

Temporary toilets can be installed by means of removal of manhole cover, putting a board with a hole, and surrounding with walls. In case of no sewerage flow in sewerage pipes, it is necessary to flush waste in the pipes, by supplying the flushing water with water tank trucks. In case that removal of the waste from the pipe is required, septic tank trucks with pumps will be used. At present, Yerevan Djur has seven (7) septic tank trucks (5 trucks of 3.5m³, 1 truck of 12m³, and another of 7m³).

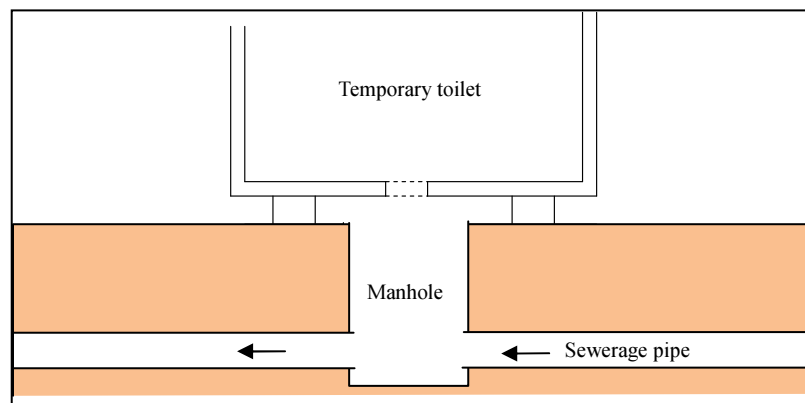


Figure 21.2.2 Temporary toilet utilizing manhole

Part 4 Emergency Response Plan

Chapter 22 Basics of emergency response

22.1 Basics of emergency response activities

In case of a severe earthquake, it is necessary to carry out comprehensive response measures to be done within 3 days or at the latest 7 days after the earthquake as well as response measures for early starting of rehabilitation/ reconstruction activities smoothly, in accordance with time frame mentioned in this plan. The basics of activities of response measures are described below.

(1) Save human life in the highest priority

The most important point on emergency response is the protection of human life. Therefore, the rescue residents from damaged areas should be in the highest priority.

(2) Establish structure and foundation for effective activities

For implementation of emergency measures in consideration of rescue of human life, continuation of social-economic systems, and maintenance of governance of the Nation, it is necessary to establish Crisis Management Center, information collection and transmission system, transport system, and cooperative network among related organizations at the earliest time

(3) Implementation of urgent measures

Under the established structure and foundation, activities such as evacuation, rescue, first aid, searching missing persons should be started as soon as possible. The population should ensure own security, understanding the approach of “You should protect your life and properties”. Then, the population should start mutual support and participate to other measures as a member of community, such as rescue of casualties, initial fire-fighting, evacuation, etc. The responsible bodies of executive authority assist population by doing their best for quick allocation of official support. It is necessary to note, that provision of information has a big role in elimination of consequences at emergency situations. Immediate collection of accurate information is a key point for obtaining good results of response measures. For this purpose, it is necessary to collect and transmit proper information quickly through immediate activation of the system for collection/ transmission of information and establishment of close communication with CMC

(4) Shifting to the rehabilitation and reconstruction phase

Emergency response activities should be carried on in order to shifting to rehabilitation/ reconstruction phase smoothly, paying attention to saving human lives, maintaining social/economic system, and stability of governance of the Nation.

22.2 Comprehensive emergency response

(1) Mutual collaboration among organizations related to disaster management

Emergency response activities must be carried out intensively in a limited period of time to address needs that far exceed the normal response capacities of individual response organizations. In this regard, the assistance of administrative units outside the affected areas is the main factor. Thus, the prompt establishment of information transmission system together with interested and created bodies of neighboring areas, and also other national services, shall become a priority issue.

(2) Collaboration among residents and companies

It is necessary to bear in mind or plan beforehand such volumes of disaster, in case of which the capacities of administrative assistance (even in case of complete involvement of forces and means of services and bodies and harmonious cooperation) will be insufficient. The study of disastrous earthquakes shows that the self-defense, firefighting and human rescue operations, implemented by population, are more efficient and accurate for ensuring damage reduction.

In this regard, Yerevan City should define joint activities with population, and adopt it as the main form of approach of operative response measures, and make an initial test of cooperation principles with population, communities and volunteer unions.

(3) Flexibility, originality and ingenuity

Acting by approved emergency situations plans in case of disastrous earthquake, which are composed in the basis of assessment of assumption of possible damages, is the main principle of trainings and measures of emergency situations prevention. However, the implementation of response is not always being successfully done according to planned principles, which indicates, that the capabilities of staff in quickly estimating the situation and making decisions on-site ensures certain reduction of the volumes of disaster. Because the disastrous earthquakes are rare events, implementation of periodical trainings and exercises have a big role in formation of main capabilities and skills in the field of crisis management, based also on the indisputable realization of the reality that the activity is implemented in conditions of making decisions and maneuvering in emergency situations in usual conditions.

Chapter 23 Establishing and managing Crisis Management Center

23.1 Establishing Crisis Management Center of Yerevan City

(1) Condition of establishment

The mayor or acting mayor makes a decision on formation of Crisis Management Center (CMC) in the following cases:

- a) When Survey for Seismic Protection of Ministry of Emergency Situations (SSP) has announced about possible or occurred earthquake with intensity 5 or higher.
- b) When disaster/damage in Yerevan City has occurred as a result of an earthquake.

(2) Notification on establishment

The mayor notifies about establishment of CMC in the following cases:

- a) A command on gathering is released to heads of administrative areas and heads of structural subdivisions through CMC according to defined order.
- b) CMC informs the population on its formation by the use of warning systems, through fixed and mobile connection.
- c) The head of CMC (Mayor or acting Mayor) provides appropriate information to mass media.

23.2 Liquidation of Crisis Management Center

(1) Condition of liquidation

The head of CMC may reduce number of members of headquarters or liquidate it in case of absence of damages in the given areas or in case of completion of operative response measures.

(2) Notification of liquidation

The head of CMC immediately informs about liquidation of CMC in the following ways.

- a) The head of CMC directly informs to the staffs who operate in CMC, and informs to the staffs who operate outside of CMC by means of warning system.
- b) The staff of communication and warning division of CMC informs population about liquidation of CMC through warning system or other means of communication.
- c) The head of CMC makes an announcement to mass media.

23.3 Emergency Headquarters at the district level

Heads of 12 districts establish district-level CMCs. District CMCs implement measures for elimination of consequences of emergency situations and coordinate impetuous activities in the region according to instructions of emergency management central headquarters of Yerevan City and secure bilateral mechanism of cooperation and support. District CMCs are also liquidated in case of liquidation of CMC.

23.4 Organization and management

23.4.1 Organization

CMC is formed in accordance with the special order, corresponding to the Emergency Situations warning system. CMC is divided to 2 groups:

- a) The group under the control of the head
- b) The group, which is included in the main structure of CMC

The law of RA “about protection of population during emergency situations” defines management level in case of disaster according to disaster scales (see Table 23.4.1).

Table 23.4.1 Classification of emergency situations

Management level	Number of victims		Scales of spreading of consequences
	Dead, injured	Disturbance of vital conditions	
Local	10-50	300-500	Settlement, region, Marz
Regional	50-5000	500-1000	Several Marzes
Global	More than 500	More than 1000	The territory of RA and neighboring countries

23.4.2 Management

(1) Crisis Management Center

- a) The head of headquarter organizes 1st consultation for development of conception of response measures parallel to the formation of CMC. Further consultations are organized for discussion of key issues aimed at control of work of headquarter and elimination of Emergency Situations consequences in case of necessity.
- b) The heads of related organizations report the head of CMC on situations of preparation and measures to be taken
- c) The heads of related organizations appoint their staffs for dispatching to CMC, and inform about the appointment to CMC.
- d) The head of CMC may appoint new staff in group, if he considers necessary. Besides, the head of CMC may involve groups of organizations, which are making field management, according to the situation and in case of necessity according to defined order.

(2) District-level Crisis Management Center

The heads of district CMCs implement the following activities, based on the instructions of CMC.

- a) Submit the local situation to CMC: damage scale, the process of elimination works of emergency situations consequences, necessary aid, etc.
- b) Transfer of information and coordination of activities among CMC, emergency response services, communities and residents.
- c) Implementation of urgent measures.
- d) Other activities, if necessary

23.5 Mobilization of staffs

23.5.1 Mobilization and arrangement of staffs

- a) After receiving notification on the formation of CMC from the head of CMC, the heads of related organizations order the staff, working in their ordinary work places, to participate in the process of implementation of response measures, according to existing deployment and mobilization plan.
- b) The heads of related organizations allocate staffs, who are out of working place and arrived to the office, for smooth implementation of the highest-priority works mentioned below.
 - Collecting and coordinating information on damage scale in departmental territories and facilities
 - Making strategic decisions on implementation of operative response measures of the organizations
 - Communication and coordination with CMC
- c) The heads of related organizations make changes in the content and order of responsibilities of the staff by their own command, which is aimed at more efficient response.
- d) The heads of related organizations inform the head of CMC about allocation of staffs of organizations, and apply for providing additional staffs to the head of other organizations through the head of CMC, if their own staffs are insufficient for solution of the specified tasks. The heads of organizations, who receive the application, provide their staffs on the condition that no interference occurs in their own activities.
- e) In case of necessity of assistance such as guidance for evacuation in crowded public facilities, the heads of related organizations can dispatch their staffs for assisting operative response measures, being implemented by other managing organizations.

23.5.2 Points to be noted in gathering

When called on to gather in off-duty hours, the staffs shall take the following points into consideration.

- a) Ensure safety
 - Ensure own safety
 - Be sure of safety of their family, residential buildings, and neighboring areas
- b) Clothes and accouterment during gathering
 - Suitable clothes for implementation of emergency response measures
 - Carrying gloves, towel, additional clothes, reserve of water and food, portable lantern and radio-receiver
- c) Participating in urgent works, occurred on the way to gathering point
 - In case of encountering accidents and emergencies, immediately call to 911 and provide necessary support
 - Carry out requirement of the head of consequences elimination during the elimination of the sources of emergencies and accidents and take the position of leader in case of necessity

- d) Informing damage situations to related organizations
 - Collect information on damages on the way to gathering point, paying special attention to the state of medical institutions, roads, bridges and other important facilities.

Chapter 24 Collection and transmission of information

24.1 Principles on collection and transmission of information

Collection and transmission of information is indispensable for implementation of emergency response measures.

The collection and transmission of information on damage, which is implemented in the frames of operative response, is carried out on the basis of following principles.

- a) Systematic arrangement of information, received from emergency response services, other organizations, population and other sources, for clarification of the scale of damage and conditions for proper and quick implementation of necessary measures
- b) Proper and quick communication of information regarding emergency response
- c) Promotion of dissemination of disaster information to population, considering the importance in terms of calmness of population, implementation of efficient response, and organization and coordination of activities
- d) Securing reliable ways of information dissemination such as utilization of mass media and publication of booklets

24.2 Collection, reporting and registration of disaster information

24.2.1 Collection of disaster information

Emergency response services provide information (epicenter, scale, aftershocks, etc.), received from SSP, to related organizations.

The responsible staffs of RS for assessment of damage, collect and generalize the information, received from SSP on the scale of damage by efficient use of various communication means.

24.2.2 Reporting disaster information to Crisis Management Center and district Crisis Management Center

Related organizations collect the disaster information and submit report to the head of CMC. The report should include appropriate information for operation. At the same time, the cooperation of internal subdivisions and services with regional divisions and other similar related organizations should be maintained.

An information management section is created in the structure of CMC, where whole the input information is collected. This sector systematizes and analyses the collected information according to instructions of the head of CMC.

24.2.3 Information to be collected immediately after disasters

Information to be collected immediately after disasters is shown in Table 24.2.1.

Table 24.2.1 Information to be collected immediately after disasters

Classification	Content of the message	Means of collection (examples)
Casualties	<ul style="list-style-type: none"> - The number of casualties, including dangers, threatening the life of population - The state of casualties - The necessity of evacuation and the state of evacuation 	<ul style="list-style-type: none"> - Damage assessment according to results of visual observation by ES headquarter and ES regional headquarters - Information on scale of damages, received from firefighting subdivision of ES department - Messages, received from ES bodies and services - Messages, received from drivers and passengers, who are in traffic (municipal busses, fixed-run, taxis, etc) - Information, provided by television and radio - Messages, received from population and other organizations
Fires	<ul style="list-style-type: none"> - The situation of occurrence and spreading of fires 	
Material damages	<ul style="list-style-type: none"> - The scale of damages of state constructions - Damages, received by passable roads and bridges - Collapse situation of structures and constructions - Collapses and danger of their occurrence - Damages to electricity cables, gas and water pipelines and telephone communication 	
Other	<ul style="list-style-type: none"> - Necessary information for implementation of quick response 	

24.2.4 Further reporting

Report of information is composed together with the receipt of the information as an addition to information, provided immediately after disaster. Besides, report is regularly composed also about increase or change of the scale of damage, state of implementation of operative and planned measures.

24.2.5 Registration of information on disaster

(1) Registration of information

The information management section of CMC carries out precise registration of information on disaster, classifying it according to urgency, importance and other similar principles.

(2) Registration of visual information during disaster

In case of necessity, photo and video records are made, which are necessary for implementation of operative response, and also for provision of photo and video clips on disaster.

24.3 Public relation in disasters

24.3.1 Purpose of information dissemination to residents

The purpose of public relations in case of a disaster is as follows.

- Prevent social confusion resulting from anxieties in the mind of the people caused by speculations and false information
- Stabilize the livelihood of residents by providing information on emergency and relief activities
- Encourage the reconstruction of lives of the victims

24.3.2 Announcement through media

(1) Contents of announcement immediately after disasters

Immediately after the Crisis Management Center is set up, the director of the Headquarters will hold a press conference to announce the items listed in Table 24.3.1 and call on residents to behave carefully and considerately.

Table 24.3.1 Items to be included in an announcement by the Crisis Management Center

1. Call for preventing fires and extinguishing small fires.
2. Call for refraining from panic and being careful about false information
3. Call for cooperation in protecting persons in need of assistance and relieving human life
4. Outline of the consequences from the disaster
5. Declaration of the establishment of the city's Crisis Management Center and the status of its activities
6. Advisories/instructions on evacuation.

Besides, information on current situation and activity of CMC is provided to mass media in case of necessity (see Table 24.3.2).

Table 24.3.2 Information to be provided to mass media by CMC

1. Information about aftershock situation
2. The scale of damage
3. The system of activity, which is being implemented
4. Information about evacuated people and people being searched
5. Social and vital information <ul style="list-style-type: none">- The state of water, gas and power supply- The process of supply of foods and commodities- Information on traffic and transport vehicles
6. Work status of medical centers
7. The process of recovery of municipal activity and supply of public services

(2) Public announcement to be in priority

Related organizations implement the process of information dissemination by the use of existing various information means, and may cooperate with various bodies and organizations in case of necessity.

CMC collects and analyzes the information provided by emergency services, and then, provides it to all residents, evacuees, injured, etc. by means of loudspeakers and all other communication means.

(3) Broadcasting of urgent warning program

Broadcasting companies should terminate everyday programs and broadcast programs on urgent warning in case of serious disaster, which may threat human lives and properties. The secretary of CMC should conclude agreements with broadcasting companies beforehand on order of receipt, content, means of operative information, etc, for more operative and precise broadcasting of such urgent warning programs.

24.3.3 Information dissemination by means of publishing

(1) Publishing of newsletters on disaster measures

For provision of information to population, the secretary of CMC provides published information of administrative nature, which is necessary for independent execution of response measures and development of mutual assistance, and also for calming the residents. Detail local information is also regularly available to population, especially about assistance for evacuated regions.

(2) Distribution of leaflets

Leaflets and posters are prepared and distributed or stuck in various places, if necessary.

24.4 Informing Media on emergency situations

24.4.1 Organizational framework for information dissemination

Work on information dissemination is implemented jointly by media and a press secretary, who is a member of secretariat of CMC.

24.4.2 Announcement to media

The head of CMC or the press secretary makes an announcement, depending on degree of importance of the information. The information is provided in-situ and in accordance with the order, defined by CMC in order to avoid confusion.

Temporary journalist points are created near the office of CMC for journalists of newspapers, radio and TV.

24.4.3 Role of collaboration of broadcasting companies

Broadcasting companies disseminate urgent warning programs in case of necessity of provision of operative information to population and related organizations.

24.5 Public hearing activities

The secretariat of the CMC will strive to resolve the anxieties of the victims, reconstruct their livelihood, and encourage their self-help reconstruction efforts.

24.5.1 Opening provisional counseling rooms

The Secretariat of CMC will open provisional counseling rooms for victims and address consultations and requests of victims, so that victims can submit their claims, wishes and receive consultation, which is aimed at reducing the anxiety of population, who have social and vital problems during ES, and returning them to normal life.

The district level headquarters cope with problems, wishes and consultation applications of evacuated population in prefectural offices and local shelters. Based on situation, a step-by-step provision of various kinds of consultations by professional consultants starts after ensuring security of population and stabilization of situation.

24.5.2 Response of population wishes

The wishes of population, received at provisional counseling rooms, which are allowed based on the level of given prefecture, are implemented by corresponding district level headquarter. The requirements of public, which cannot be satisfied by the forces of prefecture, are transferred to secretariat of CMC for taking corresponding measures in case of necessity.

The secretariat of CMC classifies the requirements of public according to themes, which were received directly from population or regional headquarters and are related to corresponding services and other interested bodies of ES.

24.6 Prevention of information disorder

At the time of earthquake, panic may occur in such mass accumulated places as supermarkets, cinemas, streets, city stations, and other public places. Such panic is an interaction of various factors of psychological (anxiety, fear, etc) and informational nature (lack of information, non-sufficient knowledge, rumors, etc). It is necessary to take measures on warning of information chaos for its prevention, through dissemination of information.

24.6.1 Responsibility of companies

The shops and other mass accumulated objects, located in the streets, persuade population to maintain calmness by the use of loudspeakers and guide them for the purpose of ensuring security of clients.

24.6.2 Actions of public transportation

The residents, who are using public transportation, are informed on current situation for the purpose of ensuring security, and are guided to safe places of evacuation and other measures are taken for prevention of chaos.

24.6.3 Responsibility of broadcasting companies

For the purpose of prevention of possible chaos during occurrence of disasters the broadcasting companies should terminate everyday programs and broadcast urgent warning programs, and also inform the population on ES according to pre-developed plan.

Chapter 25 Security, traffic control, emergency transport

In time of earthquake disaster, several social disturbance and traffic chaos are foreseen. Prioritizing population safety and other purpose mentioned below, the Public Order Protection Service and Motor transport, Roads, and Bridge Service make their efforts to realize prompt and appropriate security control, road traffic, and urgent transportation.

- a) Protecting life, health and property of residents
- b) Preventing and controlling criminal offense
- c) Maintaining road traffic order and rules
- d) Maintaining public order

25.1 Preserving activities

Public Order Protection Service creates public order headquarters (POHQ) and develops system of implementation of urgent operations, system of interoperations, and cooperation of interested bodies for realizing the following activities.

(1) Collection of information and communication

POHQ realizes collection of information necessary for realization of urgent preserving operations and transfer the collected information to interested bodies.

(2) Dispatching troops and coordinating activities

Based on received information, POHQ dispatches security troops and implements security activities necessary for emergency response activities such as rescue. The heads of territorial subdivisions of Police coordinate activities for maintain public order, through mutual communication with responsible staffs of related organizations.

(3) Evacuation support

- a) Based on the situation, Police provides complex assistance in evacuation measures in order to implement those measures smoothly and continuously.
- b) During evacuation guidance, special attention is paid to elder people and invalids, and other people in need of assistance.
- c) Reception of evacuees in corresponding territories after preparation of evacuation places, organization of moving of evacuees to those places.

(4) Prevention of secondary disasters

POHQ realizes permanent inspection for detection of secondary phenomena in dangerous territories and report the results to Ministry of Emergency Situations for realization of proper measures such as issuance of evacuation order.

(5) Maintaining public order

In order to prevent marauding in devastated districts, jam and panic in roads of aid transportation and people traffic as well as accidents in evacuation places, POHQ increases preservation of these places and territories neighboring to disaster, assigns patrol service.

Besides, reinforced maintenance of public order is realized in disaster territories, paying special attention to prevention of domestic-economical crime (non- conscientious trade etc.), marauding and other crimes, which can occur in disaster zone.

(6) Support to volunteer formations for maintaining public order

In case of creation of formations on public order keeping and fighting against crime by communities, organizations and other institutions, POHQ cooperates with them and provides necessary support for implementation of their activity, prevention of other accidents, as well as decreasing of panic, stress among population and evacuees.

(7) Provision of information on maintaining public order to injured and other population

The SKPO headquarters collects detailed information on requirements of injured and other population and realize solution of tasks and problems in the places through Police.

25.2 Traffic control

Immediately after earthquake, in the first phase of urgent response, in order to secure operativeness of medical aid provision and search-and-rescue, necessary accident-recovery, firefighting works, POHQ secures smooth transportation and safe evacuation routes. For this objective, POHQ realizes the following measures.

- a) Traffic control in strategic roads (see Subclause 16.1) in heavily damaged areas, depending on the scale and extent of damage
- b) Necessary traffic control on ordinary roads
- c) Identification of dangerous sections
- d) Direction of roundabout ways
- e) Collection and provision of traffic information
- f) Dissemination of information for suspending transportation for person use

Traffic control is done flexible manner, according to the scale and extent of disaster as well as particular condition of local road network.

(1) Control of entry of vehicle into disaster zones

To prevent deregulation of road traffic, the entry of vehicle into disaster zone is restricted. Checkpoints are assigned in the streets and roads directed to the center of the city. The checkpoints coordinate and regulate vehicle flows restricting traffic or fully prohibiting it.

(2) Control of traffic for securing routes for urgent transportation

Immediately after an earthquake disaster, confusion of road traffic and consequent expansion of damage or secondary disaster are foreseen. In order to prevent such situations as well as to secure traffic for smooth implementation of emergency response such as evacuation, rescue, medical aid, fire-fighting , it is necessary to control traffic on strategic roads and other roads, except for emergency vehicles.

(3) Notification of road managing organizations

In case of conducting traffic control mentioned above, the heads of local administration such as marzes, cities, districts) and related organizations are informed about the control.

(4) Police measures on traffic clearance

In case that a vehicle or other obstacle remains on routes for urgent transportation and there is possibility of blockage of emergency response activities, Police orders or executes to move the vehicle or obstacle from the road.

25.3 Implementation of urgent transfer

During earthquake disaster, Motor Transport, Roads, and Bridge Service and Public Order Protection Service create the emergency transportation headquarters (ETHQ) for securing routes for emergency transportation and means of emergency transportaion. Responsible staffs on emergency transportation of “South-Caucasian railroad” CJSC, General Department of Civil Aviation, and “Zvartnots” international airport should involved in the ETHQ.

25.3.1 Securing emergency transportation routes

Emergency transportaion routes are secured in the following manners.

- a) Immediately after earthquake, ETHQ organizes inspection in order to clarify the condition and damages on roads and examine ways of the elimination. The collected information is summarized and submitted to Republican Emergency Situations Committee and Ministry of Emergency Situations, together with a draft plan of road clearance. At the same time, urgent activities on cleaning and passability securing of main routes are organized, based on the draft plan.
- b) Republican Emergency Situations Committee checks the draft plan of the clearance, orders ETHQ for modification, if necessary, and then, approves the plan. The approved plan is surculated in the related organizations.
- c) Based on the approved plan, ETHQ under coordination of Ministry of Emergency Situatins realizes the clearance works. The forces of Ministry of Defence, road construction and other construction organization urgent cleaning and engineering-recovery works carry out removal of obstacles on roads, urgent repair of bridges, so that 2 traffic lines of strategic roads can be secured.

In case that land transportation route is not available, helicopters will be used for transportation of responsible/management staffs, badly injured persons to hospitals, and assistant materials to logistic bases. For the efficient use of hericopters, heli-ports for emergency transportation should be secured in Yerevan City.

25.3.2 Securing transportation system

(1) Primary objects of transportation

During organizing and realizing transportations the first priority is given for securing people’s life, as well as factors of prevention of disaster expansion and smooth realization of urgent transportations. Primary objects of transportation are differentiated as shown Table 25.3.1 and adjusted in according to damage and progress of elimination of disaster consequences.

Table 25.3.1 Primary objects of transportation/ Classification by priority

Phase	Object of transportation
1st phase	<ol style="list-style-type: none"> 1. Rescue and medical staff, rescuing and medical equipment 2. Staff and equipment for firefighting and prevention of factors of secondary disasters 3. Staff and equipment of urgent accident-recovery and recovery of regular life activity (rehabilitation of communication systems, gas, water, electricity supply etc.) 4. Injured and suffered transported to medical institutions 5. Staff serving road-transportation objects, securing traffic, rehabilitating important transportation objects (highways, roads, bridges)
2nd phase	<ol style="list-style-type: none"> 1. Primary objects of transportation of the I-st phase 2. Food, drinking water and other means of life provision 3. Transportation of injured, suffered and sick people out of disaster zone 4. Staff and equipment rehabilitating transportation objects (highways, roads, bridges)
3rd phase	<ol style="list-style-type: none"> 1. Primary objects of transportation of the II-nd phase 2. Staff and equipment rehabilitating accident/disaster 3. Means of first necessity

(2) Provision of vehicles for transportations

ETHQ secures provision of vehicles for urgent transportation. In necessary, vehicles are provided from transportation companies under the jurisdiction of Department of Transport of Yerevan City, according to prior agreement.

Each organization conducting emergency response, such as emergency response services, district CMC, departments of Yerevan City, should use own vehicles in the process of liquidation of disaster consequences. In case of insufficiency of own vehicles, the organizations submit application to Republican Emergency Situations Committee or Ministry of Emergency Situations for providing vehicles from related organizations in other regions.

(3) Securing fuel

In cases that ETHQ or other services responsible for emergency response are in lack of fuel or lubricant for the implementation of the activities, they should apply to responsible republican organizations or directly to Republican Emergency Situations Committee for supplying fuel or lubricant.

(4) Approval of provision of vehicle for urgent transportations

Vehicles, which are envisaged for realization of urgent transportations and which are not affected by traffic control in case of emergency situations, and which are provided with corresponding passes, should be preliminarily declared and registered in corresponding plans. Police, together with Ministry of Emergency Situations, issues special passes. The vehicles having concrete passes should not be restricted by any state governing bodies, if it realizes activities within the scope of rights mentioned in the passes. It is prohibited to use vehicles with passes for own purpose.

25.3.3 Food supply bases

Candidates of food supply bases are existing large-scale facilities for transportation and food production as shown in Table 25.3.2. Transportation service selects food supply bases

among the candidates confirmed beforehand, based on actual location of damaged areas and the supply bases.

Table 25.3.2 List of large companies of first need goods production and wholesale centers.

No.	Name of facility	Address	Product	Quantity
1	«Bred factory of Davtashen» CJSC	Davtashen, 7str.	Bakery	
2	«Elit prodet» LTD	Davtashen, 1 str, h.34	Sausages	
3	«Alik» LTD	Safaryan str., 3rd building	Bred	
4	«Dvin-1» LTD	Totovenc str, 5		
5	«Gapex» LTD	Bagrevand str.		
6	Bred factory N7	Masis str. 7	Bred	
7	«Grand candy» JE	Masis str. 31	Food production	
8	«Grand Tobacco» JE	Shahamiryanner str.	cigarettes	
9	«Yerevan bird-breeding plant»	Shirak str., 45	Meat products	
10	«Johnson» LTD	Lomonosov str., 48	Milk products	
11	Bred factory N6	Shahumyan, 16 str., 71	Bred	
12	S.Bilyan LTD	Babajanyan str. 40/1	Sausages	
13	«Javakhq» LTD	Ohanov str., 9	Macaroni	
14	«Mush» LTD	Miqayelyan str.	Public food	
15	«Dzyunik sarnaran» LTD	Arshakunyats str. 9		
16	«Garun» OJSC	Bryusov str. 26		
17	«Yerevan mill» OJSC	Nar-Dos str., 2		
18	Yerevan «Tinned food factory»	Arshakunyats str., 15		
19	Yerevan «Ararat» BWV plant	Isakov str., 9		
20	«Yerevan beer» OJSC	Isakov str., 8		
21	«Salt plant» CJSC	Acharyan str, 2-nd alley, 4	Salt	3000 ton.
22	«Argisht» LTD	Charents str.	Bakery	350 ton
23	«Atenk» LTD	Tsarav Aghbyur str. 59/1	Meat product	200 ton

Chapter 26 Mutual coordination with disaster risk management bodies

26.1 Request for a dispatchment to the republican government

26.1.1 Declaration of disaster zone

In addition to emergency response measures by the city, republican-level response measures can also be carried out in Yerevan City, in case of a severe earthquake. Yerevan City Emergency Situations Committee collects information on damage situation and affected areas and submits the information to the Government by the head of Yerevan City Emergency Situations Committee. Based on the submitted information, Republican Emergency Situations Committee is established. The committee declares the disaster zones, based on the information, and decides to provide assistance such as forces and means to the disaster zone.

26.1.2 Matters to be applied to Republican Emergency Situations Committee

Yerevan City Emergency Situations Committee applies to Republican Emergency Situations Committee for the following assistance.

- a) Clarification of damage situation
Collection of information, clarifying the created situation and the scale of damage, using all the available means of transport (on-land or air)
- b) Evacuation support
Organization of evacuation measures after making a decision on evacuation
- c) Detection of the affected
Implementation of search and rescue activities for the detection of the missing, showing assistance to the affected, taking out of the injured
- d) Firefighting
Implementation of firefighting activities together with firefighting-rescue subdivisions of the Rescue Service of MES of RA
- e) Cleaning of roads and ways for the access
Cleaning and repair of roads and ways in case they are damaged
- f) First aid, anti-epidemiological measures
Provision of first aid to the affected, implementation of relevant anti-epidemiological measures
- g) Urgent transportation of cargo and staff
Implementation of urgent transportation of cargo, relevant forces and specialists for the organization of response and provision of assistance
- h) Water supply and provision of food
Implementation of provision of the affected with water and food
- i) Liquidation and maintenance of hazardous materials
Implementation of measures aimed at safe maintenance and liquidation of explosive and other types of hazardous materials

26.1.3 Acceptance of assistance

Emergency situation committee of Yerevan City carries out the reception of assistance on the following ways.

- a) Exchange of information with responding subdivisions and formations and joint use of it
Responding subdivisions and formations decide and clarify the created situation, carry out exchange of information and joint use of it.
- b) Participation of communication subdivisions
Involvement of communication subdivisions is carried out for the coordination of the activities of responding subdivisions and formations, provision of communication.
- c) Distribution of responding formations and forces
Correct distribution of other forces carrying out joint response with responding subdivisions and formations by the permanent committee of emergency situations of Yerevan city for more effective implementation of works.
- d) Guiding of the movement of formations
The service, that receives the formations for providing assistance, selects their gathering points, movement routes and directions, distribution points of cargos received as assistance etc.
- e) Provision of squares for the landing of helicopters
Corresponding squares envisaged for the landing of helicopters allocated for the responding subdivisions in parallel with the submission of requests of assistance.
- f) Provision of responding subdivisions and formations with devices and equipment
Responding formations should have already been provided with relevant devices and equipment for the implementation of their activities but the permanent committee of emergency situations of Yerevan city makes allocations to relevant formations from the received devices and equipment based on the requests submitted.
- g) Provision of responding subdivisions and formations with lodging or deployment of field camp
Emergency situation committee of Yerevan City provides responding formations with lodging or corresponding area for the deployment of field camp.

26.2 Request for assistance to neighboring regions

26.2.1 Decision of request for assistance

Based on the scale of disaster and destructions, the number and capacity of available responding subdivisions, Yerevan City Emergency Situation Committee may make a decision that the number of responding subdivisions and forces of Yerevan City in the created situation is not enough for the implementation of rescue, response and accident-recovery operations and afterwards submit a request to Republican Emergency Situations Committee for the involvement of regional forces to provide assistance.

26.2.2 The content of the request for assistance

Yerevan City Emergency Situation committee submits a relevant request to Republican Emergency Situations Committee for receiving assistance where the following information is mentioned.

- a) Disaster situation and the reasons for applying for assistance
- b) Name of organizations and Ministries which need assistance
- c) List of items and quantity of devices, equipment, technique and other necessary means
- d) Time-period necessary for assistance
- e) Places where the assistance should be sent
- f) Nature of activities of the assistance

26.3 Acceptance of international assistance

26.3.1 Request for international assistance

Based on the created situation Republican Emergency Situations Committee makes a decision on applying to international community for receiving their assistance. For international assistance, Republican Emergency Situations Committee submits a relevant application. The following is mentioned in the application.

- a) Application sent to UN OCHA for the implementation of search and rescue operations as well as on the provision of financial, humanitarian and technical assistance
- b) Application sent to International Red Cross Federation on the provision of medical assistance, food and water as well as implementation of anti-epidemiological measures
- c) Application sent to Interstate Council of Emergency Situations of CIS on the support in the implementation of search and rescue operations
- d) Application sent to International Civil Defense Organization (ICDO) on the provision of technical and humanitarian assistance

26.3.2 Acceptance of international assistance

(1) Coordination on international assistance

Yerevan City Emergency Situation Committee applies to Republican Emergency Situations Committee for the reception of international assistance. At the same time, Yerevan City Emergency Situation Committee, together with the corresponding services, carries out coordination on planning of the process of reception of international assistance (according to the type of assistance, scope, nature etc.)

The measures of coordination of reception, transportation, storing, distribution of the assistance as well as other activities are carried out according to the type of assistance.

International assistance can be provided in the following directions.

- a) Search and rescue operations (also with the participation of rescue dogs)
- b) Provision of medical aid (medical staff, drugs, medical equipment etc)
- c) Technical assistance rapid recovery of facilities)

- d) Distribution of evacuees (temporary shelters being rapidly built, provision of tents, construction of temporary tent and other towns)
- e) Provision of food
- f) Provision of drinking water
- g) Provision of staples (clothes, blankets and so on)
- h) Provision of communication equipment and means
- i) Provision of means of transport (buses, lorries and passenger cars)
- j) Provision of financial means (donations)

(2) Simplifying procedure on custom clearing and visa issuance

The relevant working group of Republican Emergency Situations Committee clarifies the type and quantity of the assistance to be provided, the structure of international forces, transfers this information to corresponding services and solicits for implementation of customs procedures and provision of entry visas in a simplified way.

26.4 Acceptance of volunteers

Department of Healthcare of Yerevan City attached to Republican Emergency Situations Committee establish the following two organizations for effective involvement and use of volunteers in time of a severe earthquake.

(1) Information center for disaster volunteers

After a severe earthquake, an «Information center for disaster volunteers» is established, being attached to Yerevan City Emergency Situations Committee for providing information about disaster situation, damage, needs of victims as well as volunteers.

The «Information center for disaster volunteers» establishes a communication with volunteer formations, applies for the allocation of volunteer forces, coordinates their works and functions as a center of information reception and exchange with municipal level volunteer forces. This center also provides assistance in different places of disaster zone in establishing «On-site centers for assisting volunteers».

Main activities of the «Information center for disaster volunteers» are as follows.

- a) Reception and exchange of information about disaster together with crisis management division of Yerevan Rescue Department
- b) Provision of assistance in the establishment of “On-site centers for assisting volunteers” in different sites of the disaster zone for coordinating and assisting of volunteers’ activities
- c) Cooperation with republican and volunteer forces of response to emergency situations

(2) On-site centers for assisting volunteers

After a severe earthquake «On-site centers for assisting volunteers» are established by Yerevan City Emergency Situations Committee, together with Department of Healthcare of Yerevan City. Based on the created situation, these centers carry out assistance to volunteers, obtainment of

devices, equipment and means necessary for the activities for these forces and submit requests for the involvement of corresponding staff.

Main activities of the «On-site centers for assisting volunteers» are as follows.

- a) Clarification of the necessity of volunteer forces and allocation of information
- b) Submission of a request on the necessity and provision of volunteer forces, establishment of communication with crisis management center of Yerevan Rescue Department
- c) Recruitment of volunteers, playing the role of representation for implementation of works with volunteers
- d) Initial tasking of recruiting volunteers on volunteer activities (types and content of activities, places of residence and so on)
- e) Collection and summarization of information about the activities of volunteer forces in the given community of the city
- f) Cooperation with district divisions of Yerevan Rescue Department
- g) Cooperation with NGOs, state non-commercial and other volunteer organizations

Chapter 27 Evacuation and rescue

In case of earthquake hazard threatening population of Yerevan City or in case of Emergency Situations, meeting of Yerevan City Evacuation Committees is immediately held and evacuation measures and rescue works are organized as shown in Figure 27.1.1.

Organization	Occurrence of disaster		
	1 hour	24 hours	72 hours
	Initial response phase	Emergency response phase	Rehabilitation/reconstruction phase
Evacuation HQ	<ul style="list-style-type: none"> Establishment of HQ, summoning of staff members 	<ul style="list-style-type: none"> Selection and establishment of evacuation centers (additional) Management of evacuation centers, designation of alert areas Directing in evacuation, acceptance of victims Assisting the livelihood of evacuees 	
Rescue HQ	<ul style="list-style-type: none"> Establishment of HQ, summoning of staff members Relief and rescue activities 		

Figure 27.1.1 Outline of rescue and evacuation activities

27.1 Organization and implementation of evacuation

It is necessary to implement evacuation for protection of life and properties as well as prevention of secondary damages.

(1) Criteria of issuance of recommendation/ order for evacuation

Recommendation of evacuation is issued in the following situations. When the situation is getting more difficult and urgent activities are necessary, evacuation order is announced.

- Fire spreading and gas outflow, occurred due to an earthquake, make a threat to life and properties of population
- Hazardous landslides, river flood, or those possible situations, arisen due to an earthquake make a threat to population's life
- Other situations of disaster which the head of Yerevan City Emergency Situations Committee or the head of Evacuation Committee consider necessary

(2) Officials who issue evacuation recommendation or order

- The head of Yerevan City Emergency Situations Committee issues evacuation recommendation or order in the procedure agreed with Ministry of Emergency Situations.
- Beside that, when the situation is very urgent to wait for the order for evacuation from the head of the committee on emergency situations or there is a direct hazard for population life or health, in such cases the order could be made by the head of district. The person who announced about evacuation should immediately report about it to the head of Yerevan City Emergency Situations Committee.

(3) The content of the command for evacuation preparation

The order (command) of evacuation includes items mentioned in Table 27.1.1 for quick and safe evacuation.

Table 27.1.1 Items of the order on evacuation

1. Reason of evacuation,
2. Territory from which the evacuation is realized,
3. Evacuation site and allocation,
4. Evacuation route,
5. Important notes.

(4) Transmission of the order on evacuation

a) Ways of transmission of information to residents

Transmission of information on evacuation to residents is made on the ways shown in Table 27.1.2.

Table 27.1.2 Way of transmission of information

1. To transfer the command for evacuation preparation and realization to the population of the territory through hooters, vehicle signals, microphones and other means.
2. To inform about evacuation preparation and realization decision those organizations, which are ready to help
3. To post information on evacuation preparation and realization on the web-page managed by YRD.

b) Transmission through media

In case information on evacuation is transferred to wide areas, or other situations that information transfer is in difficulty, the head of Yerevan City Emergency Situations Committee requests media to disseminate the information with available ways.

c) Information to related organizations

The head of Yerevan City Emergency Situations Committee transmits the contents of evacuation recommendation or order to related organizations, when the head issue the recommendation or order.

(5) Report on evacuation

a) Report of the head of Yerevan City Emergency Situations Committee

The head of Yerevan City Evacuation Committee or other leader who made a command on evacuation preparation and implementation or received a notification on evacuation to inform other bodies and organizations should report the head of Emergency Situations Committee.

b) Report to central state bodies

The head of Yerevan City Emergency Situations Committee who announced about evacuation preparation or implementation or received a report on evacuation preparation or implementation from Evacuation Committee and other leading bodies should immediately report to the head of Republican Emergency Situations Committee on the items mentioned in Table 27.1.3.

Table 27.1.3 Items of report to central state bodies

1. Person who announced evacuation preparation and implementation
2. Date and time of announcement
3. What was a base for the announcement
4. Territory from which an evacuation is realized
5. Number of people and families evacuated
6. Evacuation place

(6) Termination of command on evacuation

In case of elimination of the reasons of necessity of evacuation, the head of Yerevan City Emergency Situations Committee makes an announcement about that by available communication means, posts the information on the web-page of Yerevan City and report to the head of Republican Emergency Situations Committee.

27.2 Development of evacuation points and their management

27.2.1 Development of evacuation points

(1) Selection of evacuation points during earthquake

After receiving an order on evacuation, 165 Temporary Distribution Points are prepared in Yerevan City. If a Temporary Distribution Point is in dangerous condition, the head of Emergency Situations Committee decides to close the point and allocate the evacuees in other reception points.

(2) Preparation for reception of evacuees

If the strength of the earthquake is 4 and more grade by MSK scale, and start of evacuation preparation and implementation is announced then responsible persons are dispatched to administrative districts from the evacuation committee. The responsible persons check safety of reception points and report about it to the head of evacuation committee. They bring radio-communication means, water, food and other means to the points preparing for reception of evacuated people.

(3) Clarification of number of evacuees and other situations

Responsible persons report to Evacuation Committee from about number of evacuees, sick and injured people and other necessary issues. Evacuation Committee collects the reports, summarizes, and reports to the head of Yerevan City Emergency Situations Committee.

27.2.2 Evacuation guidance

(1) Management of traffic in evacuation routes

Evacuation Committee in cooperation with the firefighting-rescue service, Police and related organizations, organizes teams for guidance of evacuees in evacuation routes ensuring quick and safe evacuation.

(2) Prevention of accidents

Evacuation Committee gives commands to the heads of districts to develop safe evacuation routes; the heads must ensure arrival of evacuees at reception points. The responsible of echelons must show the possible dangerous places. The heads of districts assign coordinators for taking measures to prevent emergency occasions and accidents.

(3) Provision of support to vulnerable people

The heads of districts, together with Yerevan Rescue Department, provide support/aid to elder persons, children, sick people and other persons in evacuation routes while conducting evacuation guidance.

27.2.3 Setting up disaster zones

In case of the occurrence of disaster or disaster is foreseen, the heads of Evacuation Committee and Emergency Situations Committee or other responsible persons on safety make assignments to police to locate in disaster zone and to limit or prevent people from entering the area in order to secure their safety.

27.2.4 Reception of victims

Victims, who have lost their houses because or cannot live in their houses because of damages with disaster, should be received in following order.

Detailed of process of evacuation, reception of evacuees, assistance to evacuees, etc. are described in “Evacuation Plan of Yerevan City” approved by Mayor as shown in Attachment 3.

27.3 Evacuation and rescue for people in need of care

27.3.1 Measures for evacuation and rescue of people in need of care

It is necessary to clarify the situation of elder, disable, vulnerable persons and others who in need of care. Special measures such as guidance for evacuation, rescue, necessary welfare and health services should be properly taken to the vulnerable and others in need of care.

(1) The role of residents and community

- a) In order to protect people who are in need of special care in case of earthquake disasters, community, residents, and volunteers should implement measures such as providing necessary aid, under the management of district Emergency Situations Committees, on the basis of mutual assistance principles.
- b) Autonomous disaster management groups in communities, together with district Emergency Situations Committee clarify the situations of vulnerable people who are in need of special care, using a list prepared beforehand and take appropriate measures for missing people.

(2) Main principles of emergency assistant activities

- a) For people who need medical aid, immediate measures such as hospitalization and other measures to secure their health conditions should be taken, in cooperation with medical institutes.

- b) In case that proper measure cannot be provided to people who are in need of special care in evacuation points or their houses, care is provided in special evacuation points.
- c) It is necessary to simplify the administrative processes so that necessary services can be provided smoothly.
- d) For elder and disable persons, particular measures for creating stable living conditions should be taken, in addition to provision of ordinary services.
- e) Long-sighted and well-designed measures for elder and disable persons should be implemented.
- f) In evacuation points, measures should be taken to prevent ordinal people falling into conditions requiring special care.

(3) Securing assistance system

District Evacuation Committee clarifies the condition of people who are in need of special care, based on the reports from responsible persons in evacuation points and organizes the following assistance.

- a) Responsible persons dispatched to evacuation points in cooperation with district Emergency Situations Committee clarify and report to evacuation committee about address, name, surname, health condition, diseases, damages and other necessary data on people who in need of care.
- b) District Emergency Situations Committee clarifies people who stay in their home and need care.
- c) Evacuation Committee based on the situation in evacuation sites forms checking groups during 48 hours after the earthquake and dispatches them to evacuation places; the groups at first check people who are in need of care.
- d) Evacuation Communities clarifies damage to residents and facilities of which suffered allocation places and report to evacuation committee about that.

27.3.2 Livelihood assistance for people in need of care

Evacuation Committee organizes reception, social provision in professional institutions of damaged, elder and disable persons and other persons in need of care, and provides such people with public apartment or locate them in the apartments of other residents. Evacuation Committee discusses and realizes measures for providing social-living loans, supplies of livingwares, etc.

27.4 Rescue activities

In time of earthquake disaster, several kinds of damages such as fire outbreak, collapse of buildings, falling of objects/materials, car accidents, leakage of dangerous/poisonous materials etc., which may cause large-scale damage to human. Yerevan City Emergency Situations Committee, in cooperation with RS, should secure population safety, utilizing the forces and means of rescue works.

Since there is limitation of the forces and means available for rescue works and first aid, Yerevan City Emergency Situations Committee, in cooperation with CMC, Police, fire-fighting service, and other related organizations, defines the allocation and order of activities for realising maximal effectiveness of the works.

- a) Yerevan City Emergency Situations Committee, together with Yerevan Rescue Department, realizes organizational activity for saving of people's life and providing of first aid. In case of difficulty in response with ordinary response technique, special forces are created for particular case and dispatch the forces efficiently for prompt rescue activities.
- b) Rescue activities implemented, putting the highest priority onto rescue of people alive. For this purpose, the priority areas for rescue activities should be selected,
- c) After rescuing people from the ruins, they are passed to urgent medical points taking into consideration degree of the injury. For urgently transport to medical institutions, emergency vehicles and helicopters are used.
- d) If the rescue forces and means are not enough for efficient rescue works and first aid, district Emergency Situations Committee reports the situations to Yerevan Emergency Situations Committee for providing necessary assistance.
- e) Assistance activities of rescue by volunteers dispatched from other marzes or countries are managed by Yerevan City Emergency Situations Committees.
- f) Before setting up of first aid stations, first aid is provided at evacuation points with available staffs and stored medical materials. Department of Healthcare organizes medical care activities, utilizing available medical staffs and urgent medical means, in cooperation with medical institutions, fire-fighting and rescue detachments, medical volunteers and trained residents.
- g) In case of shortage of urgent medical and rescue technique, additional rescue means and urgent medical assistance provision is realized from private sector on the basis of prior agreements for rescue operations and urgent medical aid.

Chapter 28 Emergency medical care, health care, and sanitation

Medical Service and Sanitary-epidemic Control Service create an emergency response headquarters in the structure of Medical Service. The activities to be managed by the headquarters are shown in Figure 28.1.1.

Organization	Occurrence of disaster		
	1 hour	24 hours	72 hours
	Initial response phase	Emergency response phase	
			Rehabilitation/reconstruction phase
Medical Care HQ	<ul style="list-style-type: none"> ○ Gathering information on the injured ○ Setting up of emergency medical care facilities ○ Transport of medical staff 	<ul style="list-style-type: none"> ○ Transport of the injured ○ Implementation of emergency medical care activities ○ Provision of medical supplies <ul style="list-style-type: none"> ○ Implementation of mental care ○ Requesting assistance from other areas 	<ul style="list-style-type: none"> ○ Implementation of environmental health activities ○ Acceptance of assistance from other areas

Figure 28.1.1 Outline of emergency medical care activities

28.1 Objectives of emergency medical care

The emergency response headquarters implements collection of information about casualties and injured persons, and also collection of information about damage of medical facilities and acceptance of casualties by those facilities. The objectives are defined on the basis of received information. The emergency response headquarters submits information to ES headquarter about the state of the objects in case of necessity.

28.2 Medical care activities

28.2.1 Transportation of medical staffs

The emergency response headquarters organizes transportation of medical staff in the following way:

- a) The emergency response headquarter organizes transportation of mobile medical detachments in cooperation with transport service.
- b) Transport vehicles, which are registered at public order maintenance, are used for their transportation.
- c) Transport vehicles are requested from nearby regions in case of insufficiency of transport vehicles.

28.2.2 Transportation of the injured

Medical Care HQ organizes transportation of injured persons and medical staffs in the following way.

- 1) Primary transportation system (transportation from site to emergency medical institutes in the city)

Mobile medical detachments communicate with the information center for emergency medical care and transfer injured persons to emergency hospitals. Slightly injured persons go to first aid stations by own means such as on foot and they are treated at the stations.

- 2) Secondary transportation system (transportation from medical institutes in the city to major medical institutes outside the city)

In case of difficulty in treatment of injured persons in hospitals in the city, the injured persons are transported to other cities, according to agreement on cooperation. Information center for emergency medical care, in cooperation with Transport Service, organizes the secondary transportation, under the management of Medical Care HQ.

28.2.3 Provision of emergency medical care

The Headquarters, upon receiving reports from the staff dispatched to prepare for opening emergency medical facilities on the safety and the like, immediately takes necessary actions to accept injured persons at the facilities.

28.2.4 Provision of medicine and medical materials

- a) Medicines and medical supplies/devices stockpiled by Medical Service shall first be used in medical institutes in case of an earthquake disaster.
- b) In case of insufficiency of medicines during emergency response, measures are taken to provide them to medical institutes, on the logistic system created beforehand.
- c) Sanitary-epidemic Control Service promptly clarifies the damaged facilities and provides necessary materials for maintaining sanitary conditions.

28.3 Psychological care

Medical Care Headquarters will strive for mental care of victims by dispatching trained and educated mental-care experts, and requesting Rescue Service to dispatch experts. In order to allay the stress of disaster victims and prevent the development of mental diseases, the Medical Care Headquarters sets up mental care hotlines whereby the sufferers can freely call to consult with and be advised by professionals and nurses on their problems.

28.4 Sanitary control at evacuation points

Medical Care Headquarters implements measures to prevent infectious diseases and food poisoning among citizens and to attain the safety of civil life in the affected areas and evacuation centers. These measures include public relations on environmental health, secure of drinking water and food, and sanitary control at evacuation centers.

The emergency response headquarters organizes the activity, mentioned in Table 28.4.1, for preventive measures of infectious diseases.

Table 28.4.1 Activity of preventive measures for sanitary control

<ol style="list-style-type: none">1. Preliminary collection of information about infectious diseases2. Implementation of study about origination of rodents and insects, implementation of disinfection in case of necessity, etc.3. Sanitary briefing of usage of toilets4. Implementation of disinfection in case of outbreak of infectious diseases5. Introduction of equipments and means of preventive measures of infectious diseases6. Application by the request of cooperation with interested organizations in case of insufficiency of the means of preventive measures of infectious diseases.

Chapter 29 Search and rescue of missing persons, handling of bodies

For the search and rescue of missing people, the rescue service establishes a rescue headquarters. The summary of the actions to be taken by the rescue headquarters as well as the procedure of the handling of dead bodies by the police and funeral services are shown in Figure 29.1.1.

Organization	Occurrence of disaster		
	1 hour	24 hours	72 hours
	Initial response phase	Emergency response phase	Rehabilitation/reconstruction phase
Rescue HQ	<ul style="list-style-type: none"> ○ Establishment of HQ, summoning of staff members ○ Search for the missing ○ Rescue of the missing, logistical support 		
Police, Funeral Service		<ul style="list-style-type: none"> ○ Setting up of mortuaries ○ Disposal of human bodies (initial evaluation, postmortem, placing in coffin, identity check, ○ Temporary burial ○ Burial 	

Figure 29.1.1 Outline of activities to search and rescue missing and handle bodies

29.1 Search and rescue of missing persons

29.1.1 Establishing Rescue Headquarters

In case of emergency situations due to earthquakes, the head of Yerevan City Emergency Situations Committee, based on the situation, establishes Rescue HQ to carry out search and rescue of the missing persons in cooperation with the Police, Army, and other related organizations.

29.1.2 Search and rescue activities

(1) Target objectives

The target objectives of search and rescue operations are the people missing during the earthquake with no information about their being alive or not.

(2) Receiving application

- a) Rescue HQ establishes reception/managing posts for searching missing persons requiring rescue. The name and surname, age, height, sex, clothes and other necessary data of the missing persons are clarified from the person requesting search and registered the contents.
- b) Rescue HQ collects proper information by means of sending staffs to firefighting rescue service, accident-recovery operations, Police and other organizations to check the information for close communication with the organizations.

(3) Search and rescue activities

- a) Rescue HQ has an axial role in the search and rescue operation of the missing people. Search activities are carried out rapidly, in close cooperation with relevant bodies, by firefighting and Rescue Service, Evacuation Committee, Police, the Army, etc.
- b) Rescue HQ promotes effective activities of search and rescue operations, taking necessary measures such as providing information of missing persons to related organizations.

- c) Rescue HQ and other organizations organizes necessary human resources, automobile transport, heavy technique, etc. for search and rescue operations of missing persons.
- d) Medical Care HQ coordinates activities of first aid with related department of Yerevan City and other related organizations, so that first aid is carried out smoothly after the search and rescue activities organized by Rescue HQ.

(4) Logistics activities

- a) District Emergency Situations Committee coordinates logistics activities for search and rescue (security, traffic control, public information, etc.), in cooperation with related organizations, autonomous disaster management groups, NGOs, etc.
- b) District Emergency Situations Committee reports about information of search and rescue of missing persons and logistics provision to Yerevan City Emergency Situations Committee, and also applies to heads of corresponding subdivisions for providing cooperation to those organizations, which have appropriate contracts and agreements with them.
- c) The head of Yerevan City Emergency Situations Committee clarifies the information on search and rescue of missing persons and logistics provision and applies to corresponding organizations, which have appropriate contracts and agreement with the committee.
- d) It is efficient to use large cranes, excavators and other agricultural and constructional technique. Therefore, besides the technique existing in search and rescue groups, reception of technique is organized from those organizations and companies, which have contracts with.

29.2 Handling dead bodies

Collection of dead bodies is being implemented by corresponding order, considering the emotions of relatives of died person to a great extent.

29.2.1 Organization of morgues

(1) Opening of morgues

After consultation with evacuation units, regional sections of Police, and district Emergency Situations Committee, Funeral Service dispatches its responsible staffs to organize the funeral and open morgues in each district.

(2) Provision of funeral items

Funeral Service applies to corresponding organizations for provision of coffins and other funeral items.

29.2.2 Procedure of handling of dead bodies

(1) Finding and notification

People who have found bodies immediately informs to Police and/or staffs of the district.

In case of receiving information, responsible persons of district Emergency Situations Committee about finding of corpse, the responsible persons immediately inform to Police about it.

(2) Examination and registration of bodies

Police dispatches its employees to the site of finding of corpse, who examine the corpse on-site and register the death.

(3) Examination of bodies

- a) The professional examination of bodies is implemented by forensic medical expert, doctor-specialist and doctor of forensic medicine in cooperation with police and/or doctors.
- b) After professional examination, bodies are washed, sewed, special sanitary treatment of bodies and other corresponding measures are carried out.

(4) Placing bodies in coffin

- a) District Emergency Situations Committee organizes transportation of corpses to morgues. In such case, distinct information about the following is clarified and provided to police by all means: Name and address of person who transports the corpse, the place of finding the corpse, name, address and other data of died person.
- b) The responsible employees of district ES committees, who work in the morgues, compose a «protocol of treatment of corpse», after which they place the corpse in a coffin and stick a signboard on it about the name of dead person and registration number.

(5) Identification of bodies

- a) In cooperation with the Police, district Emergency Situations Committee takes measures to identify dead person, to find his relatives and pass him to them. In a case when it is not possible to identify a dead person, photo pictures of him and his belongings are made, as well as data on outward appearance of the dead person is done.
- b) For identification of corpse which was not identified the Police applies to different departments for help, as well as existing data are compared with data on missing people.

(6) Handover of bodies

- a) After the examination of bodies and making a record of death the identified, Police hands over the bodies to relatives. The bodies which are not identified are handed over to corresponding staffs of district Emergency Situations Committee.
- b) Corresponding staffs of district Emergency Situations Committee assist Police in process of handover of bodies.
- c) After inspection of a corpse and making a record of death, the information on identified bodies is posted at the announcement table of evacuation points in order to find relatives.

29.2.3 Provision of information on bodies and interring

(1) Provision of information on bodies

After consulting with Police and other related organizations, Funeral Service notifies population about number of dead people, name, age, sex, as well as information on bodies which have not been identified.

(2) Cemeteries

- a) Funeral Service clarifies capacity of places in city cemeteries.

b) Funeral ceremony of bodies is done in city cemeteries.

(3) Temporary burial places

In case of impossibility of burial in city cemeteries, Funeral Service, Department of Healthcare of Yerevan City and other related organizations discuss and decide temporary places for funeral.

Chapter 30 Fire-fighting and protection from hazardous materials

30.1 Initial response

30.1.1 Structure of initial response

Responsible staff for firefighting rescue operations in Fire-fighting Service immediately establishes Firefighting Headquarters in case of fire due to earthquake. The headquarters issues orders on implementation of fire-fighting measures in accordance with existing plans for fire-fighting.

The fire-fighting service implements mobilization measures according to Table 30.1.1.

Table 30.1.1 Mobilization measures organized by the anti-fire service

1. Creation of firefighting headquarter adjunct to Ministry of Emergency Situations,
2. Reception and transmission of various information,
3. Checking of installation scheme and submission of report on results of checking,
4. Collection of information and report,
5. Discussion of issues of control of subdivisions,
6. Provision of communication means,
7. Determination of damage caused to transport vehicles and buildings of special significance,

30.1.2 Collection of information at initial stage

The firefighting headquarter adjunct to Ministry of Emergency Situations generalizes messages received from (1-01 or 911) calls, and also visitors, wired and wireless communication routes of emergency situation service and information received from various sources. The firefighting headquarter implements assessment of situation and forms mobilization system according to that information.

(1) Information for initial response

The mobilization information is information book of data on scales, zones and boundaries of disasters. Dispatching of fire-fighting and rescue service, conditioned by origination of fires and implementation of rescue operations, is decided, according to information collection points, mentioned in Table 30.1.2.

Table 30.1.2 Items of information for initial response on fire-fighting

1. Name of place and facility of occurrence of fire or accident,
2. Size of damage,
3. Degree of danger of spreading of damage and necessity of replenishment of firefighting forces,
4. Existence of irrevocable losses and their quantity according to sex and age,

(2) Information regarding the control of fire-fighting rescue service

Information mentioned in Table 30.1.3, are collected as necessary information for response of fires and for information on staff of fire-fighting and rescue service.

Table 30.1.3 Information points regarding the control of fire-fighting and rescue service

1. The composition of FRDs and emergency mobilization situation,
2. Information on limitations of traffic, violations and other transport disruptions,
3. Information on irrevocable losses,
4. Information on water supply networks and other information, which is necessary for provision of water for firefighting,

(3) Information regarding the assurance of security of life of population

Collection of information is carried out, which is necessary for assurance of security of life of population according to points, mentioned in Table 30.1.4.

Table 30.1.4 Information points for assurance of security of life of population.

1. Information on evacuation places, quantity of evacuees, necessity of business trip of doctors and other medical staff,
2. Damage caused to electric networks, gas pipelines and water-lines and prospects of their recovery,
3. The state of activity, implemented by ES services, besides the FRDS,
4. Information on aid, provided to population

30.2 Fire-fighting activities

30.2.1 Target

The forms and quantity of fires occurred as a result of earthquake depend on intensity of seismic vibrations, characteristics of earthquake, season, time and other factors. The anti-fire measures correspondingly should be flexibly adjusted to current situation based on quantity and sizes of fires.

(1) Priority on fire fighting

Various problems occur at same time during earthquake disaster such as fires, rescue operations and provision of medical care regarding the protection of human life. In such case, necessary quantity of resources for implementation of anti-fire measures is impossible. Thus, it is very important that the fire-fighting service detects fires in early stage, urgently isolates and extinguishes them.

(2) Utilization of local initiative in anti-fire service

It is necessary to develop initiative of population and local self-governing bodies for enforcement of preparedness of society to respond to fires and other ESs. The efficiency of firefighting can be increased by means of distinct distribution of duties and mutual cooperation with volunteer unions and population.

(3) Urgent collection of information and rearrangement of forces among subdivisions

The firefighting headquarter of anti-fire service clarifies the situation on size of damage, volume of works on municipal level and changes the location of subdivision in case of harm of works of several subdivisions, thus increasing the efficiency of implementation of works.

30.2.2 Principles of implementation of activity

(1) Active firefighting

Measures are taken in primary detection areas of fires at initial stage for extinguishing fires through active pumping of water.

(2) Purposeful firefighting

It is necessary to implement uniform pumping of water in those areas, where spreading of fire from one building to another is possible, thus securing efficient firefighting. The direction of spreading of fire, structure of constructions, spaces between buildings and state of roads should be considered in such cases.

(3) Centralized firefighting

The following measures need to be implemented in case of growth of scales of fire and as a result of insufficiency of firefighting forces: completely evacuate the population, correctly estimate the situation, consider the direction of wind, circumstances (wooden structures, facilities with hazardous substances, gas leakage) that promote quick spreading of fire, decide the area of prevention of spreading of fire, using large roads (15m or more), rivers, railroad ways, parks, open spaces and other non-flammable territories, centralize the anti-fire forces and means in direction of isolation and extinguishment of fire.

(4) Timing of relocation of fire-fighting and rescue detachment

Transportation of firefighting rescue detachments from firefighting areas to other areas is implemented in those cases, when the fire is isolated and its spreading to other areas is prevented. Extinguishment of isolated fires is entrusted to firefighting unions and population living in that area.

(5) Priority on guidance for evacuation

Saving of human life, evacuation of population and firefighting of evacuation routes are primary tasks when the firefighting forces are insufficient for prevention of spreading of fire and/or the extinguishment of fire is impossible because of strong wind or other factors.

(6) Priority on protection of important areas

The firefighting rescue detachments move to primary protection areas in case of detection of origins of simultaneous fires. Such areas are detected by means of complex estimation of various factors (direction of wind, probability of spreading of fire in the district, state of firefighting water sources, distribution of most important facilities, facilities with hazardous substances, etc.)

(7) Cooperation of local companies with volunteer firefighting unions

It is necessary to apply to local companies, volunteer firefighting unions for cooperation and maximally use their firefighting capabilities at initial firefighting stage. It is also necessary to provide assistance in firefighting areas.

30.3 Urgent measures in facilities with hazardous materials

30.3.1 Implementation of urgent measures in the facilities of keeping, usage of oil products and other facilities with hazardous substances

The firefighting headquarter adjunct to the anti-fire service gives instructions to heads of organizations keeping hazardous substances on issues regarding the security.

30.3.2 Urgent measures in facilities, dealing with explosives and inflammable materials

The firefighting headquarter gives order to the heads of organizations using explosive and inflammable materials to carry out the following measures. These measures are carried out in accordance with the scale of damage caused to the mentioned organizations.

- a) Implementation of urgent reconnaissance and taking of measures against burning/explosion
- b) Keeping of rules of early firefighting
- c) Identification of the created situation, implementation of protection measures of the staff and population of the adjacent territory in accordance with it as well as response together with territorial subdivisions of Ministry Emergency Situations.

30.3.3 Urgent measures in facilities, dealing with chemically hazardous materials

The firefighting headquarter gives order to the heads of organizations using chemically hazardous materials to carry out the bellow mentioned measures for the purposes of preventing the spread of toxic gases due to leakage or emission of chemically hazardous materials.

- a) Giving order to organizations for the decontamination by neutralizing materials in case of leakage or emission of chemically hazardous materials;
- b) Being in permanent contact with interested organizations, receipt and transfer of information;
- c) Teaching of rules of behavior of population or submission of recommendations about evacuation in case of spread of chemically hazardous materials;
- d) Population awareness and limitation of movement in case of accident.

It is necessary to work out solutions of action tasks in case of an accident due to chemically hazardous materials based on which relevant activities should be carried out.

- a) Clear differentiation of responsibilities, defining of places where the keys of storages of chemically hazardous materials are kept;
- b) Implementation of measures preventing the occurrence of fires and for urgent firefighting;
- c) Implementation of measures preventing leakage or emission of chemically hazardous materials;
- d) Implementation of measures preventing the turn-over of tank containing hazardous materials, as well as implementation of measures preventing the occurrence of fires during the accident or while working in the laboratory as well as due to turn-over;
- e) Defining the ways of clarification of the situation in the disaster zone, collection and transfer of information;
- f) Ways and the place of evacuation.

Chapter 31 School measures

This chapter describes security of students, emergency education, and resumption of school, from the perspective that school is an education environment.

31.1 Security of students

(1) Response during school hours

- a) In case of earthquake during school hours, the headmaster of school should take necessary measures, based on disaster management plan, in accordance with actual situations. Students are evacuated to the school yard, guided by teachers.
- b) The headmaster should confirm the safety of each student and actual situations of damage, and then, report on the results to Department of Education of Yerevan City.
- c) When it is deemed safe to send students home, the teachers and school staff will give directions and turn students over to their parents or guardians, based on the list of students prepared beforehand.

(2) Response after school hours

If deciding to close the school while students are at home, the headmaster will so report to the Department of Education. The responsible person or the group appointed by the director informs the learners about the termination or restart of lessons using the list of learners prepared beforehand for that purpose.

31.2 Emergency education

(1) Securing place for emergency education

The headmaster of school organizes educational activity as real as possible taking into consideration destructions, damages as well as rehabilitation period. If the damage to the facilities is minor, the headmaster will immediately implement emergency measures and conduct classes. If the facilities are completely unusable, the learning process is organized in safe classrooms of educational buildings, sport halls etc. It is possible to organize the education also in the form of joint classes and other means.

In cases when the educational institution cannot be used totally, in cooperation with the Department of Education, the uniting of educational institutions in safe places is selected as an alternative way. If it is difficult to organize the education process in place temporary classrooms are deployed and lessons get restarted.

(2) Providing school supplies to students

The headmaster will provide students, who lost educational materials in the disaster, with necessary supplies in order to prevent any hindrance to learning, in cooperation with the Department of Education. Necessary education materials will be arranged in school. In case of lack of education materials, the materials should be procured with support of Department of Educational of the city.

31.3 Restarting school

(1) Rehabilitation of education facilities

Department of Education of Yerevan City promptly ascertains the need for repair, renovation, and reconstruction of educational facilities and the construction period and cost required, to formulate school reconstruction plans. Based on the plan, the department will implement measures associated with educational facilities, such as construction of temporary schoolhouses, use of alternative buildings, and repair and renovation of the facilities. The temporary schoolhouses will be basically constructed in existing school yard. If it is difficult to secure such space for temporary schoolhouses, construction in another place will be considered.

(2) Preparation of re-start of classes

The teachers and school staff will, under the supervision of the headmaster, strive to ascertain the consequences to the students and secure classrooms. Prior to restarting lessons, they will ensure the safety of the rooms and set up rooms as necessary.

Department of Education of Yerevan City will indicate estimated timing of reopening of schools. The headmaster of each school will decide exact date of the reopening, based on the actual situations of the school. The matters shown in Table 31.3.1 will be considered at the time of decision of the reopening.

Table 31.3.1 Matters to be considered at the time of reopening school

1. Recovery situations of educational institutions
2. Security measurements in places which has not been reconstructed yet
3. Situation of water supply system reconstruction
4. Number of available classrooms
5. Number of students which can attend educational institution
6. Parents' opinion

The headmasters of schools reports to Department of Education about date of the reopening of school, adopted by him as well as informs students, parents through flyers, posts, information sheets. Department of Education passes information through evacuation committee and warning service for those who evacuate far from the school.

A special attention is paid to psychological aid for students (fear from earthquake, loss of relatives, non-confidence for future). The headmasters of schools cooperate with Department of Education and health service for dispatching necessary specialist in order to provide psychological aid for students and to care about their psychological condition.

(3) Proceeding of changing school and consultation of enroll in school

If evacuation point is located far and students cannot continue their education in previous school, their replacement to other school is organized. Department of Education of the city passes detailed information to parents of students for changing school, through evacuation committee and warning system.

Department of Education has its representatives in evacuation points in order to provide consultation for entering an institution. The parents and students which should be moved to other

institutions are informed about preparation of educational institutions and security measures during attending lessons. Measures on elimination of panic and non-confidence among residents should be taken.

Chapter 32 Supply of drinking water and food

Drinking water and food will be provided, as official support, to residents who cannot have drinking water and food because of damage of water lines and absence of reserved stocks. Rapid Response Staff is established under the Water Supply Service (hereinafter referred to as RRS of WSS) for water supply and sewerage as well as under Food and Commodity Service (RRS of FCS) for supply of food and commodity.

Major activities of RRS of WSS and RRS of FCS are shown in Figure 32.1.1.

Organization	Occurrence of disaster		
	1 hour	24 hours	72 hours
	Initial response phase	Emergency response phase	Rehabilitation/reconstruction phase
Rapid Response Staff under Water Supply Service (RRS of WSS)	<ul style="list-style-type: none"> ○ Setting up of the Headquarters, summoning of staff members ○ Inspection and investigation on damage to water supply centers and water tanks ○ Installation of pumps to water supply centers and water tanks 	<ul style="list-style-type: none"> ○ Water supply from the water supply centers and water tanks ○ Requesting assistance from other areas 	<ul style="list-style-type: none"> ○ Acceptance of assistance from other areas, water supply
Rapid Response Staff under Food and Commodity Service (RRS of FCS)	<ul style="list-style-type: none"> ○ Setting up of the Headquarters, summoning of staff members ○ Ascertainment of the consequences to warehouses of food providers in the jurisdiction ○ Requesting procurement of food to food providers in the jurisdiction 	<ul style="list-style-type: none"> ○ Provision of ready food by food providers in the jurisdiction ○ Requesting assistance from other areas 	<ul style="list-style-type: none"> ○ Setting up of food bases at wide-area transport bases ○ Acceptance of assistance from other areas and supply of the provided food ○ Supply of uncooked food and daily commodities by vendors

Figure 32.1.1 Outline of activities to provide drinking water, food and commodities

32.1 Water supply activities

RRS of WSS manages water supply activities, in accordance with the system mentioned in Chapter 19. The outline of the water supply activities is as described in this clause. The details on the activities will be determined by the head of RRS of WSS or responsible staffs at the sites, according to the actual situations.

(1) Establishment of RSS of WSS

RSS of WSS is established in the management body structure of Yerevan city. The structure of RSS of WSS is composed of urgent technical inspection and reconstruction group responsible for rehabilitation of water supply/ reservoirs/ sewerage and urgent water supply. Urgent reconstruction/ rehabilitation / technical inspection group is composed of “Yerevan water supply and sewerage” CJSC staffs, who deal with technical studying and inspection of defects and damages in ordinary time.

(2) Preparation of water supply, including damage investigation of water supply bases and water tanks

Technical inspection of damage level of water supply objects and water reservoirs is realized by urgent reconstruction and technical inspection group. Inspection of water reservoirs allocated in different places of the city is realized by serving staff of correspondent branches of “Yerevan water supply and sewerage” CJSC (WSW CJSC). If as a result of inspection by serving staff of WSW CJSC comes out that works of technical service are needed for damage recovery, a report on the situation should be provided to RSS of WSS.

If damage and volume of loss are of relatively average level, is possible to rehabilitate it urgently and realize a technical inspection by serving staff.

(3) Restarting water supply

When there is no damage or the emergency repair work is completed at a water supply facility, the inspector or investigator will report to the head of the facility. Then, the head will prepare for restarting water supply, confirm the situation to the supply end to be ready, report the situation to RSS of WSS, and then, resume water supply.

(4) Requesting to other regions for assistance and accepting the assistance

If there are not sufficient pumps and water wagons for supplying water, the RSS of WSS will request assistance of other region through Ministry of Emergency Situations. The staff and the logistical means provided by regions are concentrated in the disaster zone. Water cisterns and other necessary logistical means that can be immediately used in the disaster zone are sent to working sites.

(5) Management of information, relating to water supply

RSS of WSS acts as a unified window for gathering, analyzing, and managing information, in order to ensure prompt and appropriate water supply in an emergency. The list of information to be managed is shown in Table 32.1.1.

Table 32.1.1 Information relating to water supply

1. Areas of outage of water supply, and level of damage to water supply facilities
2. Request for water supply from other basis on emergency management, medical care
3. Situations of rehabilitation of water supply facilities, and situations of allocation of staffs and equipment/ materials for the rehabilitation
4. Situations of staffs, equipment/ materials provided from outside for assistance

32.2 Supply of food and commodities

RSS of FCS manages supply activities of food and commodities, in accordance with the system mentioned in Chapter 19. The outline of the water supply activities is as described in this clause. The details on the activities will be determined by the head of RSS of FCS or responsible staffs at the sites, according to the actual situations.

(1) Establishment of RSS of FCS

RSS of FCS is established in the industrial and entrepreneurial body structure of the city. RSS of FCS requests for providing food and commodities to companies, which are producing/ transporting/ selling of food and commodities. RSS of FCS also manages the supply of food and commodities.

(2) Clarification of damages to food stock in warehouses, etc and request for providing

RSS of FCS investigates the consequence to the warehouses and sales stores of food and daily commodity within its jurisdiction and confirm the feasibility for procuring food and the amount of available food. Then, RSS of FCS requests companies, based on requests from the command, evacuation, and medical centers.

(3) Providing food and commodities from companies under Ministries

Upon request of RSS of FCS, companies supply food and commodities to the management and evacuation points and medical services which have applied for that provision.

(4) Requesting to other regions for assistance and accepting the assistance

When food and daily commodities are not sufficiently available, the RSS of FCS will request assistance of other regions through the director of Ministry of Emergency Situations. In order to avoid discrepancy between demand and supply of particular goods in suffered areas, it is necessary to clearly define kinds and quantity of requesting good at the time of request. Commodities to be supplied as official help are listed in Table 32.3.1.

Table 32.2.1 Commodities to be supplied as official assistance

Category	Main commodities
Sleeping accessories	Sleep a cover, mattress
Clothes	Clothes (for everyday live, working, and children and other
Underwear	Shirts, trousers and other underwear
Goods of individual use	Towel, socks, slipper, etc.
Hygiene means	Soap, toilet paper, toothpaste, brush, etc.
Cooking utensils	Pan, gas facility, knife, etc.
Heating and lighting facilities	Matches, candle, etc.
Eating utensils	Plate, cup, spoon, fork, etc.

(5) Management of information, relating to supply of food and commodities

RSS of FCS will act as a unified window for gathering, analyzing and managing information, as shown in Table 32.2.2, in order to ensure prompt and appropriate food supply in an emergency.

Table 32.2.2 Information relating to supply of food and commodities

- | |
|---|
| <ol style="list-style-type: none">1. Request for food and daily commodities from command, evacuation, and medical centers, other emergency response bodies, and residents2. Consequences to the warehouses and sales stores of vendors engaged in production, distribution, and retailing of food and daily commodities; and the quantities available3. Status of supply of food and daily commodities4. Status of inputs of assistance of food and daily commodities from other areas |
|---|

Chapter 33 Urgent rehabilitation of lifeline, telecommunication, and traffic facilities

Lifeline, telecommunication, and traffic facilities, damaged with an earthquake, should be rehabilitated at an early date, in order to clear away the obstacles for emergency activities such as command, rescue, evacuation, medical care, etc. as well as stabilization of civil life and social economy.

Therefore, organizations having jurisdiction over those facilities will manage the urgent rehabilitation work such as setting up the relevant response headquarters, based on preparation listed in Table 33.1.1.

Table 33.1.1 Items of preparation for rehabilitation of lifeline facilities, etc.

Item to be prepared	Clause describing the details
1. Criteria for setting up emergency headquarters and the branch posts	Clause 20.1
2. Hub of rehabilitation	Clause 20.2
3. Framework for checkup and damage assessment	Clause 20.3
4. Framework for information collection and communication	Clause 20.4
5. Procurement of rehabilitation materials	Clause 20.5
6. Priority of rehabilitation	Clause 20.6
7. Emergency transportation hub	Clause 16.2
8. Confirmation and agreement on assistance	Clause 20.7

Major activities of the headquarters on lifeline, telecommunication, and traffic facilities for urgent rehabilitation are shown in Figure 33.1.1.

Organization	Occurrence of disaster		
	1 hour	24 hours	72 hours
	Initial response phase	Emergency response phase	Rehabilitation/reconstruction phase
<ul style="list-style-type: none"> • Water supply and sewerage facilities HQ • Power supply facilities HQ • Gas supply facilities HQ • Telecommunication facilities HQ • Transport facilities HQ 	<ul style="list-style-type: none"> ○ Setting up of the emergency headquarters, gathering of staff members ○ Checkup and on damage assessment of the facilities 	<ul style="list-style-type: none"> ○ Information collection and communication ○ Emergency rehabilitation activities ○ Media and PR activities ○ Requesting assistance from other areas 	<ul style="list-style-type: none"> ○ Setting up storages for equipment and materials ○ Acceptance of assistance from other areas

Figure 33.1.1 Outline of activities for urgent rehabilitation of lifeline, etc.

33.1 Setting up of emergency headquarters and gathering of staff members

Setting up of emergency headquarters and gathering staff members should be done immediately, according to the plans such as BCP, determined and disseminated at preparedness stage (see clauses 20.1 and 20.3).

Staffs, who gather at the time of out of duty, should follow the guidance mentioned in clause 23.5.2.

33.2 Checkup and damage investigation of the facilities

Checkup and damage assessment should be done in accordance with the framework for checkup and damage assessment established beforehand (see clause 20.3).

Emergency headquarters should clarify situations of damage and staff gathering in accordance with BCP, and order to carry out checkup and damage assessment.

33.3 Activities on information collection and communication

Collection of information and communication are indispensable for understanding actual situations of damage and on-going measures, ordering proper rehabilitation, coordinating between emergency headquarters and related organizations. Each emergency headquarters should carry out activities on information collection and communication promptly and smoothly in accordance with pre-established framework (see Clause 20.4).

Since information on the progress of rehabilitation works of water/ gas/ power supply as well as estimated time of restart of the supply is important for smooth proceeding of other emergency response activities should be transmitted to other emergency headquarters promptly and properly.

33.4 Emergency rehabilitation activities

Emergency rehabilitation activities should be done promptly and efficiently, using stored materials as mentioned in Clause 20.5, according to pre-decided priority as mentioned in Clause 20.6, and based on collected information on damage and on-going measures.

The emergency rehabilitation activities must be carried out with consideration given to the following matters.

- a) Give top priority to damage concerning human life in fixing an order of facilities to be rehabilitated.
- b) Then, set priorities according to the degree of damage to the facility, difficulty of rehabilitation work, impact on command, evacuation, and medical centers, and the scale of effects, such as impact on civil life.
- c) While emergency rehabilitation work must be carried out as immediately as possible, make sure to prevent any succeeding disasters from happening and a repetition and redoing of the same work in permanent rehabilitation work.

33.5 Media and PR activities

To ensure that residents will restore their lives with their self-help and to mitigate confusion and anxiety among residents, individual response headquarters will publicly release information related to the consequence of the disaster and the facility rehabilitation status through the Emergency Management Headquarters. They will also raise awareness on necessary cautions, through PR activities, in order to prevent any succeeding disasters in conjunction with the resumption of power and gas supply, and so forth.

Major items of information dissemination to be done by emergency headquarters on the facilities are shown in Table 33.1.2.

Table 33.1.2 Major items of information to be disseminated to be done by emergency headquarters on the facilities

HQ	Major items
Water supply and sewerage facilities HQ	<ol style="list-style-type: none"> 1. Damage situations of water supply and sewerage facilities as well as estimated time of restart of water supply 2. Raising awareness on prevention of leakage at the time of restart of water supply
Power supply facilities HQ	<ol style="list-style-type: none"> 1. Damage situations of power supply facilities as well as estimated time of restart of power supply 2. Raising awareness on prevention of secondary disaster, relating to power supply <ul style="list-style-type: none"> - Prevention of fire after restart of power supply (turn off main switch when evacuating) - Prevention accident on eclectic shock (Prohibition to touch loosen electric wire)
Gas supply facilities HQ	<ol style="list-style-type: none"> 1. Damage situations of gas supply facilities and estimated time of restart of gas supply 2. Raising awareness on prevention of secondary disaster, relating to gas supply <ul style="list-style-type: none"> - Closing gas valves, particularly main valves - Prohibition of use of gas devices and emergency call to the gas company, in case of smell of gas - Prevention of gas leakage at the time of restart of gas supply (confirmation of close of valves of gas devices before opening main gas valves)
Telecommunication facilities HQ	<ol style="list-style-type: none"> 1. Damage situations of telecommunication facilities and estimated time of restoring telecommunication 2. Broadcasting special or urgent programs for dissemination of announcement and information from emergency management headquarters 3. providing information of restriction of calls to avert an overflow of the system, as well as raising awareness to make telecommunication requisite minimum for preventing congestion
Transport facilities HQ	<ol style="list-style-type: none"> 1. Damage situations of traffic facilities such as roads, bridges, railways, airports, etc. as well as estimated time of restoration of the facilities 2. Sections of roads of traffic ban or traffic control 3. Notification of prohibition of using private vehicles for emergency response activities 4. Situations of transportation of evacuees and assistant materials

33.6 Requesting and accepting assistance from other areas

When personnel or equipment and materials needed for rehabilitating facilities are predicted or ascertained as insufficient, individual response headquarters will seek assistance from related parties in the other parts of the country, through the director of the Emergency Management Headquarters, in accordance with the assistance-related details confirmed and agreed in advance (see Clause 20.7).

To accept assistance of personnel or equipment and materials from other parties in the countries, individual response headquarters will secure space for storing the equipment and materials and for dispatched personnel to stay at wide-range transport bases arranged in advance (see Clause 16.2).

When an assistance unit arrives, they will give due instructions on the details and targets of work to be carried out, in consideration of the situation in the affected area, the progress of rehabilitation work, the priority of rehabilitation, and other important matters.

Chapter 34 Handling of garbage, human waste, and debris

Garbage, human waste, debris, and the like must immediately be handled of in order to eliminate adverse effects on the sanitary environment in the affected area after the occurrence of an earthquake, and to ensure a smooth implementation of post-disaster rehabilitation and reconstruction efforts.

34.1 Basic considerations

The following defines the basic philosophy for handling of garbage, human waste, and debris.

- a) Prompt response and handling
- b) Planned response and handling
- c) Sorting out and reuse of debris
- d) Handling in consideration of sanitation and environment
- e) Security of safety of work

34.1.2 Organizational structure

For the handling of garbage, human waste, and debris, “Waste Disposal Headquarters” will be established as a subordinate unit of Crisis Management Center. The Waste Disposal Headquarters, as a working organization of the parties concerned, will establish a waste collection group and a waste handling group in each district and implement handling work in a phased manner after the occurrence of the disaster. The work items of the two groups are shown in Table 34.1.1.

Table 34.1.1 Work items of waste collection group and waste handling group of Waste Disposal Headquarters

Group	Work item	
waste collection group	Formulation of waste collection plan	Estimating the amount of garbage, human waste and debris Formulation of collecting plan Procurement of temporary toilets and preparation of operation procedure Procurement of transportation means
	Collecting work	Subletting or allocating the collecting work Installing the temporary toilets
waste handling group	Formulation of waste handling plan	Collection of data on estimating the amount of garbage, human waste, and debris Formulation of waste handling plan
	Treatment work	Subletting or allocating the treatment works Subletting treatment of large waste
	Treatment facilities	Checking and repairing of waste treatment facilities Securing and maintaining treatment facilities
	Temporaty dumping areas	Setting up temporary dumping areas Managing transportation works Management of the temporary dumping areas
	Scrapping areas	Accepting scrapping works

Procedure of waste treatment works

Waste treatment works after an earthquake disaster will be done on three steps as shown in Figure 34.1.1.

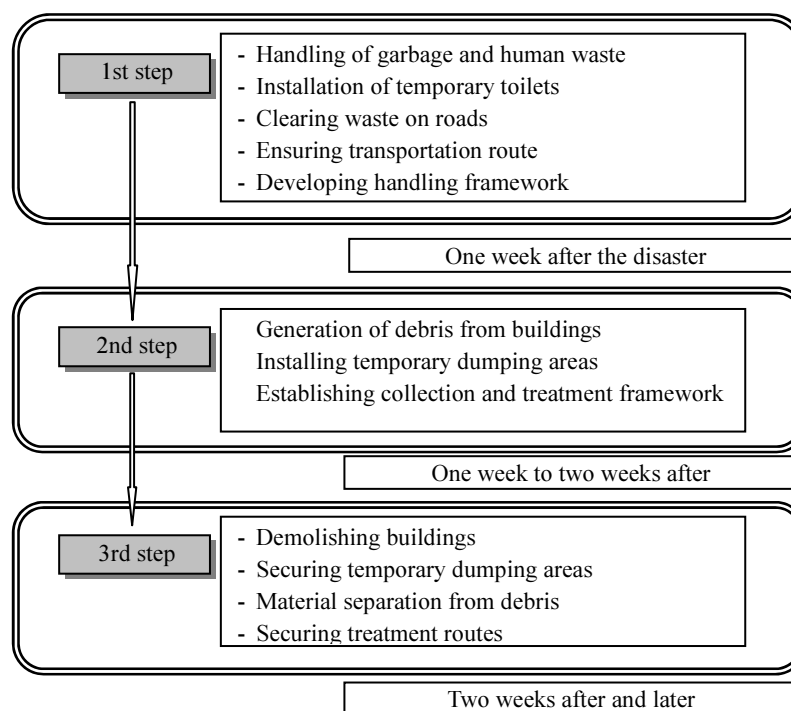


Figure 34.1.1 Outline of waste handling works

34.1.4 Requesting assistance

In order to make sure prompt and effective handling of wastes in large quantity, it is necessary to request assistance to related companies and surrounding areas. The Waste Disposal Headquarters will request cooperation of companies and neighboring marzes with whom the city have signed mutual agreements.

(1) Request to surrounding marzes

Items of requests to surrounding marzes are shown in Table 34.1.2.

Table 34.1.2 Items of requests to surrounding marzes

Human waste	<ul style="list-style-type: none"> - Procurement of transportation vehicles - Arrangement of assisting staffs - Checking and repairing of treatment facilities
Large waste	<ul style="list-style-type: none"> - Procurement of heavy machinery - Management of treatment facilities
Temporary dumping areas	<ul style="list-style-type: none"> - Installation of temporary dumping areas - Securing assisting staffs and equipment/ materials

(2) Request to related companies

Items of request to related companies are shown in Table 34.1.3.

Table 34.1.3 Items of requests to related companies

Companies to be requested	Item to be requested
Companies of rental or lease of heavy machinery	<ul style="list-style-type: none"> - Providing temporary toilets - Providing heavy machinery for large waste - Providing heavy machinery for dumping in temporary dumping areas
Companies of human waste treatment	<ul style="list-style-type: none"> - Providing collecting vehicles of human waste - Providing assisting staffs for collecting human waste
Companies of industrial waste treatment	<ul style="list-style-type: none"> - Providing collecting vehicles for large waste and its assisting staffs - Providing transportation means from the temporary dumping areas and its assisting staffs - Providing machinery for scrapping in the temporary dumping areas
Land owners	<ul style="list-style-type: none"> - Obtaining land permission for installation of temporary dumping areas

(3) Request for volunteers

At a time of earthquake disaster, huge number of staffs for handling waster is required. The Waste Disposal Headquarters will request to NGOs, NPOs, and other volunteers' organizations for providing assisting staffs for handling waste through media.

34.1.5 Providing information to residents

The Waste Disposal Headquarters will make known to residents how to collect, sort, and handle of various kinds of wastes generated as a result of the earthquake disaster immediately after its occurrence through the Warning and Communication Module and the mass media as shown in Table 34.1.4.

Table 34.1.4 Information to make known to residents

[waster and debris]
1. The way of collection
2. Timing, period, time, date of collection
3. The way of handling of indispensable waste
4. Prohibition of illegal dumping of waste
[human waste]
1. Framework of human waste collection
2. Situations of installation of temporary toilets and locations of the temporary toilets
3. Precautions of use and maintenance of the temporary toilets
[Others]
The way of regulation of volunteers

34.2 Handling of garbage

Just after an earthquake disaster, huge amount of garbage is generated and handling of the garbage is getting so difficult. Prompt handling of the garbage is required for preventing rot and bad smell as well as securing public sanitation. Waste Disposal Headquarters will start handling of garbage at least within two weeks after the disaster, according to the actual situations.

34.2.1 Estimation of amount of garbage

Generated garbage just after an earthquake disaster includes broken dishes/ electric devices, rotten food in refrigerators due to electric outage, in addition to ordinary garbage. Based on assumed period of two weeks until setting up garbage collection system, total amount of garbage to be accumulated in two weeks will be estimated.

The amount of garbage, generated with scenario earthquake GF2, is estimated to be 715,803 ton.

34.2.2 Method of collection and treatment of garbage

The locations of garbage collecting points will be basically the same as ordinary collecting points, and temporary collecting points will be set up, in case that garbage collecting vehicles cannot access the ordinary points.

It is calculated that it takes 211 days to transport garbage of 715,803 ton, which is estimated result for GF2 scenario earthquake, to disposal sites in Nubarashen district by 85 dump trucks.

Garbage collection will be restarted within two weeks after an earthquake disaster, considering period of establishing the collection framework. In case of lack of staffs and equipment/ materials, the Waste Disposal Headquarters will request assistance to neighboring marzes through Crisis Management Center.

34.2.3 Collection of garbage from evacuation points

In order to secure sanitation conditions in evacuation points, The Waste Disposal Headquarters should collect garbage from evacuation points in high priority. The Waste Disposal Headquarters will formulate garbage collection plan, after confirmation of number, locations of evacuation points as well as number of evacuees.

34.2.4 Collecting time of garbage

The collecting time of garbage will be basically the same as that in ordinary time.

34.3 Handling of human waste

At the time of an earthquake disaster, it is necessary to handle human waste generated in houses, which water supply and sewerage system is out of order, in addition to human waste accumulated in temporary toilets in evacuation points.

34.3.1 Securing temporary toilets

Evacuation Committee will install temporary toilets at evacuation points, in order to avoid difficulty in daily life of evacuees. In addition, temporary toilets, which are provided from surrounding marzes and construction companies on the basis of prior agreement, will be installed at evacuation points.

Temporary toilets will also be installed at assisting bases such as parks, and the toilets will be sanitized and managed with assistance of local residents' associations.

34.3.2 Estimation of amount of human waste

The amount of human waste to be collected will be estimated, based on number of evacuees and damage situations of water supply and sewerage facilities.

34.3.3 Procurement of septic tank trucks

In Yerevan City, human waste is transported to treatment facilities through sewerage network in an ordinary time. Although there are seven septic tank trucks in the city, it is obvious that number of septic tank trucks is not sufficient. The Waste Disposal Headquarters should supplement septic tank trucks, requesting assistance to companies of human waste collection in surrounding marzes.

34.4 Handling of debris

34.4.1 Basic points on handling of debris

At the time of an earthquake disaster, huge amount of debris is generated due to collapse of buildings and facilities. Waste Disposal Headquarters will manage removal of debris from suffered areas, and reuse/ disposal of the debris.

In debris handling, dangerous debris, poisonous debris, and debris which hamper traffic, are to be handling in high-priority.

The Waste Disposal Headquarters will collect information of damage situations, and formulate debris handling and disposal plan, which contain estimated amount of debris, way of handling and disposal, duration of handling, etc. In the course of the formulation, long-term vision and consideration on regional cooperation are required, since the amount of debris is so much.

34.4.2 Estimation of amount of debris

For the formulation of debris handling framework and debris handling plan, the amount of debris will be estimated. An example of estimation is available in Chapter 21, and the amount of generated debris due to scenario earthquake GF2 is estimated to be 5,887,478 ton.

34.4.3 Preparation of temporary dumping sites with the layout plan

Generated debris will be transported to four disposal sites as shown in Chapter 21. Since the amount of generated debris is so much; 5,887,478 ton, it will take 736 days for transportation of the debris (see Chapter 21). Therefore, temporary dumping sites of the debris will be prepared.

(1) Estimation of area of the dumping sites

Necessary area for a temporary dumping site is calculated as follows, based on amount of generated debris, height of dumping, unit weight of the debris.

$$\text{Area of temporary dumping site (m}^2\text{)} = \text{Amount of debris to be dumped (t)} / \text{unit weight (t / m}^3\text{)} / \text{height of dumping (m)} + \text{area for related works (m}^2\text{)}$$

where,

- Unit weight: 0.4 (t / m³) for combustible materials, 1.1 (t / m³) for incombustible materials
- Height of dumping: 5 m

(2) Layout of temporary dumping sites

Waste Disposal Headquarters will select candidate of temporary dumping sites, considering scale of damage, positional relation to evacuation points and temporary distribution points (TDP). Through discussion with land owners of the candidate sites, temporary dumping sites will be determined.

Points to consider and essential requirement for the selection of temporary dumping sites are as follows.

- a) Necessary area for temporary dumping of debris can be secured.
- b) Area for working with heavy machinery can be secured.
- c) The access to the site is available for heavy machinery and dump trucks for transportation of debris.
- d) Temporary dumping site is not located nearby the facilities, which require care on environment, such as hospitals and schools.
- e) There is enough distance from temporary dumping site to residential areas, so that living environment of residents can be secured.

Possible candidates of temporary dumping sites are shown in Table 34.4.1.

Table 34.4.1 Possible candidates of temporary dumping sites

1. School yard
2. Parking areas in public facilities or private land
3. Vacant area
4. Sport park
5. Unused land owned by governments or individuals
6. Unused areas nearby existing disposal sites

(3) Operation of temporary dumping sites

Points to consider in operation of temporary dumping sites are as follows.

- a) Debris to be dumped in the sites are what debris collecting group (see Clause 34.1.2) is collected.
- b) Operation managers should be stationing at the sites for managing operation of debris dumping with ledger sheets
- c) Enough number of workers, heavy machinery, and vehicles should be allocated in the sites.
- d) Recyclable debris should be transport to recycling facilities as soon as allowed.
- e) Contamination of dangerous materials and flammable materials should be prevented.
- f) Adverse influence in environment of surrounding areas such as dust and noise should be minimized by means of shrinking etc. If necessary, air fresheners and disinfectants will be spraying.

34.4.4 Collection and transportation of debris

Basically, strategic roads will be used for transportation of debris.

It is foreseen that strategic roads and ordinary roads in suffered areas are overcrowded due to damage to roads, traffic obstacle by collapse of buildings, travel of emergency vehicles, evacuation

of victims. In the course of debris transportation, necessary measures shown in Table 34.4.2 will be taken, through discussion with Crisis Management Center.

Table 34.4.2 Possible measures, relating to debris transportation

- | |
|--|
| <ol style="list-style-type: none">1. Debris transportation can be done during night time when traffic is not busy.2. Transportation route of debris to temporary dumping sites and disposal sites can be designated.3. Dedicated lane can be determined on the roads of 2 lanes or more. |
|--|

34.4.5 Treatment and disposal

1) Capacity of disposal sites

Waste Disposal Headquarters should clarify available capacity in four disposal sites in Table 21.1.3, and manage transportation amount of debris accordingly.

2) Handling and disposal plan

In order to promote minimizing amount of debris as well as reuse/ recycling of debris, segregation of debris, e.g. 6 kinds (wood, other combustible materials, concrete, metal, other incombustible materials, mixed materials) should be considered.

34.5 In-disposable waste

(1) Definition of in-disposable waste

In-disposable wastes include liquids, such as paints and oil, thick metal products, equipment with a content of chlorofluorocarbon (CFC), and any waste containing hazardous substances, such as asbestos.

(2) Handling of in-disposable materials

The discharger of in-disposable waste shall be responsible for disposing of the waste with due consideration given to the environment and the safety and sanitation in the working environment, by bringing in to an adequate and available disposer or other means.

Waste Disposal Headquarters should disseminate for well-understanding on handling manners of in-disposable materials, especially on chloride fluorocarbon. In case of temporary dumping of in-disposable materials, special areas for the dumping should be secured.

In demolition works of asbestos-contain materials, measures mentioned in Clause 21.1 (5) should be taken.

Chapter 35 Urgent measures on housing and livelihood

In addition to evacuation and relief efforts and assistance in supplying medical services, water, and food, the activities shown in Figure 35.1.1 will be carried out in order to secure housing and livelihood of the victims.

Subject	Occurrence of disaster		
	1 hour Initial response phase	24 hours Emergency response phase	72 hours Rehabilitation/reconstruction phase
Securing housing		○ Investigation on the consequence to buildings	○ Emergency repair of affected houses ○ Provision of temporary housing ○ Procurement of construction materials
Securing livelihood		○ Consultation concerning daily life	○ Employment services ○ Extension, reduction, and exemption of taxes and duties ○ Other welfare public assistance
Emergency financing		○ Stable supply of paper currency ○ Securement of sales forces of financial institutions	
Securement of labor		○ Initiation of assistance systems ○ Accepting assistance from overseas	○ Employment of temporary workers
Request for and distribution of international assistance		○ Procedure for requesting and distributing international assistance ○ Simplification of customs clearance and visa procedures	

Figure 35.1.1 Outline of activities associated with emergency response to housing and livelihood

35.1 Urgent investigation on damage to buildings

35.1.1 Basics of urgent investigation on damage to buildings

It is important to clarify and estimate damages through urgent investigation on damaged buildings by specialists for planning and implementation of urgent measures on housing and livelihood.

Although owner of a damaged building shall bear the utmost responsibility for securing the safety of the building, it is actually difficult for the owner to check the safety of the buildings with own arrangement under the situation of a severe earthquake. As the result, it is possible that many damaged buildings will remain uncontrolled, and cause secondary disaster which many people may suffer. In order to avoid such risks, in the frames of urgent reaction, Crisis Management Center and Architect and Urban Development Department of Yerevan City will play a central role in conducting urgent investigations by the experts as an urgent measure on damaged buildings, including collective houses.

35.1.2 Urgent investigation on damaged buildings

Urgent investigation of damaged buildings is carried out by those organizations, having qualification of engineer or by means of those persons, who have certificates, given by appropriate organizations.

Qualification – certificate of qualification, which gives right of making constructional designs in the seismic zones.

Given by – Ministry of urban development

35.1.3 Objects of urgent investigation

Buildings, subject to urgent investigation, are educational institutions, hospitals, kindergartens and other public buildings as well as collective houses and private houses.

35.1.4 Process of urgent investigation

(1) Request for providing experts for investigation

The owners and/or administrators of damaged buildings apply to Department of Architect and Urban Development of Yerevan City for investigation. Department of Architect and Urban Development sum up the submitted applications and request to the Ministry of Urban Development through Emergency Situations Committee for dispatching qualified experts.

(2) Preparation of investigation

Municipal department of architecture and urban development, Emergency Situations Committee and other organizations distribute the zones of survey and carry out other preparatory works. Assistance system is formed for smooth survey.

(3) Dissemination of information of investigation

Crisis Management Center and Department of Architect and Urban Development of Yerevan City will inform population by the use of mass media and sound vehicles about implementing a building survey.

(4) Marking the result of investigation

Experts, who carry out the investigation, put one of the three signboards («dangerous», «caution», «inspected») near the entrance of the building or external wall in well visible place, to show the results of the urgent investigation.

The signboards are designated for informing users, residents, passersby and other persons. The classification of damage degree of buildings coincides with classification by MSK-64 scale; «dangerous» - grade IV and V, «caution» - grade III, «inspected» - grade I and II

(5) Preparation and submission of investigation report

The experts, who made inspection, prepare the investigation report and submit it to Department of Architect and Urban Development. The department prepares summary report which generalizes the results of the investigation, and then, submits the summary report to Crisis Management Center.

(6) Duration of investigation

The investigation should desirably be completed in some parts of the damaged area within seven days and in all parts within 14 days from the occurrence.

35.2 Urgent repair of damaged houses

Decision of urgent repair of damaged houses is made by the Government by separate decision.

For emergency repair of damaged houses, Department of Architecture and Urban Development prepares a list of damage incurred, based on the reports from the owners or administrators of the damaged buildings where the financial capacities of those who submitted applications and other points for material compensation of damage. In the list the scales of disaster mentioned in «Report of urgent check of buildings and constructions after the earthquake disaster» will be reflected.

Department of Architecture and Urban Development submits «Information about material losses» to Emergency Situations Committee.

The number of closed living units subject to urgent repair is approved with the consent of Prime-Minister. The implementation of urgent repair is an important measure since as a result of this the state expenses for the construction of new apartments get reduced.

35.2.1 Purpose of repair

Urgent repair of houses is implemented for moderately damaged buildings (grade 3 in MSK-64 scale) of for creating minimal conditions for vital activity, so that the usability of housing stock is maintained, the number of evacuees, and urgently constructed temporary shelters is reduced.

35.2.2 Objectives and implementing organization

According to the Government, object persons for urgent repair are owners of damaged houses, who have no means of repair by own expense. Urgent repair of damaged houses is conducted by Department of Architect and Urban Development and/or by interested organizations, appointed by the department.

35.2.3 Manner of repair

The houses which the prime minister has approved will be repaired in the following manner.

- a) The Department of Architecture and Urban Development shall entrust subcontractors with repair work on essential parts for daily life, such as the roof, living room, kitchen, and toilet.
- b) The Department of Architecture and Urban Development shall determine the expenses per household and the number of houses to be repaired and refer to these in actual repair work.
- c) The repair work is expected to be completed within one month from the occurrence of the earthquake.

35.3 Provision of temporary housing

Provision of temporary houses will be done, in accordance with a normative document which contains the decision of the Government. Persons, who lost their houses due to an earthquake

disaster, apply to Department of Architect and Urban Development in one week and they receive temporary houses (temporary houses – vacant residential buildings which are not affected by the earthquake and where inhabitation is possible). Department of Architect and Urban Development will clarify availability of housing stock for temporary houses immediately after an earthquake.

Temporary housing shall be provided free of charge to victims, if it is found difficult for them to secure housing on their own as a result of investigations on the assets and other factors of applicants.

35.4 Procurement of construction equipment and materials

According to the actual damage situations, Emergency Situations Committee applies to the Government for the provision of material and technical means for urgent construction of temporary houses and urgent repair of damaged houses.

Emergency Situations Committee distributes the material and technical means, received from the Government, according to plan, submitted by Department of Architect and Urban Development.

There is no stockpile of material and technical resources for construction of temporary houses at present. Department of Architect and Urban Development will create reserve of necessary quantity of such materials.

35.5 Securing livelihood

In addition to the measures on housing, response activities will be done concerning the livelihood of residents: daily life consultations, employment services, extension, reduction and exemption of taxes and duties, and other measures necessary for securing the livelihood of residents.

(1) Daily life consultations

Evacuation headquarter creates temporary consultation points in evacuation places for consultation on daily life of victims. Those complaints and wishes of victims, which are not solved in the consultation point, are directed to temporary consultation centers, created on the regional level.

(2) Employment services

To make clear the situation of unemployment of victims, the center of Department of Communal Economy coordinates “The information on damage” by the help of control committee of the base points of fight against poverty, installed in the evacuation places, clarifies the qualitative parameters of unemployment, and informs the secretary of Crisis Management Center. Besides, the secretary of Crisis Management Center collects information about temporary employment for recovery projects, gathering of temporary staffs by private companies and tries to assist employment work.

(3) Extension, reduction and exemption of taxes and duties

Crisis Management Center will take measures for relieving the tax burden of victims, such as reduction and exemption of tax and duties, etc., according to actual damage situations.

(4) Other measures necessary for securing the livelihood of residents

Crisis Management Center implements other measures in cooperation with the Government.

- a) Free distribution of postal cards to victims, exemption of cost of postage
- b) Exemption of cost of postage for the postal mail on assistance to disaster zone
- c) Dissemination of information to the public on missing persons, provides television and other receivers

35.6 Emergency financing

(1) Stable supply of paper money

It is foreseen that big amount of paper money will lose due to collapse and fire of buildings, etc. Many victims may need to withdraw money for their bank account. For stable money supply, Crisis Management Center will request the National Bank to supply paper money as a makeshift measure.

(2) Extension of working day of banking institutions

Many residents will use banking system for use of their money savings for vital activity purposes immediately after an earthquake. For this purpose, the secretary of Crisis Management Center will request banking institutions through the Government for extension of working day on Saturdays, Sundays, and holidays.

35.7 Securement of labor

(1) Regional assistance

In a case where an earthquake hits Yerevan City, police forces, human resources, and vehicles needed for rehabilitation/ reconstruction will be mobilized and dispatched from all over the country to the twelve districts.

(2) Overseas assistance

If the labor is still insufficient, Crisis Management Center will request the central government to seek assistance from overseas.

(3) Employment of temporary labor force

If the disaster reconstruction work is prolonged, the Department of Communal Economy will hire workers needed for the reconstruction work as provisional city staff, based on the information on unemployed residents ascertained via the disaster notifications and other sources, and entrust them with rehabilitation work.

35.8 Distribution of relief money and goods

On the basis of “information on material damage”, the secretary of Crisis Management Center composes a plan of distribution of material and financial aid, received from the Republic and abroad, and submits to the Government. The Government investigates and approves the draft plan.

After that, the secretary of Crisis Management Center distributes the money in cooperation with related organizations, according to approved plan.

(1) Request for international assistance and procedure of distribution

All kinds of international assistance rendered by other countries shall be distributed based on a plan prepared by Crisis Management Center and determined by the central government, in accordance with legal act.

(2) Simplification of custom and visa procedures

To ensure a smooth reception of provided goods or acceptance of the personnel, equipment, and materials in association with assistance activities, it is necessary to simplify the procedures for customs clearance, border control, and issue of visas, and exempt the temporarily carried-in goods to be used in the assistance activities from taxes and duties.

Limitation and control on the import of the following materials will be cancelled as an urgent measure.

- a) Food, clothes, blankets, tents, prefabricated houses and other products of life activity
- b) Personal properties of staffs of humanitarian aid

Equipment and materials necessary for the activities of international assistance (see Table 35.9.1) will be subject to tax exemption on the condition that the equipment and materials will be brought back, except consumables.

Table 35.9.1 List of equipment and materials, deemed to be subject to tax exemption

1. Devices for transmission of data and communication
2. Special devices, technique, tools and electric equipments, necessary for works, implemented by doctors, engineers, responsible persons of service, responsible workers of public service system and other technical specialists.
3. Materials and means, necessary for activity of staff, who are making urgent assistance
4. Water purifying facilities, canning devices, medicines and other sanitary-hygienic and medical equipments, materials, means, envisaged for the aiding staff
5. Tents, prefabricated houses, life activity materials (for making foods, for canteens, sanitary and hygienic means, etc), envisaged for aiding staff.

Custom clearance procedures of emergency assistant equipment/ materials will be done by 24-hour bases at special custom corridors. Checking of the equipment/ materials will be done quickly with selective inspection method.

Boundary inspection of arrived staffs for assistance is being made as fast as possible. Crisis Management Center will order maintenance service to issue provisional pass permits for the assistance vehicles, and throw in transportation modes to transport personnel, equipment, and materials, so that the assistance personnel can arrive in the affected area in the shortest possible time.

Part 5 Rehabilitation and Reconstruction Plan

Chapter 36 Basic ideas for rehabilitation/ reconstruction

When a large earthquake occurs in Yerevan City, rapid and appropriate emergency response activities will be implemented, and, in parallel, rehabilitation/ reconstruction policies will be formulated to devise measures.

Rehabilitation measures aim for rapid recovery and resumption of functions/ activities as the capital of Republic of Armenia, including core functions of policies, economy, and banking systems as well as international urban functions.

Reconstruction measures will be implemented comprehensively and systematically to develop Yerevan City as much resilient and favorable city, including measures on employment, health/ medical care, welfare for creating a more comfortable environment for all of the residents, in addition to measures on housing and lifelines.

Disaster reconstruction of Yerevan City will incorporate life reconstruction and urban reconstruction under its basic goal of “ever-more comfortable, livelier community building” through role sharing and coordination.

36.1 Rehabilitation/ reconstruction of lives of people

(1) Target of rehabilitation/ reconstruction of lives of people

- a) Increasing stability of lives of victims as well as restoring their lives without any delay
- b) Making possible to create life style, fitting with real situations, for victims who cannot return to previous life style due to irrecoverable damage to their mind, body, and properties

(2) Promotion of rehabilitation/ reconstruction of lives of people

- a) Residents and business operators will proceed with rehabilitation/ reconstruction by own responsibility/ effort, or mutual help. Governmental organizations will straighten environment for self-reliance with providing financial support, information, guidance, consultation for smooth proceeding of the rehabilitation/ reconstruction by the victims
- b) Government organization will provide direct help to residents, who cannot proceed with rehabilitation/ reconstruction of lives by themselves, including measure on medical care, education, welfare, etc.

36.2 Rehabilitation/ reconstruction of city

Rehabilitation/ reconstruction of Yerevan City will be done for creating more dynamic and wholesome Yerevan City, where people can live more comfortable, paying attention to the followings.

- a) Creating quake-resistant city through upgrading urban infrastructures and urban areas, aiming at increasing ability to reduce disaster risks, not limited to the reconstruction of the seriously damaged areas
- b) The level of facilities and services to be developed in the rehabilitation/ reconstruction should be set up with the view to creating high-quality city, meeting needs of new generation.
- c) Creating city through task sharing and collaboration among municipal and republican governments and communities (residents' associations, schools, and companies).

Chapter 37 Rehabilitation/ reconstruction headquarters

Rehabilitation/ reconstruction headquarters will be established as a temporary organization differentiated from other administrative organizations operating during normalcy, in order to implement rehabilitation/ reconstruction projects comprehensively and systematically, from a long-term standpoint.

Organization and operation of the rehabilitation/ reconstruction headquarters will be based on the framework mentioned below, and detailed operation manner will be determined in accordance with actual situations of damage.

37.1 Setting up of rehabilitation/ reconstruction headquarters and its role

(1) Setting up of rehabilitation/ reconstruction headquarters

Rehabilitation/ reconstruction headquarters will be set up at rather early stage (e.g. one week after a disaster) in case that the damage widespread throughout Yerevan City, and considerable amount of time is foreseen for the rehabilitation/ reconstruction.

(2) Role of rehabilitation/ reconstruction headquarters

Roles of rehabilitation/ reconstruction headquarters are as follows.

- a) Formulation of basic policies of rehabilitation/ reconstruction
- b) Formulation of rehabilitation/ reconstruction plans
- c) Overall management of implementing measures for rehabilitation/ reconstruction
- d) Arrangement of issues among several related organizations
- e) Monitoring and promotion of implementing measures
- f) Formulation of individual reconstruction plans for specific areas in accordance with the necessity (see Section 40.3)
- g) Evaluation of the result of implemented measures

37.2 Organization related to rehabilitation/ reconstruction

(1) Staff of rehabilitation/ reconstruction headquarters

Members of the rehabilitation/ reconstruction headquarters consist of the Mayor as Director of the headquarters and their staff.

The staff consists of heads of city departments shown in the organization diagram as administrative organizations for the city as well as heads of state organizations/ companies, which are based in the city as head offices or branch offices and are designated by the Director as important organizations.

(2) Collaboration with Crisis Management Center

Since emergency response measures and earthquake disaster reconstruction measures should be essentially implemented in sequence, any urgent administrative tasks and projects under the control of the Crisis Management Center that are related/ continued to disaster reconstruction and

considered significant within emergency measures or reconstruction measures, will be implemented through close coordination between the both headquarters.

Chapter 38 Formulation of rehabilitation/ reconstruction plan

The director of the rehabilitation /reconstruction headquarters is responsible for formulation of basic policies related to rehabilitation/ reconstruction, formulation/ implementation of rehabilitation/ reconstruction plan primarily indicating measures, which are implemented intensively within one year from formulation of the plan, and formulation/ implementation of spectral rehabilitation/ reconstruction plans with relatively long-term targets in specific fields.

38.1 Formulation of basic policies of rehabilitation/ reconstruction

The director of the rehabilitation /reconstruction headquarters will publish basic policies of rehabilitation /reconstruction, after deliberating among the members of rehabilitation /reconstruction headquarters, in order to clarify ideal future on civil lives and urban area to be formulated after the reconstruction as well as directionality to realize the future.

(1) Clarification of damage situations

As basic information for formulation of rehabilitation/ reconstruction plan, the following damage situations will be clarified.

- a) Number of victims (dead, missing, and injured) and living conditions
- b) Damage situations of infrastructures such as gas, water supply, sewerage, electricity, communication, etc.
- c) Damage situations of transportation means (vehicles, airplane, etc.) and transportation facilities such as airports, bridges, roads, railway stations, bus stations, etc, including factories for repair, fuel stations, etc)
- d) Damage situations of river facilities such as river protections, water intake, etc.
- e) Damage situations of public facilities, especially hospitals and schools
- f) Damage situations of buildings (number, locations, and functions of collapsed and heavily damaged buildings)
- g) Others

(2) Formulation of the basic policies of rehabilitation/ reconstruction

The policies will be formulated, in consideration with the following matters.

- a) Swift implementation of reconstruction and recovery to normal life
- b) Creation of a safer and more comfortable living environment
- c) Job security, resumption of business and creation of industries that correspond to the new era
- d) Rapid recovery of the state's core financial and economic functions and solid foundation for their further growth

38.2 Formulation of rehabilitation/ reconstruction plan

Based on basic policies of rehabilitation/ reconstruction, the director of the rehabilitation/ reconstruction headquarters will formulate a comprehensive rehabilitation/ reconstruction plan as

the city's highest-level plan, in which targets of rehabilitation/ reconstruction and a scheme of rehabilitation/ reconstruction projects to be implemented will be clarified.

(1) Procedure of the formulation

The procedure of the formulation of rehabilitation/ reconstruction plan will be as follows.

- a) The director of the rehabilitation/ reconstruction headquarters will convoke rehabilitation /reconstruction council for deliberation on concept of the plan and order the council to compile the proposals.
- b) Based on the proposals of the council, and through discussion among the members of the headquarters, the director of the rehabilitation/ reconstruction headquarters will formulate and publish the rehabilitation/ reconstruction plan, within six months after the disaster.
- c) Concerning some sectors, which require concrete project master plans, such as urban reconstruction, housing reconstruction, etc., rehabilitation/ reconstruction plan on particular sectors will be formulated individually, in parallel to the formulation of rehabilitation/ reconstruction plan (see Clause 40.3).

(2) Setting up the target

The following considerations must be taken into account for target setting.

- a) Targets in the rehabilitation/ reconstruction plan should be achieved within one year from the publication of the plan.
- b) Basic policies must be clarified.
- c) The size of future population / urban areas must be set as a future frame for reconstruction.
- d) Including reconstruction of urban infrastructure, reconstruction by industry, housing reconstruction and commercial district reconstruction, areas subject to formulation of specific area reconstruction plans should be presented, and the scope of each of specific area reconstruction plans should be clarified.
- e) Taking into consideration areas such as infrastructure and housing, the period required for target achievement for specific area reconstruction plans should be set as briefly as 2 years, 5 years or 10 years, etc.
- f) The overall targets and outline targets for planned fields and items including specific areas should be quantified for effective evaluation upon completion of their terms.

(3) Formulation of implementation plan

Concrete implementation plans will be formulated for smooth implementation of the rehabilitation/ reconstruction plan. In the implementation plans, executing departments and organizations should be mentioned, and budget for implementation should be described in consideration of financial sources, including overseas assistance.

(4) Monitoring of implementation measures and assessment of the results

During implementation of the plans, monitoring of the status as well as validation should be conducted for adjustment/ modification to their methods in accordance with necessity. Also, at the end of the implementation period, results will be evaluated through comparison between targets quantified during planning and the level of their achievements. If determined necessary,

additional reconstruction plans and enhanced specific area plans will be formulated for implementation of additional reconstruction measures.

Chapter 39 Stability of civilian life

After an earthquake disaster, Yerevan City shall aim to build an environment where its residents can actively engage in reconstruction efforts as a main player of reconstruction without worries about their immediate lives. To this end, measures on the following items need to be implemented sufficiently.

- a) Welfare for disaster victims (activities needed for life, such as health, medical care, job, education, consumption etc.)
- b) Benefits/ loans for livelihood support (for living expenses, home purchase, home rebuilding etc.)
- c) Housing (securing a living space, technical assistance for repair, renovation and rebuilding)
- d) Detailed investigation and restoration of damaged residential buildings
- e) Waste treatment

39.1 Welfare for disaster victims

Residents in dangerous areas or lost houses evacuate to evacuation points, which Rescue Service designated and prepared. Evacuation Committee will provide the following welfare public assistance to the evacuees, until permanent houses are provided.

(1) Health and medical care

Medical care headquarters and evacuation headquarters will carry out sterilization and health check at evacuation points, public places, and houses, in order to prevent worsening of sanitary conditions and spreading infection (see Chapter 28). In designated hospitals, instruction on sanitation will be done, together with continuous medical care for injury and diseases. In order to provide sufficient opportunity of medical care, the rehabilitation/ reconstruction headquarters will consider taking measures to reduce burden of patients such as reduction of the cost of medical examination and medicine.

(2) Employment

It take long time and expense to resume business activities at damaged companies. Companies may become bankrupt, if the companies cannot cover the cost for restoration of the factories and machinery. It will cause loss of employment of many people. The rehabilitation/ reconstruction headquarters should promote participation of the suffered companies to rehabilitation/ reconstruction projects such as civil works, and also promote projects on daily base payment to secure cash income of workable victims. The rehabilitation/ reconstruction headquarters will provide necessary fund with low interest as assistance for restoration of damaged facilities and machinery of factories.

(3) Education

Ministry of Education and Science will provide the following assistance, following to emergency measures on education (see Chapter 31).

- a) Providing student supplies such as text books and stationaries, to suffered students who lost the student supplies

- b) Securing and allocating budget for the measures such as increase the number of scholarship students, in order to prevent withdraw of students from schools
- c) Executing damage investigation of school facilities, securing budget, and conducting project management for restoration of school facilities

(4) Consumers' life

Rehabilitation/ reconstruction headquarters and the Communal Economics Department of Yerevan City will assist for stable supply of commodities, and reinforce inspection on stability of commodity prices. In addition, the headquarters and department will assist rehabilitation/ reconstruction of markets in Yerevan City, and restructuring of commodity distribution system. In case of restriction of flow of food and materials, installation of tentative markets will be considered for smooth distribution of food and materials from the surrounding areas.

39.2 Benefits/ loans for livelihood support

Rehabilitation/ reconstruction headquarters will provide the following benefits and loans for livelihood support to victims who cannot continue daily life due to unemployment, damage to houses, loss of cash, etc.

(1) Provision of benefit money and materials

Benefit of money and materials will be provided, according to damage conditions, properties, family configuration, and income of the victims. The list of possible benefit to be provided is shown in Table 39.2.1.

Table 39.2.1 List of possible benefit

1. Food, water, clothes, bedclothes, etc.
2. Means of transportation of furniture and properties to new address
3. Expense of rather large-scale repairing such as house repairing
4. Fuel for heating and vehicles of victims
5. Support to medical care
6. Other required support

(2) Loan for livelihood support

Loan for livelihood support will be provided as follows, for the case of rather low necessity of grant.

- a) Subsidy to victims who can reconstruct daily life basically by their own expense
- b) Subsidy to expense of matters which are not included in the list of benefit, such as
- c) Subsidy to expense of matters which is judged to be not so urgent, in case that estimated cost for benefit exceed from total budget, secured for rehabilitation/ construction

39.3 Housing

Permanent houses will be provided with the following measures.

(1) Permanent housing in tentative houses

Yerevan City will provide temporary houses to victims who lost their houses, according to government decision N919, 2000 and evacuation plan (see Clause 35.3).

In case that evacuees in temporary houses wish to stay the temporary houses as permanent houses, Yerevan City will acquire the temporary houses as permanent houses on the condition that the owner of the houses agree it.

(2) Construction of permanent houses

Yerevan City will carry out investigation on the damaged houses, which are not expected to be restored due to heavily damage or collapse, for estimation of reconstruction cost. After submission of the result to Ministry of Emergency Situations and Ministry of Finance and approved the ministries, reconstruction projects will be implemented (see Clause 40.3(4)).

39.4 Detailed investigation and restoration of damaged buildings

39.4.1 Position of detailed investigation of damaged buildings

It is necessary to restore damaged buildings for continuous use through repairing as much as possible, based on the damage classification. This effort is also favorable in terms of maintaining local community.

Urgent investigation of damaged buildings is carried out for preparation of data for examination on urgent measures on housing and daily life as well as for prevention of secondary disaster of building collapse through assessment of safety of buildings against aftershocks.

On the other hand, detailed investigation of damaged houses at rehabilitation/ reconstruction stage, mentioned herein, is for formulation of plan and implementation of measures for rehabilitation/ reconstruction, so that long-term usage is available, according to the degree of the damages.

Buildings, judged to be grade 4 or 5 in damaged building classification, will be basically demolished and reconstructed.

39.4.2 Detailed investigation of damaged buildings

Following to urgent investigation, detailed investigation will be carried out by investigation teams mainly consisting of qualified engineers of structural design, who have carry out urgent investigation.

Architect and Urban Development Department of Yerevan City, Ministry of Urban Development, and NSSP will create assistant framework for smooth proceeding of the investigation.

39.4.3 Preparation and submission of reports of detailed damage investigation

The investigation teams will prepare reports of detailed investigation of damaged buildings, summarizing damage situations of schools, hospitals, collective houses, etc., objective and methodology of the rehabilitation/ reconstruction, and cost estimation (unit price per m²), etc. and submit the reports to rehabilitation/ reconstruction headquarters. The headquarters will submit the contents of the report with budgetary request. The headquarters will direct to Architect and Urban Development Department of Yerevan City and Ministry of Urban Development for conducting the rehabilitation/ reconstruction projects, after the approval of the government.

Stepwise items of rehabilitation/ reconstruction measures on damaged buildings are shown in Table 39.4.1.

Table 39.4.1 Stepwise items of rehabilitation/ reconstruction measure of damaged buildings

Stage (timing)	Item of measures
1st stage (immediately after the disaster)	Urgent investigation (investigation for clarification of damage situations and degree of safety against aftershocks)
2nd stage (time of settlement of confusion)	Detailed investigation (investigation for clarification of detailed damage situations and object/ cost for rehabilitation/ reconstruction)
3rd stage (stable perios)	Designing and implementation of rehabilitation/reconstruction works

39.5 Construction debris treatment

Treatment of debris produced with demolishing buildings will be done on the procedure mentioned in Chapter 34. Specific work items are estimation of total amount of debris, transportation, and disposal. The cost sharing of the works will be determined by rehabilitation/ reconstruction headquarters.

At the time of demolishing, careful attention should be paid on the following issues in order to minimize adverse effects to environment.

- a) Regulation of noise level should be respected (see Table 39.5.1).
- b) Necessary measures to prevent dust producing, such as sprinkling of water, should be done during demolishing.
Criterion of dust by Ministry of Nature Protection is 0.15 mg/m^3 in average of 24 hours.
- c) In case of demolishing of building, containing asbestos, investigation should be done before the demolishing, and necessary measures should be taken, according to the result of the investigation.

Table 39.5.1 Criteria on noise level

No	Significance of Buildings and Areas	Time of the Day (Hour)	Sound Levels LA, and Equivalent Sound Levels, LA eq. dBA	Maximum Levels of Sound dBA
1	Wards of health centers and hospitals, surgeries of hospitals	22 ⁰⁰ -6 ⁰⁰	35	50
		6 ⁰⁰ - 22 ⁰⁰	25	40
2	Cabinets of doctors in clinics, infirmaries, dispensaries, hospitals and health centers		35	50
3	Classrooms, learning rooms, teachers' rooms, auditoriums of education institutions and schools, conference hall, reading halls of libraries		40	55
4	Apartment rooms, holiday houses, boarding houses, nursing home and houses for the disabled, residential areas, dormitories of kindergartens and boarding schools	22 ⁰⁰ -6 ⁰⁰	40	55
		6 ⁰⁰ - 22 ⁰⁰	30	45
5	Hostel and hotel rooms	22 ⁰⁰ -6 ⁰⁰	45	60
		6 ⁰⁰ - 22 ⁰⁰	35	50
6	Halls of cafes, restaurants, canteens		55	70
7	Shops, shopping centers, waiting halls of airports and stations, reception points of organizations providing utility services		60	75
8	Areas immediately adjacent to the buildings of hospitals and health centers	22 ⁰⁰ -6 ⁰⁰	45	60
		6 ⁰⁰ - 22 ⁰⁰	35	50
9	Territories immediately adjacent to residential buildings, clinics, infirmaries, dispensaries, holiday houses, boarding houses, nursing houses, houses for the disabled, kindergartens, schools and education institutions, library buildings	22 ⁰⁰ -6 ⁰⁰	55	70
		6 ⁰⁰ - 22 ⁰⁰	45	60
10	Territories immediately adjacent to hotels, hostels	22 ⁰⁰ -6 ⁰⁰	60	75
		6 ⁰⁰ - 22 ⁰⁰	50	65
11	Open spaces envisaged for rest in the territory of health centers and hospitals		35	50
12	Open spaces envisaged for rest in the territory of micro-districts and groups of residential buildings, holiday houses, boarding houses, nursing houses and houses for the disabled, kindergartens, schools and other education institutions		45	60

Chapter 40 City reconstruction

40.1 Basic consideration of city reconstruction

City reconstruction is based on the followings.

- a) Swiftly formulate a rehabilitation/ reconstruction plan including city planning and ensure steady implementation of the plan.
- b) Based on the plan, land use and construction activities should be controlled properly.
- c) Propose a financial plan that integrates foreign assistance and rehabilitation/ reconstruction budget of Republic of Armenia.
- d) Draw a city reconstruction scenario to identify priorities.
- e) Assess progress of the rehabilitation/ reconstruction plan (effects, population and income of the residents,) and make corrections and changes to the plan with flexibility.

40.2 Reconstruction of regional economy

In case that Yerevan City; the capital and economic center of the Republic of Armenia, suffers earthquake disaster and lose the function as the economic center, economy of surrounding area and whole of Armenia will also suffer serious damage. Therefore, it is necessary to take measures for reconstruction of economy swiftly and efficiently as mentioned below.

(1) Commerce

Reconstruction commerce is indispensable for stability of daily life of residents, and moreover it is the key of reconstruction of regional economy. Facilities of commercial bases, dealing with foods, commodities, etc., should be reconstructed as a high-priority issue from the viewpoint of regional economy as well as Yerevan City.

(2) Finance

Reconstruction of the function of finance center should be done as a high-priority issue, such as designation of an area for financial center to be developed, and preferential reconstruction of buildings and infrastructures in the area.

(3) Construction

Construction industry is important for reconstruction of city, including restoration of damaged buildings. It is expected that overall economy will be become activated through activation of construction industry. In addition, lowering of construction cost and acceleration of reconstruction can be done through activation of construction industry.

Residents who stop working can secure revenue generation with having business opportunity. Consequently, it is expected to increase consumption, which is an important factor in the cycle of reconstruction.

(4) Manufacturing

Taking the opportunity of reconstruction, promotion of manufacturing (industrial complexes) will be done. Together with assembling and streamlining of domestic industries into industrial

complexes, etc., function as production bases of foreign investment will be added to the industrial complexes, with promotion of moving overseas factories.

40.3 Reconstruction of specific sectors

Specific-sector reconstruction plans will be formulated for the sectors which concrete project programs and big amount of budgeting are required, such as sectors of infrastructures, housing, etc.

40.3.1 Formulation of reconstruction plans for specific sectors

(1) Clarification of damage situations

For the preparation of specific-sector reconstruction plan, actual damage situations on the relevant sector will be clarified in detail, together with confirmation of data on damage situations described on the rehabilitation/ reconstruction plan.

(2) Setting up objectives

Objectives on specific-sector reconstruction plan will be set up, based on the directionality of each sector shown in rehabilitation/ reconstruction plan, in consideration of the following points.

- a) Setting up the target year of the specific-sector reconstruction plan to be the first stage (2 years after), the second stage (5 years after), and the third stage (10 years after or more).
- b) Setting up framework (basic policy, future vision, important issues, etc of the sector) for specific-sector reconstruction
- c) Setting up particular target for each important issue in the relevant sector
- d) Setting up quantified target for each stage of target year, so that monitoring during implementation and assessment of the results can be done easily
- e) Securing consistency between rehabilitation/ reconstruction plan and specific-sector reconstruction plan

(3) Formulation of implementation plans

For the first stage (2 years after), detailed implementation plan will be formulated, including implementation organization, budget, etc. For the second stage (5 years after) and the third stage (10 years after or more), rough implementation plan will be formulated, considering about flexibility.

(4) Monitoring of implementation progress and assessment of degree of attainment

During implementation of specific-sector reconstruction plan, monitoring of implementation progress will be done every 6 months and adjustment/ modification of the implementation method will be followed when necessary. At the end of the first stage, assessment of interim result will be done, comparing the quantified target and actual progress, and the result will be used for the detailed planning for the second stage. At the end of the second stage, same manner of assessment and its reflection to the detailed plan for the third stage will be done. At the end of the third stage, assessment of degree of attainment will be done for overall matters in the plan, and the result will be utilized for national development plan and sector development plan to be prepared as the next step.

40.3.2 Reconstruction of infrastructures

Concerning urban infrastructures, rehabilitation/ reconstruction will be done to overcome the issues mentioned in Chapter 7; Quake-resistant urban development. In addition, the following items will be important items.

- a) Reconstruction of water supply facilities and development of sewerage facilities (for creating safe and sanitary city)
- b) Reconstruction of supply of electricity and gas (for reconstruction of daily life, see Clause 40.3.3)
- c) Reconstruction of road network, bridges, and public transportation (for activation of economic and civil activities)

40.3.3 Reconstruction of daily life

Concerning urban function necessary for daily life of residents, priority matters on reconstruction are as follows.

- a) Reconstruction of facilities and functions of lifelines such as water supply, sewerage, power supply, and gas supply (necessary urban function for comfortable and sanitary daily life)
- b) Reconstruction of facilities and functions of health/ medical care, education, and welfare services (necessary urban function for abundant and safe life)
- c) Reconstruction of facilities and functions to support economic activities (necessary urban function for securing revenue for daily life)

40.3.4 Reconstruction of houses

Reconstruction of houses will be done, according to a rehabilitation/ reconstruction plan (see Clause 38.1), prepared on the basis of actual damage situations, clarified through detailed investigation of damaged buildings (see Clause 39.4).

Points to be considered on the reconstruction of houses are as follows.

- a) The following points should be examined for creating better living conditions.
 - Reviewing and adjusting national standards, such as building code, if necessary
 - Reviewing and adjusting regulation/ rule of Yerevan City, in consideration of actual situations of the city and land use
 - Making it obligatory to install parking areas in the yards of collective houses and public facilities
- b) According to the actual damage situation, the master plan of Yerevan City will be reviewed and adjusted, e.g. increase of target of number of newly provide houses and green area as well as new development of roads.
- c) Providing houses to victims who cannot reconstruction their houses, through construction of public houses, or conversion of temporary houses to permanent houses on the basis of agreement of owners of temporary houses.

Part 6 Assistance Plan

Chapter 41 Assistance Plan

In case of large-scale damage due to earthquake disaster in other cities or regions, the committee of emergency situations and organizations of liquidation of earthquake consequences provide assistance to the affected residential areas acting in accordance with existing plans.

41.1 Basics for disaster assistance

41.1.1 Establishing Disaster Assistance Headquarters

Emergency Situations Committee of Yerevan City is being deployed and its activity is being started following a command from the Government and/or a request made by the city/ region affected by the disaster, according to decision of Mayor “about establishment of emergency situations committee of Yerevan city” dated on 3rd March 2010.

- a) When a disaster occurring outside of the city due to an earthquake with MSK intensity of 5 scale or above
- b) When there is a risk of a large earthquake disaster outside of the city

41.1.2 Organization of Yerevan City Emergency Situations Committee

Formation of the Yerevan City Emergency Situations Committee (ES Committee) is based on the following principles.

- a) Mayor is the head of ES Committee
- b) Deputies of the Mayor and the head of Yerevan Rescue Department are the deputies of the head of ES Committee
- c) Heads of the departments of the staff of Yerevan City government, heads of administrative districts, heads of organizations carrying out activities in the field of territorial subdivisions of republican government, hygiene-anti-epidemiological and communal services are staff members of Emergency Situations Committee
- d) Heads of other bodies and organizations can also be included in the works of Emergency Situations Committee, based on the situation
- e) Emergency Situations Committee is activated by the decision of President in 1.5 hours after receiving a signal by the duty officer of the management center of emergency situations of Yerevan and the service of communication and warning
- f) The decisions of Emergency Situations Committee are subjected to obligatory fulfillment for all the organizations functioning in the city irrespective of the organizational-legal type
- g) The decisions of Emergency Situations Committee are transferred to all responsible bodies and, in case of necessity, also the population by means of mass-media

41.1.3 Termination of assistance activities of Yerevan City Emergency Situations Committee

The mayor terminates the activities of Emergency Situations Committee in the following cases:

- a) The termination of liquidation works of large-scale earthquake disaster at the disaster areas
- b) There is no need in the provision of assistance in emergency situations any more

41.1.4 Organization and operation of Yerevan City Emergency Situations Committee

The organization and operation is determined existing legal acts and particular regulations to be defined as required.

41.2 Mutual assistance agreement

In case that a big earthquake occurs in other regions of the Republic, emergency response should be taken in the affected regions with assistance from other regions in the Republic of Armenia.

Yerevan City has plans to provide assistance to other region, affected with earthquake disasters, under the direction of the republican government. According to the plans, Yerevan City starts providing urgent assistance based on the actual damage information, without waiting for corresponding request from the affected regions. Prior agreements are concluded with different interested organizations, companies and individual residents by municipality in case of emergency situations. Yerevan City holds periodic consultations with these partners to expand the envisaged borders of cooperation and have a possibility to apply to its partners for cooperation while providing assistance to other regions.

41.3 Activities of disaster assistance

The activities for providing assistance to be done by the city are mentioned below.

(1) Collection of information on earthquake disaster

In case of occurrence of a large-scale earthquake disaster or its threat in other regions, which may require activating Emergency Situations Committee, Yerevan Rescue Department collects information about the disaster situation for the organization of activities of provision of assistance.

(2) Preparation for earthquake disaster assistance activities

The organizations relating to disaster assistance activities, should prepare on a routine bases for providing prompt operative assistance. If necessary, the Mayor can give the order of getting prepared for the provision of disaster assistance.

(3) Dispatch of fire brigade

Based on the request of assistance by the affected region and (or) by the decision of the head of corresponding territorial subdivision of MES, firefighting groups are dispatched to a disaster zone.

(4) Dispatch of medical unit

In case there is a need for providing urgent medical assistance in the disaster zone, medical formations are rapidly formed from the staff of Ministry of Healthcare and medical institutions of the city, and the formations are dispatched to the disaster zone by the order of republican government or based on the request of the head of the affected region.

(5) Delivery of assistance materials

In case of insufficiency of materials for emergency response activities in the disaster zone, the head of Emergency Situations Committee provides necessary materials to the disaster zone by the

decision of the republican government and (or) based on the request of the head of the affected region.

(6) Provision of information on disaster and assistance

The secretary of Emergency Situations Committee provides information to the population about damage situations, the provision of assistance, recovery of the disaster zone.

(7) Collection of donations

For supporting recovering the daily life of victims, the secretary of Emergency Situations Committee, in cooperation with related organizations, carries out collection of financial donations and transfer them to the victims or the affected region. The secretary of Emergency Situations Committee informs the population about the financial accounts and, in case of need, submits a report to the municipal council.

(8) Dispatch of staff

Based on the order of the Government and/or based on the request of the administration of the affected city/region, the head of Emergency Situations Committee dispatches staff to the disaster zone for the emergency response and rehabilitation activities in the affected areas.

The dispatched staff undergoes a temporary service in assistance points of municipalities/ district administrations. Such dispatches envisaged in recovery projects can be long-lasting.

Attachment 1 Consequence Scenario

List of Consequent Scenario

No.	Category
1	Emergency management headquarters
2	Evacuation and sheltering
3	Rescue and firefighting
4	Public security and panic
5	Injured and the medical aid
6	Sanitation
7	Treatment of dead bodies
8	Psychological Care
9	Disaster education
10	Acceptance of Assistance
11	Food
12	Drinking water
13	Power supply
14	Gas Supply
15	Telecommunication
16	Mass-medias, false rumors
17	Aerial transportation
18	Roads and Bridges
19	Debris cleaning

Table ***.1 Consequence scenario (1) Emergency management headquarters

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>The building of Crisis Management Center (CMC) is not seriously damaged, since it has been constructed in accordance with seismic design standards.</p> <p>CMC immediately clarifies the parameters of the earthquake. Communication is set up with the subdivisions of MES and the situation of their subdivision and the surrounding area is clarified. Prevision of the possible situation is carried out, based on the clarified situation. The Minister of ES is reported on the situation based on the clarifications of the initial situation and gives order to alarm the whole system of emergency situations and warn Shirak regional rescue department.</p> <p>Because it takes time for the collection and processing of the damage information, reporting of the damage situations to the Minister of ES has not been done.</p> <p>Some communication means (telephone, mobile communication, radio) do not function, because emergency power back-up systems are not installed. In addition, some communication devices are broken, because the devices are not properly fixed against earthquakes and turned over. Accordingly, communication is made with limited devices as well as messengers, resulting in delay of information exchange.</p>	<p>Initial reconnaissance of damage situations is carried out as mentioned below. It takes time to clarify the damage situations, since mechanism to collect damage information from residents has not been established.</p> <ol style="list-style-type: none">in the surrounding area of the subdivision by the forces of territorial subdivisions of MES appeared in the epicenter zone according to the reconnaissance plans elaborated beforehand.in wide areas by air reconnaissance, according to the plan of interoperations with Ministry of Defense (MoD). <p>Based on the preliminary analysis of the damage situations, the Minister of ES reports to the Prime Minister of RA, submits recommendations on putting the Republican plan into action totally or partially and organizes the warning of RA state governing bodies. Based on the report of the Minister of ES, the Prime Minister declares a state of emergency and the Emergency Management Headquarters (EMH) starts functioning in the national level. Shirak regional rescue department carries out the warning of the leading staff of Shirak region and sets up a permanent communication with EMH through CMC.</p> <p>The arrival of members/staffs to EMH is organized, but safety confirmation or arrival of some members/staffs of EMH is delayed, because communication with cellar phones is not available due to the congestion of the telephone network and no other way of communication have not been prepared beforehand. Accordingly, management process has not been discussed, and thereby, information collection, decision, and direction by EMH cannot be done immediately.</p> <p>Since there is no stockpile of drinking water, food, portable toilet, etc., manpower and time are spent for the procurement.</p>	<p>The management of the process of liquidation of disaster consequences is discussed by evaluating the results of the warning of RA state governing bodies.</p> <p>After the collection of the initial reconnaissance data, MES prepares the following drafts of the RA Government decisions and submits to the approval of the republican commission of emergency situations:</p> <ol style="list-style-type: none">“Declaration of the disaster zone, definition of the borders of the disaster zone, the measures for reduction and liquidation of consequences of emergency situations”;“Defining the order of organization and conduct of rescue and other urgent accident-recovery operations”. <p>Confusion occurs in management of rescue and assisting activities of responsible organizations, because the collection of the damage information is still not efficiently done and the direction does not accord with actual damage situations.</p>	<p>The emergency management headquarters spends a lot of time to settle problems and residents’ complaint about unbearable living conditions in hospitals, evacuation areas, and damaged houses. Accordingly, important work, such as the formulation of rehabilitation/reconstruction guidelines and directions to related agencies for creating much safer Yerevan City against earthquakes, has not been proceeding well.</p>	
An improved case	<p>The building of Crisis Management Center (CMC) is not seriously damaged, since it has been constructed in accordance with seismic design standards.</p> <p>CMC immediately clarifies the parameters of the earthquake. Communication is set up with the subdivisions of MES and the situation of their subdivision and the surrounding area is clarified. Prevision of the possible situation is carried out, based on the clarified situation. The Minister of ES is reported on the situation based on the clarifications of the initial situation and gives order to alarm the whole system of emergency situations and warn Shirak regional rescue department.</p> <p>Although damage information is limited, damage situations are estimated based on the earthquake parameters, using damage estimation system. The Minister of ES reports the most possible estimated situations to the Prime Minister (PM) and submits recommendations on putting the Republican plan into action totally or partially and organizes the warning of RA state governing bodies. PM declares a state of emergency and the establishment of the Emergency Management Headquarters (EMH) in the national level. Each related organizations establishes an emergency cell as a focal point for communication with EMH and branches and departments under the organizations, according to BCP prepared beforehand. Shirak regional rescue department carries out the warning of the leading staff of Shirak region and sets up a permanent communication with EMH through CMC.</p> <p>The representatives of designated organizations and staffs of EMH are aware of the earthquake of MSK 6 or more, and immediately go to EMH on an autonomous basis as stipulated in the Plan. The safety confirmation of some representatives and staffs, who cannot attend, is made through dedicated wireless lines or priority lines of cellular phone companies which pre-agreement has been made with ARS.</p> <p>Communication means are secured for the operation of the headquarters, since emergency power back-up systems have been installed and, communication facilities and electric devices have been fixed properly against earthquakes.</p>	<p>Initial reconnaissance of damage situations is carried out as mentioned below. The initial reconnaissance is mainly for saving life, and it proceeds smoothly, since mechanism to collect damage information from residents has been established beforehand.</p> <ol style="list-style-type: none">in the surrounding area of the subdivision by the forces of territorial subdivisions of MES appeared in the epicenter zone according to the reconnaissance plans elaborated beforehand.in wide areas by air reconnaissance, according to the plan of interoperations with Ministry of Defense (MoD). <p>The management of the process of liquidation of disaster consequences is discussed by evaluating the results of the warning of RA state governing bodies.</p> <p>After the collection of the initial reconnaissance data, MES prepares the following drafts of the RA Government decisions and submits to the approval of the republican commission of emergency situations:</p> <ol style="list-style-type: none">“Declaration of the disaster zone, definition of the borders of the disaster zone, the measures for reduction and liquidation of consequences of emergency situations”;“Defining the order of organization and conduct of rescue and other urgent accident-recovery operations”. <p>EMH organizes search and rescue as a top priority, and organizes special reconnaissance for urgent accident-recovery operations etc. as well as international assistance.</p> <p>Since enough number of the stockpile of drinking water, food, portable toilets, etc., activities of EMH is not hampered.</p>	<p>Based on collected information on damage, EMH smoothly manages large-scale activities of search and rescue as well as urgent repairing and rehabilitation, in accordance with the manual on emergency response, which has been prepared beforehand.</p> <p>EMH organizes arrival and involvement of international assistance.</p> <p>Since staffs of the EMH exhaust with 24-hour operation, alternative staffs are dispatched from branches of MES. The dispatched staffs can proceed with the assisting work smoothly, based on the emergency operation manuals which have been prepared as a part of the disaster management plan.</p> <p>The following working teams are deployed in EMH for smooth operation.</p> <ul style="list-style-type: none">- Team for providing logistical means and food products- Team for receiving and distributing international assistance and so on.	<p>Following prescribed guideline in the disaster management plan, a special organization for rehabilitation and reconstruction is formulated and preparation of plan is commenced in accordance with actual damage situation.</p> <p>Settlement of emergency situation is declared, and particular responsibility and administrative power are dispersed to concerned organizations after the confirmation of the human and material resources as the process of dissolution of the emergency management headquarters.</p>	

Measures	<p>The manner of the attending the members and staffs of EMH should be stipulated in the Plan “<u>all the members and staffs should be attend the headquarters on an autonomous basis</u> when they feel or know the occurrence of an earthquake of MSK 6 or more”.</p> <p><u>CMC and MES should install emergency power back-up systems to the offices.</u></p> <p><u>Communication and electric devices such as computers should be fixed properly against earthquakes</u> in order to secure necessary function of the emergency management headquarters.</p>	<p><u>Each district should formulate an emergency management manual, including information collection/reporting system from/to residents,</u> and execute training or drill on the basis of the manual.</p> <p><u>Necessary items for collecting and reporting damage information should be fixed</u> in the Plan and distributed to responsible organizations, including district offices.</p> <p><u>CMC and MES should stockpile drinking water, food, portable toilets, etc.</u> for emergency operation.</p>	<p>In the disaster management plan, <u>the operation manual of EMH should be prepared,</u> which is also useful for alternative staffs from other offices.</p>	<p><u>A guideline for the formulation on organization and plan for rehabilitation and reconstruction should be prescribed</u> in the disaster management plan in consideration of long-term strengthening of comprehensive disaster management capacity.</p> <p><u>The tasks to be continued after dissolution of the headquarters and the responsible organization of each task</u> should be clarified in a guideline prepared beforehand.</p>
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Table ***.2 Consequence scenario (2) Evacuation and sheltering

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>More than 10000 of buildings are collapsed or heavily damaged.</p> <p>Hundreds of thousands of people lost their houses, and of them stay outside due to fear about aftershocks. Approximately four hundred thousand 400,000) people need to evacuate.</p>	<p>The affected families stay near the collapsed buildings, since no evacuation area has been designated.</p> <p>People are seeking for the missing family members, but can hardly obtain information, and that situation spreads irritation.</p>	<p>Since many affected families rush to reception, the queues for registration get longer, and thereby, many families cannot move to the allocated shelters.</p> <p>Many families without damage to their houses move to shelters, because of no utilities such as electricity and water. Some of them cannot find accommodation space in the shelter areas and stay outside.</p> <p>Some damaged buildings collapsed due to aftershocks. Because of delay of emergency diagnosis on safety of buildings, residents of damaged houses are afraid of returning to their houses.</p>	<p>Many affected people intend to stay in the vicinity of their houses, and areas of shelters in densely built-up areas are not sufficient for receiving all the affected.</p> <p>People are afraid of aftershocks and remain in their cars, kiosks, garages and other areas near to their houses using them as temporary shelters.</p>	<p>Although the construction of temporary dwellings started, some evacuees complain of the distribution area of dwellings and the order of moving there.</p>
An improved case	<p>Number of damaged buildings is reduced due to the implementation of strengthening of vulnerable buildings.</p> <p>Number of evacuees is also reduced, due to the strengthening of vulnerable buildings and other measures.</p>	<p>The number of homeless people is decreasing because of moving to other houses which is not damaged or slightly damaged.</p> <p>The meeting place in an emergency was decided beforehand in each family. Therefore the family members can immediately gather and check the number of missing people and turn to official bodies with a definite request.</p> <p>The residents are informed that the evacuation commission of Yerevan is the leading evacuation body and they can also turn to heads of staffs of administrative districts on evacuation issues. They can ask their questions and submit requests there. The evacuation bodies clarify the scales of the necessary support.</p>	<p>Although number of evacuees are much more than that calculated in the Plan, setting up tents, which are stored by MES or provided by donors, are immediately done by responsible volunteers.</p> <p>Since the residents are informed about the registration procedure and functions of the shelters, the affected can move to the shelter areas with their family having the minimum and vital commodities.</p> <p>Since system for training and registration of architects or engineers for quick diagnosis on safety of buildings has been established, the quick diagnosis of damaged buildings is carried out promptly.</p> <p>The affected can decide themselves whether they can stay in their houses or must move to the shelter areas, based on the results of evaluation a separate decision is made in each case.</p>	<p>The movement of the affected from shelters to temporary dwellings is managed well according to the disaster management plan. Works are carried out till the last affected is taken to the dwelling area and consequently the situation is under control.</p>	
Measures	<p>It is required <u>to promote building diagnosis from seismic resistance point of view</u> and carry out necessary measures for strengthening vulnerable buildings, such as <u>reconstruction and reinforcement in accordance with building codes.</u></p> <p>It is also required to promote re-housing from inadequate buildings in densely built-up areas to new adequate buildings.</p>	<p>The necessity of <u>prior decision of a meeting place in a family</u> should be well-understood by all residents through information dissemination and education.</p> <p>District offices should be reinforced to be used as emergency reception/assistance base.</p> <p><u>The location of the reception of requests for emergency support should be well informed to the residents beforehand.</u></p>	<p>Materials and equipment for establishment of shelter areas should be stocked, and materials provided by donors should be clarified beforehand. <u>Open spaces or empty land should be secured in/around shelter areas</u> so that the areas can be used as tent towns in case of need.</p> <p><u>All the residents should be informed on the registration procedure and locations/functions of shelter areas beforehand.</u></p> <p><u>Qualification and enforcement of volunteers should be done through training and emergency drill, including establishment of shelter areas.</u></p> <p>Ministry of Urban Development should <u>define the methodology and procedure of quick diagnosis of damaged buildings.</u> The Architect and Urban Development Department of Yerevan City should <u>establish system for training, authorization, and registration for the diagnosis</u> to be done by experts such as architects and engineers.</p>	<p>An outline and standard of the construction and supply of temporary dwellings to victims should be prescribed in the disaster management plan and all the residents must be informed on the outline and standard.</p>	

Table ***.3 Consequence scenario (3) Rescue and firefighting

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Since companies which use products causing fire have prepared fire extinguishing equipment and trained the staffs for fire extinguishing, it was possible to prevent fire spread with initial fire extinguishing.</p> <p>Fire breakout occurs at about 1,500 places in Yerevan City, because some residents evacuate without turning off the stoves etc.</p> <p>The fire spreads, because initial fire extinguishing equipment was not arranged in ordinary houses and residents have not been trained for initial firefighting.</p> <p>About 20% of staffs of firefighting teams and rescue forces of RS gather in their offices within one hour as prescribed in the disaster risk management plan.</p>	<p>Firefighting teams and rescue forces go into action, but the activities are not so efficient, because fire breakout occurs at many places and access to the fire points is blocked with debris due to collapsed buildings.</p> <p>RS staffs are dispatched to clarify the situations of the fire breakout and confined persons in collapsed buildings, but it takes long time for collecting the information on fire, because the procedure of collecting information from residents was not clearly defined beforehand.</p> <p>Residents start rescue activities by themselves without official support, but the activity is not efficient because few tools are available for rescue.</p>	<p>Overall situation of damages is clarified with the assistance from other Marzes, but the activities are not smoothly progressing, because of the lack of manpower, heavy equipment, etc. and delay of arranging and dispatching the additional ones.</p> <p>Although overseas supporting teams arrive in Yerevan City, the rescue activity is neither well organized nor efficient, because the procedure of reception, dispatching to affected area, and orientation on task sharing has not been properly done.</p> <p>In addition to spreading fire at the areas where initial firefighting failed, another fire breakout occurs at collapsed buildings due to short circuit and heating of electric equipment, when power supply is restored. The fire disturbs rescue activities.</p>	<p>International rescue teams spend a time with few achievement, and leaves from Yerevan.</p> <p>Although several problems are pointed out, the problems are not summarized for improvement in the future.</p>	
An improved case	<p>Since companies which use products causing fire have prepared fire extinguishing equipment and trained the staffs for fire extinguishing, it was possible to avoid fire spread with initial fire extinguishing.</p> <p>Fire breakout occurs at some places, although many residents have closes gas valves before evacuation. The fire was extinguished by the residents and neighbors, led by local leaders who were trained for initial fire extinguishing.</p> <p>Since criteria for gathering, shown in BCP, is known by staffs of firefighting teams and rescue forces of RS, about 40% of the staff gathers their offices within one hour.</p>	<p>Firefighting teams and rescue forces go into action at the areas where access is not blocked with debris. At isolated areas due to road blockage, residents start fire extinguishing, but some areas are still burning.</p> <p>Collection of damage information such as fire breakout and confined persons in collapsed buildings by RS staffs is progressing well with assistance of residents, and rescue teams are dispatched, based on the collected information.</p> <p>Residents in the areas unable to have official support, start rescue activity by themselves, using tools stored in their houses or in their residents’ groups.</p>	<p>Firefighting activities are conducting well in densely built-up areas, following to the progress of road clearing, and accordingly, fire is almost extinguished in the entire area of Yerevan City.</p> <p>Based on damage information collected and evaluated by the CMC, rescue teams of RS conduct rescue and relief activities in cooperation with assisting teams from other Marzes and other countries within the framework and procedures prescribed in the disaster management plan.</p> <p>Fire breakout does not occur at the time of restoration of power supply, because residents have known about the possibility of the fire breakout due to power restoration, and had shut down main switch when they were being evacuated.</p>	<p>Residents highly appreciate big effort and fruitful results by RS rescue teams.</p> <p>The details of the operation is summarized, evaluated, recorded, and announced officially to the public. Defects of the activities are utilized for improvement of future activity in a revised plan.</p> <p>Collaboration with international rescue teams has been done smoothly. Using this opportunity, official agreements on further cooperation among several foreign agencies are signed.</p>	
Measures	<p><u>Criteria of gathering should be stipulated in BCP</u>, which is a part of the disaster management plan and all the staffs must understand the criteria shown.</p> <p>The necessity of immediate fire extinction at the time of earthquake and the procedure of initial fire extinguishing at the time of fire breakout should be well understood by all residents through <u>education and training on disaster management, including initial firefighting by residents.</u></p>	<p><u>Procedure and system for arranging and managing damage information should be established</u> beforehand in order to unite the information collected by RS staffs and residents.</p> <p>Promoting <u>the storing and maintenance of tools for emergency rescue activities by residents’ groups as well as training for the use of the tools on emergency response.</u></p>	<p>RS should <u>formulate a framework and procedure on management of rescue teams dispatched from Marzes and foreign countries beforehand</u>, and then, RS should <u>prepare a detailed action plan</u>, based on the actual damage situations, characteristics of the dispatched teams, collaboration among the teams. RS should conduct training in collaboration with related organizations (Ministry of Defense and Police, and Yerevan City office etc.) and residents.</p> <p>RS should <u>conduct training on rescue in an emergency</u> in cooperation with all related agencies and residents.</p> <p>In the education on disaster management, the possibility of <u>fire breakout at the time of power restoration should be explained</u>, and necessary action at the time of evacuation, such as turning off the main switch and closing the gas should be understood by residents.</p>	<p><u>An evaluation report of the rescue activity, including recommendation for future improvement</u>, should be prepared and open to the public for betterment, considering residents opinion.</p> <p>Seizing this opportunity, it is recommendable to <u>make agreement with international agencies for further cooperation</u>.</p>	

Table ***.4 Consequence scenario (4) Public security and panic (RS, Police under the Government of RA, information institutions)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Several officers of the Police are injured and some facilities/objects of Police are damaged and, consequently, the functions of police decreased. A lot of manpower is used to take care of the injured and repair the buildings and objects.</p> <p>Though the back-up system for electricity supply in disasters is installed the communication means and electric devices, such as computers, are not properly fixed to work in case of earthquakes.</p> <p>Consequently the information necessary for command is destroyed, and communication is unavailable due to turning down of the computers and the facilities.</p>	<p>Reorganization and deployment of troops necessary for public security are delayed because there are many affected in police offices and a lot of damaged buildings and facilities beyond estimation in existing plans, caused by unimaginable scale of an earthquake.</p> <p>Though the police establish control-checking points on personnel and traffic into/from the disaster zone for assistance/evacuation, the operation is not smoothly done, because it is done by only the existing forces due to delay of dispatching additional forces. The advance of the means and forces carrying out rescue and urgent accident-recovery operations to the earthquake zone is secured but delayed, whereas the advance of transportation means and people having nothing to do with those operations is prohibited.</p> <p>Although operations of public security provision, including patrol service, are being implemented in the earthquake zone aimed at prevention of panic, dissemination of false and intentional news as well as conduct of measures for hampering possible mass disorders, there is difficulty in smooth operation due to the lack of communication means.</p> <p>The relevant section of MES establishes a mobile information center in the disaster zone (where the telephone communication, electricity supply have failed) organizing press conferences with the journalists in the disaster zone on the humanitarian assistance for the implemented rescue and accident-recovery operations and so on. Brief information references are given to the journalists.</p>	<p>The Police of RA starts cooperation with the MES of RA, military command on the issues of organization of rescue operations.</p> <p>The clarification of available quantity and the location of transport means and engineering technique not affected by the earthquake are delayed, because the procedure and focal point of the clarification has not been clearly stipulated beforehand.</p> <p>There is confusion in rescue and assisting activities of responsible organizations, since the collection of information on the damage is irregular and instructions do not correspond to the real situation of damage. The residents are also in confusion because their requirements are not properly conveyed to the RA Government and the announcements of the RA Government are not properly conveyed to the residents.</p> <p>Activities are carried out aimed at keeping public order in evacuation gathering points and in the places for placing the evacuated population.</p> <p>Robbery/thief of food/ valuables/money occurs in some areas while the security persons and lightening at night are not enough, and the robbery/thief is spreading over.</p> <p>Some residents, who are not informed of prohibited matters in an emergency, are confined by security forces due to insufficient dissemination of the prohibited matters.</p> <p>The robbery and kidnapping takes place in the areas where the security forces are sparsely deployed.</p> <p>The maintenance of public order on transport highways as well as the protection of the remaining property in the evacuated settlements and facilities are strengthened in the disaster zone.</p> <p>The police is facing difficulty in registration of population losses, address checking and participates in the works of funeral committee of the victims, because of insufficient number of staffs and improper arrangement of the committee.</p>	<p>Public security bodies provide the security of road traffic and maintenance of public order, carries out registration of the evacuated population in the near-city area and address checking during the population evacuation.</p> <p>Much time is spent on satisfying the complaints of the residents on unbearable conditions for living in the evacuation places and damaged houses, and disorders continue.</p> <p>Groups of people who are not satisfied with government's response to liquidate the emergency situations raise disturbing or non-peaceable attempts.</p>	
An improved case	<p>The damages of buildings and structures are limited because they have been reinforced against earthquakes.</p> <p>An emergency power back-up system is installed, and electric devices such as computers and communication facilities have been fixed against earthquakes. Accordingly, neither data destruction in computers nor disconnection of communication has occurred.</p> <p>For securing the security of important establishments and hubs, police headquarters issues instruction on deployment of police officers.</p>	<p>Activities for public security are reinforced with smooth reorganization and addition of undamaged police officers, in accordance with prescribed procedure for the worst scenario of an earthquake disaster.</p> <p>The police establish control-checking points on personnel and traffic into/from the disaster zone for assistance/ evacuation, and the operation is smoothly done with additional forces from other regions. The advance of the means and forces carrying out rescue and urgent accident-recovery operations to the earthquake zone is secured whereas the advance of transportation means and people having nothing to do with those operations is prohibited.</p> <p>Operations of public security provision are being implemented in the earthquake zone with proper communication means, aimed at prevention of panic, dissemination of false and intentional news as well as conduct of measures for hampering possible mass disorders.</p> <p>The protection of facilities securing the vital activities of the population and other important ones is reinforced.</p> <p>The relevant section of MES establishes a mobile information center in the disaster zone (where the telephone communication, electricity supply have failed) organizing press conferences with the journalists in the disaster zone on the humanitarian assistance for the implemented rescue and accident-recovery operations and so on. Brief information references are given to the journalists.</p>	<p>The Police of RA starts cooperation with the MES of RA, military command on the issues of organization of rescue operations.</p> <p>The quantity and the location of transport means and engineering technique not affected by the earthquake are clarified by the police and they organize their involvement in rescue operations, according to the plan prepared beforehand.</p> <p>There is no confusion in rescue and assisting activities of responsible organizations, since the collection of information on the damage is smoothly done in accordance with the plan prepared beforehand.</p> <p>Activities are carried out aimed at keeping public order in evacuation gathering points and in the places for placing the evacuated population.</p> <p>Robbery/thief of food/valuables/money is prevented with immediate deployment of security force in accordance with prescribed plan, and sufficient lightening at night.</p> <p>Unnecessary confinement is avoided because the public is well informed on the prohibited matters in an emergency beforehand.</p> <p>Neighborhood watch groups assembled with residents are carrying out night watch in corporation with police and army forces for securing security.</p> <p>The maintenance of public order on transport highways as well as the protection of the remaining property in the evacuated settlements and facilities is strengthened in the disaster zone.</p> <p>The police carry out registration of population losses, address checking and participate in the works of funeral committee of the victims, since assistant staffs are dispatched from other region, in accordance with the plan prepared beforehand.</p> <p>Comprehensive activity on public security is conducted in wide areas, and thereby, threatening attempts are suppressed.</p>	<p>Residents are always well informed about the details and necessity of government's activity on emergency response and public security and disturbing and un-peaceable attempts are prevented in cooperation with residents.</p>	
Measures	<p><u>Important buildings and facilities for the command and activities for public security should be reinforced</u> against earthquakes.</p> <p>Together with emergency power back-up systems and water supply systems, <u>other measures against earthquakes such as fixing electric and communication devices should be taken.</u></p>	<p><u>An operation plan for public security should be prepared in advance</u>, based on the assumed worst scenario, and <u>training on the emergency operation should be done</u>, according to the prepared operation plan.</p>	<p>Police, in cooperation with related agencies such as Ministry of Urban Development, should <u>store sufficient number of mobile lightening facilities for its prompt installation for public security.</u></p> <p><u>Police should notify clearly of the prohibited matters to the public</u>, using notice boards, wide speakers, and media, and <u>conduct for public security activity in wide areas</u>, including surroundings of damaged areas.</p> <p>For the increase of public security at the time of large-scale disasters, the procedure for establishing neighborhood watch groups and official support to the activities should be prescribed for fill a gap in required number of security officers.</p>	<p>The public should always be well informed on details and necessity of activity on emergency response and public security for well cooperation with residents.</p>	

Table ***.5 Consequence scenario (5) Injured and the medical aid (RS, Ministry of Healthcare)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>About twenty thousand (200,000) people are injured such as traumatic injuries, bone fractures, damage to internal organs, mainly due to collapse of buildings and turn-down of furniture.</p> <p>Out of 66 major medical facilities (42 hospitals and 24 polyclinics) in Yerevan City, buildings of 29 facilities are moderately to seriously damaged. Many of buildings of 23 mono-clinics included in civil defense medical facilities are also seriously damaged, because of no reinforcement of buildings against an earthquake.</p> <p>Water and power supply to the 89 medical facilities are stopped, because the supply networks of water and electric are damaged. Since water tanks and generators for the emergency supply have not been installed to the medical facilities.</p> <p>Medical instruments and medical supplies are turned down and broken with earthquake shaking due to improper fixing.</p> <p>Consequently, most of medical facilities lose their function of medical services, particularly treatment of seriously injured. The injured people are left outside the damaged buildings of medical facilities, and only first aid is provided to the injured.</p> <p>RS and Ministry of Healthcare is collecting information on damage situations of the medical facilities, based on the list prepared beforehand. The information collection is facing difficulty, since only fixed phone numbers are available on the list.</p>	<p>Restart of medical services in many medical facilities is delayed because of slow progress of urgent building diagnosis for confirming the safety of the buildings.</p> <p>Although medical services are restarted in un-damaged medical facilities as it has been trained according to manual for emergency medical care, number of available medical teams is limited; about half of 300 urgent pre-medical teams and 200 urgent medical teams. In addition, many slightly injured persons rush to the hospitals, and accordingly, the medical services for seriously injured persons in the hospitals are hampered.</p> <p>Ministry of Healthcare starts establishing emergency field medical facilities with tents in cooperation with RS and Ministry of Defense. Since the locations of the facilities have not been informed to residents properly, all injured people, including slightly injured, are transferred to hospitals. Although first aid kits are stored in each district office, usage of the kits has not been informed to residents, and many of injured rush to the hospitals. Consequently, hospitals are in confusion and many injured people remain un-treated for a long time.</p>	<p>Because aftershocks occur several times and many people concern about stability of buildings of medical facilities, medical services are done in open spaces outside the buildings. Medical services are not efficiently provided, because of shortage of tents, medical instruments, and medical supplies.</p> <p>Medical teams dispatched from other Marzes start services with urgent medical teams of Yerevan. However, medical teams and supplies from foreign countries do not operate efficiently, because procedures and system for their reception and collaboration with Armenian teams has not been well-established beforehand in the disaster management plan.</p>	<p>Some of medical supplies and instruments are out of stock, and much time is spent for collecting the supplies and instruments. The shortage of medical supplies causes insufficient medical services, and accordingly the condition of some patients are getting worse.</p> <p>Ingredients of some of medicians provided by foreign countries are not meet with Armenian standard, the medicians are kept in storage, and expiration date are over.</p>	
Relatively moderate case	<p>Number of injured people is reduced to be about half, because buildings have been strengthened and furniture in houses has been fixed.</p> <p>Number of moderately to seriously damages to buildings of 66 major medical facilities are reduced to be about half, because the buildings have been reinforced against earthquakes. Some of buildings of 23 mono-clinics are seriously damaged.</p> <p>Although supply networks of water and electricity are damaged, water and electricity for medical treatment are secured, because water tanks and generators for emergency supply have been installed to the medical facilities.</p> <p>Medical instruments and medical supplies are fixed against earthquakes, and there is no serious damage to the instrument and supplies.</p> <p>Operation in mono-clinics such as quick treatment of slightly injured persons and transportation of seriously injured persons to major medical facilities is smoothly done, because tasks shearing and collaboration has been determined beforehand between the mono-clinics and major medical facilities. Medical treatment is provided to injured people in the hospitals which buildings are not damaged. At the medical facilities of damaged buildings, first aid is provided, and seriously injured people are transferred to other medical facilities for further treatment.</p> <p>RS and Ministry of Healthcare is collecting information on damage situations of the medical facilities, based on the list prepared beforehand. The information collection is proceeding smoothly, since alternative way of communication are available on the list.</p>	<p>Medical services in most of hospitals is available. Medical services in damaged medical facilities restarts, after urgent building diagnosis for confirming safety that is done in accordance with the procedure stipulated in the disaster management plan.</p> <p>Most of 200 urgent medical teams are operative, mainly in hospitals, and provide medical treatment for seriously injured people, after triage. Some of the seriously injured people are treated in emergency field medical facilities, which are established by Ministry of Healthcare in cooperation with RS and Ministry of Defense at designated areas in a disaster management plan beforehand. Most of 300 urgent pre-medical teams are also operative in medical facilities or outside the facilities, and provide medical treatment mainly for slightly injured people. Seriously injured people brought to the pre-medical teams are transported to major medical facilities after preliminary treatment. The transport of seriously injured are systematically done, based on information on the capacity of treatment in the major medical facilities as well as number of seriously injured people, managed by Ministry of Healthcare and RS.</p> <p>Some of slightly injured people are treated at each family, because first-aid-kits are kept in each house or provided by a district office. Training of emergency medical care has been done by a district office and RS for each family. Consequently, time for treatment of slightly injured people is shortened, resulting in alleviation of crowdedness in medical facilities.</p>	<p>Provision of medical instruments and medical supplies to medical facilities are smoothly managed, since those are stored in major hospitals and national reserve agency, and provided from other Marzes and foreign countries. For the management, Ministry of Healthcare and RS utilize the database which data of available beds, urgent medical teams, required medical supplies, etc.</p> <p>Medical teams dispatched from other Marzes and countries start services with urgent medical teams of Yerevan. Reception and allocation of medical teams from outside are managed by Ministry of Healthcare and RS, according to the prescribed procedure in a disaster management plan, and accordingly, the assistance of medical services is efficiently done.</p>	<p>Medical supplies and instruments are provided smoothly to medical facilities, utilizing database managed by Ministry of Healthcare, in close communication with medical facilities. Although some of stored medical supplies are consumed, necessary medical supplies are provided from foreign countries, based on the request of Ministry of Healthcare through Ministry of Foreign Affairs. The condition of patients is getting better, and medical care system is shifted from emergency to ordinary system.</p> <p>Pre-agreement has been made on medical assistance with other countries and donors. Since Armenian standard on the ingredients of medicines has been mentioned in the agreement, there is no confusion on the quality on medicines provided from foreign countries.</p>	
Measures	<p><u>Measures for strengthening buildings of medical facilities should be taken with high priority.</u></p> <p><u>Water tanks and generators should be installed to medical facilities</u> as emergency back-up of the water and electricity supply.</p> <p><u>Medical instruments and medical supplies in medical facilities should be fixed</u> against earthquakes.</p> <p><u>Task sharing and collaboration mechanism should be determined beforehand between major medical facilities and mono-clinics,</u> and the mechanism should be described in a disaster management plan.</p> <p>For collection of information such as damage to medical facilities, capacity of acceptance of the injured, <u>the procedure of the information collection and database of major medical facilities, including a communication chart, should be prepared beforehand.</u></p>	<p><u>The criteria and procedure of urgent diagnosis for the buildings of medical facilities should be standardized</u> before hand, and training and qualification for architects for the diagnosis should be promoted.</p> <p><u>Communication network among major medical facilities and mono-clinic should be maintained for efficient treatment of the injured.</u></p> <p><u>Storing a first-aid kit</u> in each house and district office should be promoted, and <u>training for the proper use</u> of the kit should be done.</p> <p><u>The locations of emergency field medical facilities,</u> which are determined in the disaster management plan, <u>should be informed to residents beforehand,</u> in order to avoid confusion of major hospitals with teeming injured persons.</p>	<p><u>The database of major medical facilities,</u> which include the capacity of beds, available medical instruments, stored medical supplies, etc., <u>should be prerared and shared beforehand</u> by each facilities and Menistry of Healthcare, and updated in the course of emergency respose.</p> <p><u>Prodedure of reception and allocation of medical assistace teams from outside should be prescribed</u> in a disaster management plan.</p>	<p><u>The database of major medical facilities should be updated and utilized for the provision of necessary medical supplies.</u></p> <p><u>Pre-agreement for medical assistance should be made with other countries and donors.</u> The agreement include required standard on quality of medical supplies.</p>	

Table **.6 Consequence scenario (6) Sanitation

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Concerning sewerage network, 714 points of waste water pipes of about 865 km, and 95 points of rain water pipes of about 182 km are damaged. Other sewerage facilities, such as “Aeracia” treatment plant and pumping stations are also damaged and do not function due to electric outage.</p> <p>Failure of water supply system also causes further difficulty in maintaining sanitary circumstances.</p> <p>Most of the members of utility technical service of the Committee for Emergency Situations (CES) of Yerevan do not gather for the management of the emergency situations, since rule of initial response of the members has not been determined in a disaster management plan.</p> <p>Toilets are damaged due to damage to buildings.</p> <p>At Yerevan Djuris assembling the members of emergency response group for damage reconnaissance and other initial response works, but only a few members gather, since there is no definite rule on gathering in emergency.</p>	<p>Human waste litters in many places, since few people pay attention to keep sanitation condition.</p> <p>Although damage reconnaissance by the teams of Yerevan Djur proceeds, the damage information is not transfered to the utility technical service of the CES of Yerevan City, because communication flow between Yerevan Djur and the Committee has not been determined beforehand in a disaster management plan, and thereby, arrangement and direction for efficient repair works are not proceeded smoothly.</p>	<p>Food is decayed, water purification system does not function, sewerage treatment plants do not function, garbage accumulates, human waste is littered, and accordingly, sanitation condition is getting worse. Few measures are taken to improve the above conditions, since necessary measures and responsible organizations for each measure have not been determined in a disaster management plan.</p> <p>Because toilets are limited in number, the aged and women intend to drink little water, and some of them are affected with dehydration.</p> <p>Repairing works of sewerage are commenced. The works are not progressing well, because of the lack of manpower, materials, parts, and equipment for the repair works. Although dispatch of repairing teams from Marzes is desired, the organization and deployment of the teams is delayed, since prior agreement for the dispatch has not been made.</p>	<p>Due to bad sanitary conditions, many evacuees, especially infants and elders are affected with diarrhea and infection diseases. Many people wait for vaccination at medical facilities, because number of stored vaccines is limited.</p> <p>Repairing works are carried out 24 hours with triple shifts by 15 teams. As of 7 days later, 60 points out of 800 damaged points of sewerage network have been repaired (progress is 7.5%).</p>	<p>Bad sanitation conditions is still not improved in some areas, since staffs for sanitation are busy for taking measures to halt spreading of diseases, and do not have time for prevention.</p> <p>Due to the lack of parts and materials for repairing of sewerage facilities, the progress of the repairing works is about 30 % as of one month later.</p>
Relatively moderate case	<p>Reinforcement of sewerage pipelines, especially replacement of vulnerable ceramic pipes with reinforced concrete pipes, contributes to reduction of damages to sewerage network, about 1/5 of the worst case. Reinforcement of sewerage facilities also contributes to reduction of the damages.</p> <p>There is less failure of water supply system due to reinforcement of the water supply facilities.</p> <p>Number of damaged toilets is reduced, because measures for reinforcing buildings have been taken.</p> <p>The members of utility technical service of the CES gather autonomously for the management of the emergency situations, since rule of initial response of the members has been determined in a disaster management plan.</p> <p>At Yerevan Djur, assembling of members of emergency response group and damage reconnaissance teams starts, most of all members are going to their head office, since rule on gathering in emergency has been shown in BCP of Yerevan Djur.</p>	<p>Evacuees prevent scattering of human waste by means of making tentative toilet with digging ground together with family members or community members.</p> <p>Damage reconnaissance by the teams of Yerevan Djur proceeds and the damage information is transferred to the utility technical service of the CES of Yerevan City, in accordance with the prescribed procedure in a disaster management plan. Based on the damage information, the utility service of CES instructs Yerevan Djur to carry out efficient repairing works. The utility technical service informs of the reconnaissance damage situations to CMC for efficient delivery of sanitation measures such as stored portable toilets, vaccines, and disinfectants.</p> <p>Yerevan Djur calculates necessary spare parts for the repairing works for import of the parts.</p>	<p>Measures on sanitation, such as the treatment of decayed food, water purification, sewerage treatment, garbage collection, and human waste treatment, have been taken by responsible organizations, according to the outline of measures mentioned in a disaster management plan.</p> <p>In order to prevent spread of diarrhea and infection diseases, sanitation measures to be taken by residents are disseminated, together with distribution of sanitary materials such as portable toilets and disinfectants. Vaccines are distributed to medical facilities for timely vaccination. At the areas where number of portable toilets is not sufficient, trench type temporary toilets are installed.</p> <p>Repairing works of sewerage commences. Although the procurement of some parts takes time, the repairing works proceed well, because the manpower, materials, stored parts, and equipment for the repair works have been arranged, according to a disaster management plan. The repairing teams from Marzes are organized and deployed, according to the prior agreement other operating companies of sewerage in other Marzes.</p>	<p>Diarrhea and infection diseases are prevented, since sanitation measures to be taken by residents are disseminated, together with distribution of sanitary materials such as portable toilets and disinfectants. Vaccines are distributed to medical facilities for timely vaccination. Temporary shower facilities are installed to tentative evacuation areas.</p> <p>Repairing works are carried out 24 hours with triple shifts by 40 teams. As of 7 days later, 200 points out of 800 damaged points of sewerage network have been repaired (the progress is 25%).</p>	<p>Ministry of Healthcare monitors and manages proper preventive measures on sanitation. Since the preventive measures such as vaccination and disinfection are carried out smoothly in collaboration with residents, there is no outbreak of epidemics.</p> <p>Before stored parts and materials are consumed, necessary ones have been imported, and thereby, repairing works progress well (the progress is about 90% as of one month later).</p>
Measures	<p>Ministry of Territorial Administration, Yerevan City, and Yerevan Djur should proceed with <u>the reinforcement of sewerage facilities against earthquakes. Especially, replacement of old ceramic pipes should be promoted.</u> Generators for back-up power supply should be installed to treatment plants in order to maintain the function during electric outage.</p> <p><u>Rule for initial response in emergency,</u> such as autonomous gathering of staffs of concerned organizations, <u>should be stipulated in a disaster management plan.</u></p>	<p><u>A manual on sanitation in an emergency should be prepared</u> beforehand such as the manner of the installation of dug toilets for family and community, and conduct training with residents, using the manual.</p> <p><u>Portable toilets should be stored,</u> based on the damage estimation result.</p> <p><u>Communication flow and form for reporting damage situations to responsible organizations on sewerage should be prescribed</u> in a disaster management plan.</p>	<p><u>The outline of necessary measures on sanitation and the responsible organization of each measure should be determined</u> beforehand in a disaster management plan.</p> <p><u>The guideline for the storage and distribution of portable toilets as well as the installation of temporary trench type toilets, should be prepared</u> beforehand in a disaster management plan.</p>	<p><u>Sanitation measures to be taken by residents should be listed</u> beforehand in a disaster management plan, and <u>necessary materials and equipment for the measures should be stored</u> for smooth implementation of the measures in collaboration with residents.</p>	<p>Ministry of Healthcare should <u>monitor sanitation condition,</u> and take <u>necessary preventive measures</u> accordingly.</p>

Table ***.7 Consequence scenario (7) Treatment of dead bodies

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	Around hundred thousand (100,000) people are dead, due to mainly with collapse of buildings.	Before dispatching rescue forces, residents search neighbors remaining buried under collapsed buildings. Residents find dead bodies and transfer then to medical facilities. The space of dead bodies in the hospitals is limited, and some hundred of bodies occupies wide space in the medical facilities.	Rescue activity proceeds by official agencies, and many bodies are found. Although bodies are transported to mortuaries where funeral services determine, autopsy is not progressing well, because of the lack of number of medical coroners, and thereby, bodies are piled up at the mortuaries.	Bodies at mortuaries are getting rotten, and people are afraid of epidemic and send the bodies to burial places without body identification.	Because many bodies were buried without identification, there are many missing persons whose life or death is unknown, and thereby, complaint and confusion arise from families of mission persons.
Relatively moderate case	Due to reinforcement and reconstruction of buildings against earthquakes, such as retrofitting and rebuilding, number of collapsed buildings is reduced and number of deceased persons is reduced accordingly.	The unit of special service of Committee of Emergency Situations of Yerevan (CES), in cooperation with Ministry Healthcare and Ministry of Justice, starts establishing space for dead bodies in or around medical facilities. The bodies are laid out in the space, and autopsy is started after medical coroners arrive.	Bodies are transported to mortuaries, and autopsy continues, according to the procedure determined beforehand in a disaster management plan. After the body identification, bodies are arranged for identification, and identified bodies are received by the families.	Unknown bodies are getting rotten, and the bodies are buried at pre-determined places after the registration of things (such as photos, ID card, fingerprint, tooth profile, hair for DNA identification, etc.) for identification afterward as prescribed in a disaster management plan.	Memorial service is held for all fatalities, organized the unit of special service of CES. Death confirmation is done, based on registered left things, compensation to the family was made in accordance with prescribed criteria in a disaster management plan, and thereby, little complaint or confusion arise from the families.
Measures	<u>Reinforcement and reconstruction of buildings</u> in accordance with building code should be promoted.	<u>The locations of space for dead bodies should be determined beforehand</u> in the disaster management plan, and <u>inform to residents</u> , in order to proceed with the autopsy of bodies without confusion.	The unit of special service of CES should <u>prepare disaster management plan on procedure of autopsy at the time of emergency</u> in cooperation with concerned organizations such as Ministry of Healthcare, Ministry of Justice, RS, and Police. The unit of special service of CES should <u>conduct training, based on the plan</u> , for proper application in an emergency.	The unit of special service of CES should prepare the disaster management plan, defining <u>the burial places, the procedure and manner for burial</u> , and <u>the plan for transportation of bodies</u> in cooperation with motor transport services.	<u>The system and procedure of compensation</u> should be prepared and well informed to the public in order to avoid complaint and confusion of the residents.

Table ***.8 Consequence Scenario (8) Psychological Care (Ministry of Healthcare)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	Residents get panic and cannot accept the real situations, because of violent earthquake which never been experienced (such as collapse of buildings and furniture, evacuation from debris, and separation from family). Many residents run out of the houses in panic, and some of them gather just nearby the entrance of the buildings, although the places are dangerous.	Following to the recognizing the actual situations (such as losses of their partners and children), the residents deeply feel loneliness and fear. The loneliness and fear are increasing, because of the lack of information such as missing people, disaster situations, provision of water/food, etc. Since there specialists for psychological care, the mental trauma of residents is getting serious.	Feeling of fear increases with every aftershock, residents cannot sleep well, and the symptom is worsened. Many residents rescued from debris are affected with crush syndrome. Evacuees staying in a car are affected with economy-class syndrome. The symptom is getting worsened due to lack of specialists able to care of the syndrome.	In addition to psychological trauma sleeplessness and tiredness occur among residents, and the stress is transformed into neurosis. Some staffs for emergency response are working without sleep and get more tired, resulting in death by overwork.	Due to weary soul in evacuation life and fear for instable future life, some residents commit suicide. Victims who cannot rescue their family suffer from continuous neurosis. Some staffs of emergency services suffer from PTSD (posttraumatic stress disorder).
Relatively moderate case	Although residents feel loneliness and fear, they calm down somewhat, since they have been trained what happens at the time of severe earthquakes. Therefore, the residents can consider what should do and response properly.	Together with emergency medical treatment at the evacuation areas, specialists for psychological care are dispatched for initial care. Information is transferred properly, and the residents somewhat feel safe about their future situations.	With the initiative of Ministry of Healthcare, consultation centers are installed into evacuation areas and medical facilities for psychological care of residents. Ministry of Healthcare also install hotline for Psychological care.	Psychological care is provided for staffs for emergency response as well as residents, so that psychological stress can be released.	Based on the list of residents and staffs of emergency services, long-term psychological care is provided, and suicide, neurotics, and PTSD staffs are avoided.
Measures	<u>Disaster educaation and training should be promoted</u> , so that residents can behave in proper manner at the time of severe earthquakes.	<u>Organization or association for emergency psychological care</u> should be established and the organization should <u>train psychologists for psychological care in emergency situation</u> .	Ministry of Healthcare should <u>formulate a plan for emergency psychological care</u> in a disaster management plan. In the plan, establishment of psychological care points and hotline should be included. It is necessary to have psychologists in the Crisis Management Center, in order to manage psychological issues.	Ministry of Healthcare should <u>conduct psychological care for staffs</u> being in charge of emergency response as well as residents.	Ministry of Healthcare should <u>prepare the list of residents/staffs in order to conduct psychological care</u> , especially for children who lost their parents.

Table ***.9 Consequence scenario (9) Disaster education (MES of RA, Ministry of Education and Science of RA, Yerevan municipality)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Almost ... % of school buildings were destroyed (84 schools were destroyed during Spitak earthquake) or seriously damaged.</p> <p>The reasons are the following:</p> <ul style="list-style-type: none">- The low level of seismic stability of buildings,- The mistakes made during the design stage of buildings,- The low quality of construction etc. <p>The big number of dead is also conditioned by the lack of security culture among school staff and pupils, i.e. lack of the knowledge about earthquakes and other disasters, rules of behavior during disasters and perception of skills.</p>	<p>The schools slightly damaged as a result of the earthquake and their yards are used as temporary sites of evacuation but they may not meet the requirements envisaged for the areas and temporary shelters, which are supposed to be evacuation sites, since the schools may not be provided with the necessary quantity of water, food, medicament and logistical means.</p>	<p>The plan of recovery works of school buildings cannot be worked out without the technical diagnostics of school buildings.</p> <p>For the affected due to the earthquake it is important to use the schools as evacuation areas and provide them with eater and food for a long time.</p>	<p>In some administrative districts school lessons are conducted in barracks or tents. Because the quantity of teachers is not enough, they are replaced by volunteers who are unable to organize the learning process properly. There is a shortage of handbooks and other learning materials.</p>	
An improved case	<p>The number of destroyed buildings will considerably decrease in case of enhancement of seismic stability of school buildings and compliance with the existing building standards and rules. The number of the dead among school staff and pupils will also reduce taking into account the training of school directors, deputy directors, teachers including teachers of military science on “the main issues of emergency situations and civil defence” carried out by Crisis Management State Academy by the RA Government decision N134 of 2003 and a similar course conducted in schools, specialized colleges and higher educational institutions by the RA Government decision N320 of 1996.</p> <p>Within the 3rd priority of Hugo activities program, which emphasizes “the use of knowledge, innovations and education in all the levels for developing security and disaster resisting culture”, a number of methodical, educational, deductive and other materials on the topics of disaster risk reduction are published within 2005-2015 “UN Decade of Education for Sustainable Development” Project Armenia-Estonia-Sweden trilateral cooperation and other international projects (UNICEF, UNDP, Armenian Red Cross Society) and are recommended by the RA Ministry of Education and Science for application.</p> <p>3 days retraining courses of deputy directors and teachers are conducted for many regions of RA on the topics of disaster risk reduction (DRR) with the help of UNICEF both in the Crisis Management State Academy and on sites (regional administration). During the retraining it was recommended to use modern interactive methods in teaching. DRR teams are created in schools, competitions disputes, quizzes and other events at schools. Plans of preparedness of families towards disasters/ earthquakes as well as evaluation sheets of schools and communities are developed.</p> <p>Education in DRR field is aimed at learning the rules of behavior in case of earthquake and other disasters, DRR thinking and development of a safe community as well as formation and development of skills, capacities and abilities for getting oriented, making decisions and fulfilling them in emergency situations. Evacuation plans are worked out in schools and conditional signs of evacuation and fire security are placed in relevant places. According to the RA fire security rules and tests of evacuation plans are conducted twice a year at schools (evacuation exercise).</p>	<p>In the yards of some schools it is envisaged to deploy temporary evacuation areas for the people who are homeless since necessary reserves of water, food, medicaments and logistical means are created in those schools.</p> <p>The teachers and pupils of those schools who were not affected as a result of earthquake can assist the people and particularly children located in the school in different ways.</p>	<p>The relevant body (NSSP) carries out technical diagnostic of school buildings very quickly. School buildings which are considered to be safe are used as temporary shelters for the evacuees and are provided with logistical materials in emergency situations for a period until the affected are taken to temporary resettlement places.</p> <p>Later on, the school buildings are considered dangerous and do not function till their recovery.</p>	<p>In more affected administrative regions the lessons are conducted in temporary classrooms. Special programs are included into the school educational plan aimed at learning of rules of behavior during earthquakes and other disasters as well as development of skills and abilities.</p>	<p>In more affected administrative regions the lessons are conducted in temporary classrooms. Special programs are included into the school educational plan, such as provision of vital activity in the evacuation places and generalization of the obtained experience for reducing the losses in similar situations in future.</p>
Measures	<p>NSSP of MES of RA must carry out technical diagnosis of the level of seismic stability of all the schools of Yerevan city by the order of the education department of Yerevan municipality. Based on the results obtained the buildings needing retrofitting should be retrofitted.</p> <p>DRR education should be included in school educational programs by all means as a separate educational field and must be delivered by a separate discipline.</p> <p>RA Ministries of Education and Science and Emergency Situations as well as Crisis Management State Academy declared a competition of “Development of plan of preparedness of schools towards disasters” and all the RA schools can participate in that competition /UNICEF/. Applications are accepted till 21 November of 2011. The development of plans will contribute to the enhancement of the level of culture of the school staff an pupils in the field of security provision as well as development of rules of safe behavior, skills and abilities.</p>	<p>RS should inform the heads of schools which schools are going to serve as temporary evacuation places in case of emergency situations and that should be mentioned in the plan of actions of emergency situations of the school.</p> <p>The education department of Yerevan municipality should work out a plan of response of teachers and employees to emergency situations and establishment of necessary reserves of water, food, medicament and logistical means. The citizens, condominiums should be informed about these reserves.</p>	<p>The engineering service of Yerevan municipality should work out a guideline of urgent technical diagnosis and examination of buildings, prepare relevant architectures and specialists and define the succession of schools needing technical diagnosis based on the condition of buildings and its necessity.</p>	<p>The education department of Yerevan municipality should work out a plan and order of urgent repair of schools together with relevant structures.</p>	<p>For the purposes of equivalent response to similar situations and resistance to the earthquake as well as reduction of consequences in future it is necessary to generalize the experience of our country and other countries.</p> <p>Conduct workshops, competitions, conferences and other learning activities on the mentioned topics.</p>

Table ***.10 Consequence scenario (10) Acceptance of Assistance

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Acceptance of assistance consists of three parts; 1) acceptance of domestic assistance from the RA regions, 2) acceptance of assistance from abroad, and 3) acceptance of volunteers’ assistance. They, in their turn, consist of 2 parts: reception of rescue forces and acceptance of material means.</p> <p>The procedures of the acceptance are stipulated in The RA Government decision N919, but detailed method of the acceptance has not been defined in emergency response plans of related organizations, and thereby, the related organizations wait the direction from the responsible organization without taking initial response such as arrangement of staffs and materials for acceptance of assistance.</p> <p>The organizations for providing assistance do not take initial response such as arrangement of staffs and materials for proving assistance, since prior agreement has not been made with the organizations in the affected responsible for receiving assistance.</p>	<p>According to the declaration of a state of emergency, responsible and related organizations start establishing reception points both for international and RA regional assistance. It takes time to determine the details such as the locations, the staffs, and materials of the reception points, and thereby, the establishment has not been completed, because an emergency response plan, stipulating the details has not been prepared beforehand.</p> <p>The arrangement of the first echelon of assistant troops of RA regional assistance also starts, according to the declaration. Although the arrangement has been completed in accordance with existing population protection plans of Marzes, the deployment is delayed, since some of reception points have not been established yet.</p> <p>The deployment of tent town by Gegharqunik and Vayots Dzor regions of RA is carried out in the surrounding territories of Yerevan city decided beforehand.</p> <p>The arrangement of the second echelon is on-going.</p> <p>Most of people in the peripheral areas, who are not damaged and do not have relatives in the affected area, do not intend to participate assistance activities, because they are neither informed nor educated about necessity and importance of volunteers’ support. Although a small number of volunteers gather around the affected areas, there is no official guidance/support to establish of reception of volunteers, and accordingly, the volunteers’ activities are not organized and inefficient.</p> <p>The request for the assistance of international forces is carried out by the MES of RA based on previously signed agreement/ contract and also from UN “Virtual OSOCC” and NATO EADRCC.</p> <p>Although the procedure for requesting international assistance on materials has been stipulated in The RA Government decision N919, the application of the international assistance is delayed, because it takes time to determine items and quantities to be applied.</p>	<p>Although reception points have been established and many assistance troops have arrived at the reception points, allocation of the assistance troops and means is in confusion in some reception points, because of mismatch between needs from affected areas and provided assistance.</p> <p>Due to the delay of repairing of Zvartnots International Airport, international assistance is landed at Shirak Airport of Gyumri. Because preparation for reception at Shirak Airport was not well planned, confusion and delay of reception occurs.</p> <p>The assistance troops start their activities without proper arrangement by reception groups, without maps and information necessary for the activities, and thereby, the activities are not so efficient.</p>	<p>Staffs of reception points and Emergency Management Headquarters are reinforced to reduce mismatch between needs and assistance, and thereby, confusion at reception points are resolved.</p> <p>Many assistants and materials from NGOs, private companies, and individuals arrive at reception points. Since reception of such big number of assistance has not been considered/ planned, confusion and delay occurs on the reception.</p> <p>Although supply of food, water, commodities to the reception staffs is secured, the staffs continue working without rest, and thereby, the staffs are exhausted and some are hospitalized.</p>	<p>Assistance troops and persons are not satisfied with their results, feel tiredness and irritation, finish their activities, and return to their home towns, since there is no information for further assistance such as care for the evacuees, debris clearance in individual houses, education for children, etc.</p>
An improved case	<p>Acceptance of assistance consists of two parts; 1) acceptance of domestic assistance from the RA regions, 2) acceptance of assistance from abroad. They, in their turn, consist of 2 parts: reception of rescue forces and acceptance of material means.</p> <p>The procedures of the acceptance are stipulated in The RA Government decision N919, and detailed method of the acceptance has been defined in emergency response plans of related organizations, and thereby, the related organizations start taking initial response such as arrangement of staffs and materials for acceptance of assistance.</p> <p>The organizations for providing assistance start initial response such as arrangement of staffs and materials for proving assistance, since prior agreement has been made with the organizations in the affected responsible for receiving assistance and the items and quantities to be provided has been shown in the agreement.</p>	<p>According to the declaration of a state of emergency, responsible and related organizations start establishing reception points for international and RA regional assistance as well as volunteers. The locations, staffs, and materials of the candidates of reception points have been determined in disaster management plan beforehand, and thereby, the selection and establishment have been completed in a short time.</p> <p>The arrangement of the first echelon of assistant troops of RA regional assistance also starts, according to the declaration. The arrangement has been completed in accordance with existing population protection plans of Marzes, the first echelon arrives at the reception points established in accordance with disaster management plan, and starts rescue activities.</p> <p>The deployment of tent town by Gegharqunik and Vayots Dzor regions of RA is carried out in the surrounding territories of Yerevan city decided beforehand.</p> <p>The arrangement the second echelon is on-going.</p> <p>Most of people in the peripheral areas, who are not damaged and do not have relatives in the affected area, participate assistance activities, because they have been informed and educated about necessity and importance of volunteers’ support. The volunteers gather at the reception points around the affected areas, and the organization of the volunteers is on-going with official guidance/support.</p> <p>The request for the assistance of international forces is carried out by the MES of RA based on previously signed agreement/ contract and also from UN “Virtual OSOCC” and NATO EADRCC.</p> <p>The procedure for requesting international assistance on materials has been stipulated in The RA Government decision N919, and the application of the international assistance is issued, based on estimated damage calculated with damage estimation system as well as collected damage information.</p>	<p>Assistance groups for international troops on the RA borders; crossing points and airports, provide necessary information to the troops, such as maps, road conditions, damage situations, venues for obtaining fuel-lubricants, food and water, and the place of OSOCC site office. Interpreters and a reference on the peculiarities are also provided.</p> <p>The allocation of assistance troops and means is smoothly done, based on information of needs from affected areas and the direction from CMC are well regulated.</p> <p>Regional forces of the second and third echelons arrive at reception points, and start assistance activities.</p>	<p>Although many assistants and materials arrived at reception points, the operation of the reception points are smoothly done by official staffs in rotation shift with alternative staffs dispatched from related organizations.</p> <p>For smooth operation of the reception, staffs of NGOs and private sectors are involved, in accordance with agreement made beforehand.</p>	<p>Following to the reduction of arrival of assistance, number of staffs in a reception point is reduced, since the operation can be shared with local people.</p> <p>The activities of reception is reviewed and evaluated, and a report with recommendations for future improvement is prepared by responsible organizations. Based on the recommendations, procedure on establishment and operation of reception points are revised and prior agreements for collaboration with NGOs and private sectors are made for the future activities.</p>
Measures	<p><u>Detailed emergency response plans for reception of assistance should be prepared in the responsible organization and related organizations</u>, based on damage estimation result, and items and quantities of expectable assistance from the outside should be defined in the plans.</p> <p><u>Agreements on emergency assistance should be made</u> with foreign countries, donors, and related organizations in peripheral areas, including private companies.</p>	<p><u>The details on the establishment and operation of candidate of reception points such as locations, staffs, and materials, should be determined beforehand</u> in a disaster management plan.</p> <p><u>Measures for enhancing volunteers’ activities should be promoted</u> in ordinary time, and <u>a plan for involvement of volunteers should be prepared</u> as a part of a disaster management plan.</p> <p><u>Data and procedure for determination of items and quantities of international assistance should be prepared</u> beforehand. The data will be a list of national reserve and a list of prepared materials of international organizations in an UN contingency plan. Items and quantities to be asked for international assistance will be calculated “International assistance materials to be applied = Reserved materials –Required materials”. The required materials will be calculated with damage estimation system.</p>	<p><u>Information flowchart and procedure for regulating information should be determined beforehand</u> in a disaster management plan to avoid mismatch between needs and assistance.</p> <p><u>Items of information to be provided to assistance troops should be clarified beforehand</u> in a disaster management plan.</p>	<p>Considering arrival of huge number of assistants and materials at reception points, <u>measures for smooth operation of reception such as rotation shift with alternative staffs and collaboration with NGO/ private sectors, should be described</u> in a disaster management plan.</p>	<p>The activities relating to the reception should be reviewed and evaluated, and the report with recommendations should be prepared for future improvement.</p>

Table ***.11 Consequence scenario (11) Food

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Most of families keep a small amount of long life food at home. Due to collapse of many buildings, food in shops and families is lost.</p> <p>A number of food production companies suspend the production due to damages to the facilities as well as secondary effects such as fires, explosions, emission of toxic materials, etc. and the suspension of supply of water, electricity, and gas.</p> <p>State Reserve Agency keeps a small amount of food for emergency compared with maximum 200 thousand evacuees.</p>	<p>Some families are in difficulty in ensuring food. Particularly, lack of milk for babies is serious problem.</p> <p>Official reserve of food is limited. Some amount of food is provided from other Marzes. Proper distribution of food is not available, since the rule of distribution has not been determined in a disaster management plan beforehand. Therefore, trouble and scramble of food occur in many places.</p> <p>Although the Mayor of Yerevan City decides to introduce cheque system for food provision and defines food distribution points, trouble and scramble of food is not settled, since many residents have not been informed about the Mayor’s decision.</p> <p>Enough hot food supply is available only for rescue force, and it results in complain of residents.</p> <p>Restoration works of food producing facilities is delayed, since there is no preparation for quick restoration of the production.</p>	<p>Although food is provided from other Marzes and foreign countries as humanitarian aids, the general procedure of the transportation has not been determined. Accordingly, the transportation is not smoothly done, food is left without eaten, resulting in rotting.</p> <p>Since information on food distribution such as the contents of food and the locations of distribution points is not announced to residents, residents are rushing around distribution points.</p> <p>Lack of food cause rapid rise of food price in markets, reluctant selling, and robbery of food.</p> <p>Due to insufficient nutrition, many people catch cold.</p> <p>Restoration of food production facilities is not progressing, because of lack of manpower and materials.</p>		<p>Food provided from Marzes and foreign countries is not distributed properly and left in storehouse, since the number of official staffs for the management of transportation and distribution is not sufficient.</p>
An improved case	<p>Most of families keep some amount of long life food at home to survive for three days as recommended in a disaster management plan.</p> <p>A number of food production companies suspend the production due to damages to the facilities as well as secondary effects such as fires, explosions, emission of toxic materials, etc. and the suspension of supply of water, electricity, and gas. The companies start initial response such as confirmation of available manpower and materials, in accordance with BCP (Business Continuation Plan).</p> <p>State Reserve Agency keeps some amount of food stock to be provided to the families.</p>	<p>Although many families have food reserve, the reserve in some families is not available, because of the collapse of houses.</p> <p>According to damage situations, reserved food is provided to the suffered families at evacuation points designated in a disaster management plan. The rule of distribution of food, such as the standard contents of food and distribution points, has been determined in a disaster management plan. Although long queues occur at the food distribution points in evacuation areas, provision of emergency food is managed by Department of Trade and Services of Yerevan City as prescribed in Mayor’s decision, and thereby, there is no big confusion and scramble.</p> <p>Enough food supply for rescue forces is secured by RS with its own storage materials.</p> <p>Additional food for emergency is arriving from other Marzes.</p> <p>Restoration works of food producing facilities is on-going, in accordance with BCP, prepared beforehand in each production companies.</p>	<p>RS, Department of Trade and Services of Yerevan City, and Ministry of Economy transport food provided from Marzes and foreign countries. The transportation activities are assisted by Ministries of Emergency Situations, Agriculture, Labor and Social Affairs, Healthcare, Transport and Communication, Police under RA, volunteers, and others. Since the general procedure of the transportation has been determined beforehand in a disaster management plan, the transportation is smoothly done.</p> <p>Information on food distribution such as the contents of food and the locations of distribution points is widely announced to the public and accordingly confusion and complaint are limited on food supply.</p> <p>Mayor of Yerevan City issues an order for the control of food price, such as the prohibition of reluctant selling and sudden rise of food prices. The decision is informed widely to public, and accordingly, food prices are controlled properly.</p> <p>Restoration of food production facilities is on-going, in accordance with BCP. Some of facilities such as milling facilities, have been repaired, and food production is partly restarted.</p>	<p>Distribution of food provided from foreign countries starts.</p> <p>According to evacuees’ demand on food, hot meal is prepared in cooperation with volunteers at tentative evacuation areas.</p> <p>Considering nutritional balance, nutritional supplements such as vitamin drops are distributed.</p>	<p>Although number of official staffs for food distribution is limited, evacuees participate the distribution works as well as cooking, together with volunteers, through coordination of official staffs.</p>
Measures	<p>RS and Ministry of Economy should <u>promote self support of every family such as storage of long life food</u> as a preparation against disasters.</p> <p><u>Each food production companv should prepare BCP</u> beforehand for the quick restoration of the production activities.</p> <p>State Reserve Agency should <u>store some amount of food.</u></p>	<p>RS and Ministry of Economy should <u>determine the rule of distribution of emergency food</u>, such as standard contents of food and the location of distribution points (195 points), beforehand in a disaster management plan.</p> <p>RS, Department of Trade and Services of Yerevan City, and Ministry of Economy should <u>make prior agreement on provision of emergency food with Marzes and food production/ supply companies</u>, and information on available food stock should be shared among related organizations.</p>	<p><u>The general rule of transportation of food provided from Marzes and foreign countries should be determined beforehand</u> in a disaster management plan. The plan should describe the way of cooperation in the transportation with other ministries, volunteers, and others.</p> <p><u>Information on food distribution managed by Ministry of Economy should be widely announced to public.</u></p> <p><u>Guideline for price control</u> in an emergency should be prepared and <u>well informed to the public.</u></p>	<p>System for <u>feedback of evacuee’s demand</u> should be prescribed and <u>evacuation areas should be managed according to the demand.</u></p>	<p><u>Autonomous actions of evacuees</u> such as distribution of food and cooking, should be promoted for smooth operation with limited number of official staffs.</p>

Table ***.12 Consequence scenario (12) Drinking water

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Concerning water supply network, 274 points of supply pipes out of about 1,300 km are damaged. Other water supply facilities, such as 3 reservoirs, intakes, purification plants, and 2 major pumping stations, are also damaged and do not function. Distribution pipes to houses are damaged at many points. Many water tanks are also damaged and water leaks out. As the result, drinking water supply to 380,000 people in Yerevan City is suspended.</p> <p>Because sewerage pipelines are also damaged, contamination of drinking water with sewerage is concerned, even in areas where piped water supply is reduced due to leakage.</p> <p>Most of the members of the utility technical service of the Committee for Emergency Situations (CES) of Yerevan do not gather for the management of the emergency situations, since rule of initial response of the members has not been determined in a disaster management plan.</p> <p>At Yerevan Djur, assembling of members of emergency response group and damage reconnaissance teams starts, but only a few members gather, since there is no definite rule on gathering in emergency.</p>	<p>Water supply by tank trucks to evacuation areas and supply points is not managed properly, since the detailed procedure of emergency water supply has not been determined in a disaster management plan. People is adviced not to drink tapped water, since there is concern of contamination. Accordingly, people cannot get drinking water, and some people break shops and supermarkets to get water.</p> <p>Although damage reconnaissance by the teams of Yerevan Djur is carried out, the damage information is not transfered to the utility technical service of the CES of Yerevan City, because communication flow between Yerevan Djur and the Committee has not been determined beforehand in a disaster management plan, and thereby, arrangement and direction for efficient repairing works do not proceed smoothly.</p>	<p>Although repair of water facilities starts, the progress is slow, because of the shortage of manpower, materials, parts, and equipment for the repair works as well as blockage of access roads with debris. Although dispatch of repairing teams from Marzes is required, the organization and deployment of the teams is delayed, since prior agreement for the dispatch has not been made. Consequently, water supply is still not available in wide areas of Yerevan.</p> <p>Some families, facing difficulty in securing water, raise requests to district offices, but drinking water distribution is not progressing well, because number of water tank trucks is limited.</p>	<p>Repair works are carried out 24 hours with triple shifts by 10 teams. As of 7 days later, 130 points out of 274 damaged points have been repaired (progress is 50%). At the central area of the city, water supply lines are not quickly repaired due to heavy damages. Water distribution by tank trucks is in difficulty, because of the shortage of trucks and road blockage. Drinking water is barely secured through distribution of bottled water arrived from Marzes and foreign countries. Evacuees complain about shortage of drinking water, and some are suffer heat disorder and dehydrating illness.</p>	<p>Repairing works are not completed in some areas due to the lack of spare parts to be imported, and the works are completed in one month later.</p> <p>Installation of temporary supply lines mainly to the central area of the city, but suspension of water supply still continues. Water supply to evacuation areas is still carried out with tank trucks, and thereby, available water volume is limited.</p>
An improved case	<p>Old supply pipes made of asbestos-concrete, ceramic, cast-iron have been replaced with polyethylene and steel pipes, and which replacement contributes to reducing damages to water supply network. As a result, number of damaged points in the network is reduced to be about half. The reinforcement of water facilities also contributes to reducing damages, although 2 major pumping stations do not function due to electric outage. Reinforcement of water tanks against earthquake also results in reduction of areas where water supply is suspended. Number of people without water is about 150,000.</p> <p>Because sewerage pipelines are also damaged, contamination of drinking water with sewerage is concerned, even in areas where piped water supply is reduced due to leakage.</p> <p>Since residents have well informed and understood necessity of securing water of 9 lit./day/person for survival for 3 days, many families reserve drinking water in bottles or small tanks in houses.</p> <p>The members of the utility technical service of the CES gather autonomously for the management of the emergency situations, since the rule of initial response of the members has been determined in a disaster management plan.</p> <p>At Yerevan Djur, the members of emergency response group and damage reconnaissance teams are going to the head office and other gathering points, since the rule on gathering in emergency has been shown in BCP of Yerevan Djur.</p>	<p>The utility technical service of the CES arranges urgent water supply tank trucks for delivering drinking water to evacuation areas, in accordance with a disaster management plan. In the areas which water delivery is not available, people can secure drinking water as they have reserved in their houses. People share drinking water with evacuees who lose everything. Shops and supermarkets deliver bottled water to people voluntarily, and neither riot nor robbery occurs in shops and supermarkets.</p> <p>Damage reconnaissance by the teams of Yerevan Djur is carried out and the result is transferred to the utility technical service of CES in accordance with urgent reconnaissance procedure prescribed in a disaster management plan. Based on the result of the reconnaissance, the utility technical service of CES arranges and directs for efficient repairing works.</p>	<p>Water supply is still suspended in many areas, but no big trouble on drinking water has occurred, because most of families keep water and shops deliver bottled water.</p> <p>Emergency water distribution by tank trucks is on-going for the residential and evacuation areas where water supply is suspended for a long time.</p> <p>Based on the damage reconnaissance results, rehabilitation works of the facilities is commenced, using stocked materials and equipment, arranged by the utility technical service of CES. Installation of temporary water pipes to evacuation areas is also commenced.</p>	<p>Repairing works are carried out 24 hours with triple shifts by 15 teams. As of 7 days later, almost all damaged points are repaired have been repaired (the progress is almost 100%).</p> <p>Temporary installation of water pipes to evacuation areas has also completed,</p> <p>In limited areas where piped supply is not available, drinking water is supplied with tank trucks and bottled water arrived from the outside, in cooperation with volunteers.</p>	<p>Piped water supply is available in all areas of Yerevan City.</p> <p>Further works for strengthening water supply facilities are planned, and commenced, in accordance with a guideline of rehabilitation/reconstruction, which is included in a disaster management plan prepared beforehand.</p>
Measures	<p>Ministry of Territorial Administration, Yerevan City, and Yerevan Djur should proceed with <u>the reinforcement of water supply facilities against earthquakes. Especially, replacement of old ceramic pipes should be promoted.</u> Generators for back-up power supply should be installed to treatment plants in order to maintain the function during electric outage.</p> <p>Ministry of Territorial Administration, Yerevan City, and Yerevan Djur should <u>reinforce water facilities such as reservoirs, pumping stations, and water tanks</u> against earthquakes.</p> <p>RS should <u>promote campaign or education for raising awareness of residents</u> such as reserving drinking water in their houses.</p> <p><u>Rule for initial response in emergency</u>, such as autonomous gathering of staffs of concerned organizations, <u>should be stipulated in a disaster management plan.</u></p>	<p><u>The procedure for urgent water supply by tank trucks should be prescribed</u> in a disaster management plan.</p> <p><u>RS and Yerevan City should promote mutual and self supports</u> such as sharing water among residents and the voluntary delivery of bottled water of shops.</p> <p><u>Communication flow and form for reporting to responsible organizations on damage situations of water supply system should be prescribed</u> in a disaster management plan.</p>	<p>RS and Yerevan City should <u>store emergency water supply facilities such as water tank trucks.</u></p> <p><u>RS and Yerevan City should prepare an emergency supply plan as a part of a disaster management plan. The plan should include the location of water supply points (195 points), the criteria of water distribution (i.e. 10 lit./person/day), the way of collaboration with volunteers and other units concerned.</u></p> <p>Yerevan Djur and Yerevan City should <u>store materials and equipment for repair of the water supply facilities, and conduct training of the staffs.</u></p>	<p>For further strengthening of water supply facilities, RS and Yerevan City should <u>prepare a guideline for rehabilitation/reconstruction, which shows the procedure of formulation of the plan</u> beforehand in a disaster management plan.</p>	

Table ***.13 Consequence Scenario (13) Power supply (Ministry of Energy and Natural Resources)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Out of 1,950 km of aerial power lines, 22.4 km is damaged. Out of 3,517 km of underground power lines, 305 km is damaged. The operation of the most of all power plants and substations is suspended, due to the strong shaking. Just after the earthquake, power outage occurs at the entire area of Yerevan City.</p> <p>Although most of the members of energy and black-out service and the Committee for Emergency Situations (CES) of Yerevan gather for the management of the emergency situations, initial response, such as collecting damage information and safety confirmation of staffs, is delayed, since tasks of the service and CES in sever earthquakes have not been clearly defined.</p> <p>At Yerevan Light and Electric Network of Armemia, emergency response teams are established for damage reconnaissance and other initial responses. But, the safety of some members cannot be confirmed, since there is no definite rule on safety confirmation of staffs in emergency.</p>	<p>Damage reconnaissance of power supply facilities is commenced, but it is not progressing well, since number and degree of the damaged points so big.</p> <p>The damage information is not smoothly processed for the rehabilitation of power supply system, because the procedure and methodology for analysis of damage and arrangement of rehabilitation teams for huge disasters have not been well-established beforehand.</p> <p>Since tasks/ responsibilities/ communication means between the CES of Yerevan and the CES of the State have not been clearly defined, gaps in decision and direction cause confusion or delay in initial response and rehabilitation activities.</p> <p>Although emergency power supply to important facilities with generators has been carried out, the supply cannot be done for short time, because stock of fuel is limited.</p>	<p>Assistant teams have been arrived from other Marzes for the rehabilitation of the facilities. Although the teams consist of trained technical staffs, the rehabilitation works are not progressing well, because of lack of spare parts as well as the lack of information on priority locations for rehabilitation from the energy and black-out service and the CES of Yerevan.</p> <p>Rehabilitation of power plants is delayed, since replacement of special parts is required and no supply chain has been clarified beforehand.</p> <p>Rehabilitation of high-voltage transmission lines is progressing at about 40%.</p> <p>Power supply to houses has not been restored, since distribution lines have not been repaired yet.</p> <p>Although people observe the rehabilitation works at several locations, many complaints arise since no power supply to their houses and no information when the supply restored.</p>	<p>Power supply to houses is restored in some areas. Although staffs of power companies confirm safety before the restoration, fire breaks out due to short-circuit and over-heating of electric devices after the power restoration, since some evacuees have not turned off the electric devices.</p> <p>Rehabilitation of heavily damaged power plants and transmission lines is suspended due to the lack of special parts. Comparing rehabilitated distribution network, the capacity of restored power generation is small, and planned rolling blackout is applied. People complain the situations of power shortage.</p>	<p>The energy and black-out service, CES of Yerevan, and related organizations should concentrate for short-time tentative power supply to meet minimum needs, long-term plan and vision for the reconstruction of power supply facilities cannot be considered.</p>
An improved case	<p>Since power supply facilities have been reinforced in terms of seismic stability, damage to the facilities is reduced, comparing with the worst case. Although damage is reduced, power outage occurs at the entire area of Yerevan City, due to strong shaking.</p> <p>The members of the energy and black-out service and the CES of Yerevan gather autonomously for the management of the emergency situations, since the rule of initial response of the members has been determined in a disaster management plan, and they start immediately collecting information on damages situation of safety of the members and the staffs of power companies.</p> <p>At Yerevan Light and Electric Network of Armemia, assembling of members of emergency response groups and damage reconnaissance teams starts, most of all members are going to the gathering points autonomously, since rule on gathering in emergency has been shown in BCP of Yerevan Light and Electric Network of Armemia.</p>	<p>Damage reconnaissance of power supply facilities is commenced, and proceeding smoothly, since number and degree of damaged points are reduced and the procedure and responsibility of the reconnaissance work have been well understood by related staffs, including management staffs and site-working staffs.</p> <p>The energy and black-out service and the CES of Yerevan gathers/ analysis all information on damages, in corporation with Crisis Management Center and related companies. Based on the analyzed information, the schedule and priority of rehabilitation are decided, directed to relevant companies, and announced to the public.</p> <p>Emergency power supply to important facilities with generators has been carried out, and minimum necessary power supply can be secured with stockpiled fuel.</p>	<p>Assistant teams have been arrived from other Marzes for the rehabilitation of the facilities. Since the teams consist of trained technical staffs having enough spare parts and the instruction on locations for their works is properly done by the energy and black-out service and the CES of Yerevan, the rehabilitation works are progressing well.</p> <p>Supply chain for special parts for the rehabilitation of power plants has been established beforehand, the rehabilitation of the plants is progressing smoothly.</p> <p>Rehabilitation of high-voltage transmission lines is progressing at about 60%.</p> <p>Power supply to houses is restored in the area where damage is not serious, after the confirmation of safety by staffs of power companies. At the time of power restoration,</p> <p>In the heavily damaged areas, installation of tentative power distribution network and portable generators are installed to the evacuation areas, so that minimum supply of power is secured.</p>	<p>Power supply to houses and evacuation areas has been restored at about 90%.</p> <p>The energy and black-out service and the CES of Yerevan formulate a reconstruction plan, especially heavily damaged areas, and the reconstruction works are commenced successively.</p>	
Measures	<p>The energy and black-out service, the CES of Yerevan, Ministry of Energy and Natural Resources, Yerevan Light, and Electric Network of Armemia should proceed with <u>the reinforcement of power supply facilities against earthquakes.</u></p> <p><u>Rule and tasks for initial response in emergency,</u> such as autonomous gathering and safety confirmation of staffs, <u>should be stipulated or clarified in a disaster management plan or BCPs of the related organizations.</u></p>	<p>The energy and black-out service, the CES of Yerevan and related organization should <u>clarify the organizational structure and procedure of damage reconnaissance in case of huge disasters</u> beforehand in a disaster management plan, and <u>conduct training on the reconnaissance.</u></p> <p>The energy and black-out service and the CES of Yerevan should <u>clarify the information flow on damage situations, analysis, and direction for rehabilitation</u> works beforehand in a disaster management plan.</p> <p>The energy and black-out service and the CES of Yerevan should <u>promote installation of emergency power back-up system together with stockpile of fuel to important facilities,</u> considering the duration of rehabilitation at the time of severe earthquakes.</p>	<p>The energy and black-out service and the CES of Yerevan should <u>promote stockpile of materials or secure supply chain of materials</u> for the rehabilitation of power facilities.</p> <p>The energy and black-out service and the CES of Yerevan should <u>promote establishing safety confirmation rule to avoid secondary fire due to restoration of power supply.</u></p>	<p>The energy and black-out service and the CES of Yerevan should <u>promote stockpile of devices or secure supply chain of devices</u> for the installation tentative power generation and supply system to the heavily damaged areas.</p> <p>The energy and black-out service and the CES of Yerevan should <u>promote people's intension or awareness on necessity of switch-off at the time of evacuation</u> in order to avoid secondary fire outbreak due to short-circuit and over-heating at the time of power restoration.</p>	<p>The energy and black-out service and the CES of Yerevan should <u>prepare the framework (responsible organizations and the tasks) and procedure for smooth formulation of reconstruction plan.</u></p>

Table ***.14 Consequence Scenario (14) Gas Supply

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>In 67.6 km of underground gas pipe lines, 2.9 points is damaged. Out of 1,027.0 km of on-the-ground gas pipelines, 221.1 km is damaged. The operation of all gas facilities has been suspended due to strong shaking.</p> <p>No gas explosion occurs, since safety devices, such as emergency shutdown devices and gas release devices, function properly.</p> <p>Although most of the members of utility technical service and the Committee for Emergency Situations (CES) of Yerevan gather for the management of the emergency situations, initial response, such as collecting information and safety confirmation of staffs, is delayed, since the tasks of the service and CES in severe earthquakes have not been clearly defined.</p> <p>At ArmRusgasprom, emergency response teams are established for damage reconnaissance (safety confirmation) and other initial responses. But, the safety of some members cannot be confirmed, since there is no definite rule on safety confirmation of staffs in emergency.</p>	<p>Damage reconnaissance (safety confirmation) of gas supply facilities is commenced, but it is not progressing well, since number and degree of the damaged points so big.</p> <p>The damage information is not smoothly processed for the rehabilitation of the gas supply system, because the procedure and methodology for analysis of damage and the arrangement of rehabilitation teams for huge disasters have not been well-established beforehand.</p> <p>Since tasks/ responsibilities/ communication means between the CES of Yerevan and CES of the State have not been clearly defined, gaps in decision and direction cause confusion or delay in initial response and rehabilitation activities.</p> <p>Although residents have understood the risk of explosion due to gas leakage, some residents evacuate without closing gas valves and gas explosion occurs in several places.</p> <p>Due to gas release for safety and leakage of gas, the smell of gas spreads in some areas, and residents are in panic, being afraid of explosion.</p>	<p>Damage reconnaissance (safety confirmation) is on-going. Since number of gas detecting devices is limited, the clarification of damaged parts of gas supply network is progressing slowly.</p> <p>Although assistant teams from other Marzes, join the damage reconnaissance (safety confirmation) work, reconnaissance operation is not smoothly done, since management of the reconnaissance works, such as sharing the target areas, provision of information of gas network, etc., is not properly done.</p> <p>Gas supply cannot be restored within three days after the earthquake.</p>	<p>Although safety confirmation has been done in some areas, gas supply cannot be restored, since safety confirmation of main pipes has not been completed. Accordingly, gas supply has not been restored in Yerevan.</p>	<p>Safety confirmation of main pipes has been completed two weeks after the earthquake.</p> <p>Although safety confirmation of distribution pipes has been completed in slightly damaged area, gas supply cannot be restored, since gas some residents evacuated without closing gas valves and leakage occurs through the open valves.</p> <p>Although rehabilitation works of gas pipe lines has been commenced, the works are suspended due to the lack of spare parts. Accordingly, rehabilitation works have not been completed within one month after the earthquake.</p> <p>Since the rehabilitation works has been done only for restoration of gas supply, there is no improvement in terms of strengthening of the gas supply system, comparing with the previous conditions.</p>
An improved case	<p>Since gas supply facilities have been reinforced in terms of seismic stability, damage to the facilities is reduced, comparing with the worst case. Although damage is reduced, gas supply outage occurs at the entire area of Yerevan City, due to strong shaking.</p> <p>The members of the utility technical service and the CES Yerevan gather autonomously for the management of the emergency situations, since the rule on the initial response of the members has been determined in a disaster management plan, and they start immediately collecting information on damages situation and safety of members and the staffs of gas companies.</p> <p>At ArmRusgasprom, assembling of members of emergency response groups and damage reconnaissance (safety confirmation) teams starts, most of all members are going to the gathering points autonomously, since rule on gathering in emergency has been shown in BCP of ArmRusgasprom.</p>	<p>Damage reconnaissance (safety confirmation) of gas supply facilities is commenced, and proceeding smoothly, since number and degree of damaged points are reduced and the procedure and the responsibility of the reconnaissance work have been well understood by related staffs, including management staffs and site-working staffs.</p> <p>The utility technical service and the CES of Yerevan collect and analyze all information on damages, in cooperation with Crisis Management Center and related companies. Based on the analyzed information, the schedule and priority of rehabilitation are decided, directed to relevant companies, and announced to the public.</p> <p>Residents understood the risk of gas explosion due to gas leakage and they have been informed what to do in severe earthquakes, they close gas valves before evacuation.</p> <p>Since residents have been informed that gas release devices are function at the time of severe earthquakes, they evacuate in calm manner and extinguish fire as far as they can without danger.</p>	<p>Damage reconnaissance (safety confirmation) is on-going. Assistant teams have arrived in Yerevan from other Marzes, having gas detecting devices, and carry out damage reconnaissance (safety confirmation), shearing the target areas with the teams of Yerevan.</p> <p>Although the damage reconnaissance (safety confirmation) is progressing well, gas supply cannot be restored within three days after the earthquake.</p> <p>The utility technical service and the CES of Yerevan instruct ArmRusgasprom to carry out damage reconnaissance (safety confirmation) of main supply pipes in high priority.</p>	<p>Safety confirmation has been completed for main pipes.</p> <p>Gas supply is gradually restored from the areas where safety confirmation of distribution pipes has been completed.</p>	<p>Together with restoration of gas supply in the areas where safety confirmation has been completed, rehabilitation works in damaged areas are on-going.</p> <p>Although stockpile of pipes is limited, new pipes for replacement of heavily damaged pipes imported from foreign suppliers, and thereby, the rehabilitation works are progressing well, and almost completed within one month after the earthquake.</p> <p>The rehabilitation works have been done, not only for restoration of gas supply, but for the improvement of the gas supply system in terms of seismic stability, based on a future vision and strategy on strengthening of system against earthquake.</p>
Measures	<p>The utility technical service, the CES of Yerevan, Ministry of Energy and Natural Resources, and ArmRusgasprom should proceed with <u>the reinforcement of power supply facilities against earthquakes.</u></p> <p><u>Rule and tasks for initial response in emergency,</u> such as autonomous gathering and safety confirmation of staffs, <u>should be stipulated or clarified in a disaster management plan or BCPs of the related organizations.</u></p>	<p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>prepare the procedure damage analysis and communication flow in severe earthquakes,</u> in addition to that for the ordinary time.</p> <p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>inform residents about necessity of closing gas valves at the time of evacuation and also the outline of gas release in case of severe earthquakes</u> for proper and calm behavior of the residents.</p>	<p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>prepare the task sharing and cooperation program with assistant teams of other Marzes</u> beforehand in a disaster management plan.</p>	<p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>prepare priority targets of damage reconnaissance (safety confirmation)</u> before hand in a disaster management plan.</p>	<p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>store pipes and other materials and secure supply chain of deficient materials</u> for huge scale rehabilitation.</p> <p>The utility technical service, the CES of Yerevan, and ArmRusgasprom should <u>carry out rehabilitation work, based on future vision and strategy to strengthening gas supply system against earthquake.</u></p>

Table ***.15 Consequence Scenario (15) Telecommunication

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Although main telecommunication lines are limited, lead-in lines to houses are damaged due to collapse of buildings.</p> <p>Since the antennas of cellular phones are installed onto seismic-resistant buildings, damage to the antennas is limited.</p> <p>Some telecommunication devices in relay stations are turn-down and telecommunication is not available in some areas.</p> <p>Although short-wave communication systems for related organizations (N1 to N9) are not damaged, power back-up systems do not function in some station. Therefore, communication for initial response among some related organizations is delayed.</p>	<p>Because many people try to confirm safety of their families, congestion occurs in cellular phone network, and communication with cellular phones is not available.</p> <p>Although the teams of telephone companies start damage reconnaissance, the reconnaissance works are not progressing well, since number of teams is not sufficient.</p>	<p>Although rehabilitation works to secure official communication is on-going, the works is not progressing well, because of the lack of spare parts.</p> <p>Although short-wave channels are allocated to Ministries for the management of rehabilitation works, several troubles occur, because the staffs are not familiar with the usage of the emergency communication devices.</p> <p>Since damage reconnaissance works for public lines are not progressing well, the rehabilitation works are not efficiently done.</p> <p>The lack of spare parts causes the delay of rehabilitation works.</p>	<p>Official communication with short-wave systems has been restored.</p> <p>Inability of public fixed and cellular phones continues.</p> <p>Mobile units of wireless telephones are being installed, but the number of the units is limited, and many evacuees rushing to the units cause confusion.</p>	<p>Using mobile units of wireless telephones installed tentative evacuation areas, telecommunication is secured in the evacuation areas.</p>
An improved case	<p>Since several measures to strengthen telecommunication system have been implemented, damage to telecommunication facilities and disconnected area are reduced. The implemented measures are the redundancy of telephone lines, the reinforcement of buildings of telephone companies, fixing of telecommunication devices, and the strengthening of telephone poles and antennas.</p> <p>Short-wave communication systems for related organizations (N1 to N9) are not damaged, and power back-up systems has been installed properly, and thereby, communication with short-wave devices is available among related organizations.</p>	<p>Although congestion occurs in cellular phone network, telecommunication with numbers registrated beforehand is available, using priority system introduced by telephone companies.</p> <p>The teams of telephone companies start damage reconnaissance with assistant teams from other areas, which assistant mechanism has been agreed before hand among branches in telephone companies.</p>	<p>Rehabilitation works to secure official communication is on-going. In case that necessary spare parts and materials are not sufficient, a department responsible for communication in each official organization submits a list of parts and materials for rehabilitation to the communication and warning service of CES and Ministry of Transport and Communication.</p> <p>Short-wave channels are allocated to Ministries for the management of rehabilitation works, according to a disaster management plan prepared beforehand.</p> <p>With the assistant teams of branch offices in other regions, telephone companies clarify the scale of damage, and according to the damage situation, rehabilitation works are progressing. Arrangement or procurement of necessary spare parts is also on-going, according to the procedure prescribed in a business continuity plan of telephone companies.</p>	<p>Official communication with short-wave systems has been restored.</p> <p>Telecommunication with cellular phones and fixed phones are almost resumed, except heavily damaged areas.</p> <p>Enough number of mobile units of wireless telephones is installed into tentative evacuation areas, and evacuees' communication means are secured.</p>	<p>A rehabilitation plan, including replacement of tentatively repaired facilities, renewal of heavily damaged system, is prepared, and priority work in the plan is commenced in order.</p>
Measures	<p><u>Telecommunication companies should implement measures to strengthen telecommunication facilities</u> with guidance by the communication and warning service of the Committee for Emergency Situations (CES) of Yerevan City. The measures include the redundancy of telephone lines, the reinforcement of buildings of telephone companies, fixing of telecommunication devices, and the strengthening of telephone poles and antennas.</p> <p><u>The responsible organizations should properly maintain short-wave communication systems</u> (N1 to N9), together with maintaining power back-up systems.</p>	<p>Telephone companies should <u>install a system which secures urgent communication by priority</u>, with guidance by communication and warning service of CES.</p> <p>Telephone companies should <u>prepare urgent damage reconnaissance plan for cooperation with other branches in a disaster management plan, together with training plan of the staffs</u>, with guidance by communication and warning service of CES.</p>	<p><u>Communication and warning service and Ministry of Transport and Communication should prepare the procedure and procurement route for securing necessary spare parts for urgent rehabilitation works</u> for official communication system in a disaster management plan.</p> <p><u>Telephone companies should prepare the procedure and procurement route for securing necessary spare parts for urgent rehabilitation works</u> of public telecommunication system.</p>	<p><u>Telephone companies should store temporary antennas and mobile units of wireless phones, which may installed to evacuation areas, etc.</u>, with guidance by communication and warning service of CES.</p>	<p>Communication and warning service and Ministry of Transport and Communication, together with telephone companies, should <u>prescribe in a disaster management plan about the procedure for smooth formulation of a reconstruction plan.</u></p>

Table ***.16 Consequence scenario (16) Mass-medias, false rumors (RS of MES of RA, “Public TV company of Armenia” CJSC, “Public radio of Armenia” CJSC”)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>The facilities of Mass-medias, equipment of TV-radio provision and printing are essentially damaged.</p> <p>Some printing devices are not damaged, a few printing procedures are remaining.</p>	<p>Since the disaster education to residents through mass-media was incomplete, the residents are in panic due to extraordinary situations beyond their images without sufficient information about the situations.</p> <p>Because of false rumor on aftershocks, many residents start escaping from evacuation zones, and the behavior causes confusion and injury.</p>	<p>Some mass-media stop their work and the some media focused on the transmission of information on the worst case without reliable sources. Pessimistic attitude is prevailing among residents, such as uneven distribution of supporting materials, because mass-media focuses on accumulation of supporting materials in storehouses without delivering. Due to spreading news on aftershocks and bad things without reliable sources, confusion and panic arose among residents.</p> <p>False rumors, such as robbers enter the empty houses, cause panic among evacuees. Some evacuees refuse to stay in evacuation areas.</p> <p>Another false rumor, that international assistance materials are sent to black markets, causes demonstration of residents in front of district offices.</p>		
An improved case	<p>The buildings of media companies have been reinforced and facilities of media have been fixed as measures against earthquakes, and thereby, there is little damage to the buildings and facilities. Initial response safety confirmation of staffs, has been immediately done in media companies, in accordance with BCP which has been prepared beforehand. It is thereby, the functions of media can be secured.</p>	<p>The residents have been informed about the general features of earthquakes such as the fact that bigger aftershocks happen very rarely, and they have knowledge how to behave in natural disasters. It is accordingly, there is no confusion in rescue operations and false rumors are not spread among the residents.</p> <p>Since mass-medias properly transfer the message of MES about situations and measures taken to residents as it has been determined in the plan beforehand, victims can stay evacuation places without concerns on their properties.</p>	<p>Mass-medias disseminate reliable information on the damage and assistance and turn to the public not to be in panic or confusion. Residents can receive necessary information, including on security via mass-medias.</p> <p>Information of distribution of assistance materials is also properly informed to residents, and thereby, there is no complain and distrust to government from residents.</p> <p>The information received from official messages is rapidly broadcasted to the population by mass-medias, in accordance with the agreement made with MES beforehand. In the evacuation areas, evacuees are informed through loudspeakers, managed by Evacuation Committee of Yerevan City.</p> <p>In cooperation with RS, groups of volunteers are formed among the residents for assisting dissemination of information necessary for evacuees, such as information on missing people, provision of foods/water/necessities, rescue operations together with the police bodies.</p> <p>Mass-medias transfer information on security, such as cases of robbery, to residents properly, together with measures taken by Police, and the information contributes to keep public order in cooperation with residents.</p>		
Measures	<p><u>Anti-seismic measures</u>, such as reinforcement of buildings and fixation of equipment, <u>should be planned and carried out beforehand</u> in the buildings/facilities of mass-medias.</p> <p><u>Population should be informed and highlighted on official messages and trained</u> so as to be calm in case of earthquakes.</p>	<p>In cooperation with MES of RA, <u>mass-medias should prepare an own plan and guideline for proper dissemination of information for promoting preparedness and raising awareness</u> of residents on disaster management.</p> <p><u>Mass-media should have system to monitor adequacy of their programs (such as ethics panel) on disaster management.</u></p> <p><u>The outline on collecting disaster information from official agencies (such as focal point, responsible personnel, etc.) should be determined in a disaster plan</u> beforehand in order to acquire adequate information on damages and measures, immediately and accurately.</p>	<p><u>Mass-medias should prepare a plan for immediate/ accurate dissemination of disaster information</u> to residents.</p> <p>RS should prepare a plan for assisting volunteers on their registration, creation of groups, sharing tasks, receiving information to be provided to evacuees, etc.</p> <p><u>RS and Yerevan City should prepare loudspeakers and other communication tools to the public</u> so that official announcement on damage and support can be transferred promptly to the areas, where no fixed information device is available.</p>		

Table ***.17 Consequence scenario (17) Aerial transportation (RS, General Department of civil aviation under the Government of RA, “Zvartnots International Airports” CJSC)

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>One of the terminals of the airport is damaged, the equipment of the navigation facilities are turned down and broken, and consequently the airport doesn't function.</p> <p>Because of the damage of the runway, the takeoffs and landings of planes are impossible.</p> <p>The storage for the fuel is damaged and there is a leakage.</p>	<p>Takeoff and landing is terminated, and the urgent check of the runway is done.</p> <p>Because there are many damaged portions, repairing teams and the storage of materials for repairing are not sufficient, it is unable to restore the navigation process.</p> <p>Airplanes cannot be operated, due to the damage of tanker for the storage of fuel.</p>	<p>The reconstruction of the navigation equipment and runway is delayed due to the lack of trained staffs and insufficiency of stored materials and equipment.</p> <p>That is why the assistance from international organizations and other countries by aerial ways becomes impossible.</p>	<p>Though the runway is repaired, the navigation equipment is not repaired due to the absence of spare parts, and thereby, the activities of the airport are limited.</p> <p>The international assistance is received from the Shirak airport but the transportation requires much more energy and time.</p>	<p>The majority of procedures of the airport is restored and the works restarted.</p> <p>Because the unloading area is limited and the unloading is not controlled well, the area is occupied with randomly unloaded assistant materials from foreign countries, and thereby, supply of the materials is hampered.</p>
An improved case	<p>Since anti-seismic measures, such as fixation of navigation facilities, were carried out beforehand, there are no serious damages.</p> <p>Takeoffs and landings are delayed due to the damage of the runway.</p> <p>Since anti-seismic measures were strengthened beforehand there are very slight damages in the fuel storage.</p>	<p>Takeoff and landing is terminated, urgent check of the runway is done. Based on the result of checking, trained employees of the airport start repairing the runway using the materials and equipment stored beforehand.</p> <p>Detailed checking of navigation facilities is carried out so that navigation function will be secured. Spaces for takeoff and landing of helicopters for reconnaissance of damages are arranged at un-damaged spaces in the airport and other areas in Yerevan city.</p>	<p>The operative repairing of the runway and replacement of the navigation equipment from the warehouse are completed, and the majority of procedures of the airport is restarted for receiving assistance from other countries.</p> <p>By helicopters, air reconnaissance as well as sending seriously injured persons to hospitals outside of Yerevan are carried out.</p>	<p>Replacement of temporarily repaired equipment and devices with new ones without hampering the functions of the airport.</p> <p>Because the extra-unloading areas for assistant materials in emergency situations were determined beforehand, there is no confusion on unloading as well as supplying the materials to the victims.</p>	
Measures	<p>Car-transport economy of the airport and General Department of civil aviation under the Government of RA must <u>carry out anti-seismic measures, such as fixation of navigation equipment and strengthening of seismic stability of storage for fuel.</u></p>	<p>Car-transport economy of the airport and General Department of civil aviation under the Government of RA must <u>include operative procedures for urgent check, maintenance and materials for repairing works in the plan</u> of actions in emergency situations.</p>	<p>Car-transport economy of the airport and General Department of civil aviation under the Government of RA must <u>introduce material provision and repair procedures to secure the adequate operability of the airport</u> in case of a severe earthquake which causes serious damages in many places on aviation.</p>		

Table ***.18 Consequence scenario (18) Roads and Bridges

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>In Yerevan City, four bridges (ARB-3, ARB-5, MLS-3, and SHN-5) are collapsed and some sections of roads are blocked with debris of collapsed buildings.</p> <p>Although main roads are passable, several streets are blocked and impassable.</p> <p>The work of railway connecting the northern part of the republic with the central part due to the collapse of the bridge of the damaged railway.</p> <p>On the south-east part of Yerevan City, roads are blocked as a result of landslide.</p>	<p>Based on the report of the Minister of Emergency Situations, the Prime-Minister declares a state of emergency and the MES CMC started acting on national level. The head of Republican committe of ES of RA (RA Prime-Minister) assigned the engineering subdivisions, together with engineering service of CES of Yerevan, to assess the situation, calculate the technique necessary for the recovery of damaged bridges/roads and start recovery activities not late than after 4 hours. The assessment takes time, because collecting system of damage information has not been established beforehand.</p> <p>The RA Police is assigned for traffic control, but, the control is in difficulty, since the priority roads on traffic control for disaster management has not been designated.</p> <p>Passable roads are occupied with cars for evacuation and rescue, and heavy traffic jam occurs. In addition, many abandoned cars block traffic. Most of all roads consequently are getting impassable.</p>	<p>Engineering subdivisions and the engineering service of CES of Yerevan start rehabilitation works of damaged bridges, but the works are not progressing well, since equipment and materials are not sufficient.</p> <p>Since the clearance procedure for priority roads for rescue and urgent accident-recovery operations have not been defined, the works are delayed.</p> <p>Pontoon bridges are installed by the RA Ministry of Defence.</p> <p>The engineering subdivisions carry out the opening of the roads closed with landslides.</p>	<p>Rehabilitation works of damaged bridges continues, and heavy traffic jam continues at the bridges under rehabilitation.</p> <p>Although traffic on one lane of main roads is secured, many roads are still impassable.</p> <p>Engineering subdivisions recovered the damaged bridges and apt for traffic. The road obstacles for the subdivisions carrying out rescue and urgent accident-recovery operations are mainly eliminated.</p>	<p>Although urgent repairing work is completed, reconstruction of collapsed bridges has not started, and traffic control continues.</p> <p>Due to lack of equipment and tiredness of workers, clearance work is progressing slowly and impassable roads still remain.</p> <p>Since the related organization should concentrate the habilitation works, long-term reconstruction plan has not been prepared yet.</p>
An improved case	<p>Due to implementation of preventive measure against collapse of bridges, the collapse of bridges is avoided.</p> <p>Some of minor roads are blocked with debris due to collapse of buildings.</p> <p>The work of railway is not hampered.</p> <p>The landslides didn’t get activated as a result of the preventive measures, such as lowering of groundwater, having been done beforehand.</p>	<p>Based on the report of the Minister of Emergency Situations the Prime-Minister declares a state of emergency and the MES CMC started acting on national level. The head of Republican Committe of ES of the RA (RA Prime-Minister) assigned the engineering subdivisions having technique, together with engineering service of CES of Yerevan, to assess the situation, calculate the technique necessary for the recovery of damaged buildings and start recovery activities not late than after 4 hours. The assessment has been completed on time, since the damage information and assessment can be done, according to the stipulated manner in a disaster management plan.</p> <p>The RA Police is assigned for traffic control, and the control has been dome smoothly, since priority roads on traffic control has been designated in a disaster management plan.</p> <p>Since citizens are well informed of prohibition on use of cars for evacuation, traffic jam on main roads are alleviated. Traffic control by police on designated strategic roads contributes to smooth transportation of emergency vehicles. Cars left behind are unlocked and easily removed.</p>	<p>The rehabilitation works of damaged bridges are progressing well, since the engineering service of CES has made agreement with related companies for the deployment of rehabilitation teams with equipment and materials.</p> <p>Since the priority roads and the clearance procedure have been defined beforehand, the works are progressing well.</p> <p>Pontoon bridges are installed by the RA Ministry of Defence.</p> <p>The engineering subdivisions carry out the opening of the roads closed with landslides.</p>	<p>Most of rehabilitation works of damaged bridges are completed. In the parts where recovery was impossible pontoon bridges are installed by the RA Ministry of Defence.</p> <p>Clearance of main roads are almost completed, and the clearance works on minor roads are on-going, according to priority in road clearance, defined beforehand in a disaster management plan.</p>	<p>The recovery works of the roads taking to the disaster zone are mainly accomplished.</p> <p>Some auxiliary works such as repairing sidewalks, roadside facilities, and traffic lights are commenced.</p> <p>A full-scale reconstruction plan for bridges and roads has been formulated for creating much strong conditions.</p>
Measures	<p>Engineering service of Committee of Emergency Situations and Ministry of Territorial Administration should <u>carry out diagnosis on seismic resistance of bridges and necessary reinforcement</u>, including installation of preventive measures against bridge beam displacement.</p> <p>Engineering service of Committee of Emergency Situations and Ministry of Territorial Administration should <u>implement stability measures for the landslides</u> distributed on the south-east of Yerevan City.</p>	<p>engineering subdivisions and the engineering service of CES of Yerevan should <u>prepared the procedure and method of collecting damage information and damage assessment</u> beforehand in a disaster management plan.</p> <p>engineering subdivisions and the engineering service of CES of Yerevan should <u>designate priority roads for disaster management</u>, and <u>prepare a plan for the road clearance and traffic control</u> beforehand in a disaster management plan.</p> <p>engineering subdivisions and the engineering service of CES of Yerevan should <u>well inform to citizens of prohibition of evacuation by cars, and conduct evacuation drill without using cars</u>.</p>	<p>The engineering service of CES Yerevan should <u>prepare a road clearance plan for emergency in a disaster management plan, including agreement with private contractors on procurement of equipment, and storage of materials and equipment</u>.</p>	<p>The engineering service of CES should <u>prescribe the procedure of formulation of full-scale reconstruction plan in a disaster management plan about</u>, in order to create more reliable traffic system against severe earthquake.</p>	

Table ***.19 Consequence scenario (19) Debris cleaning

	0 to 1 hour later	1 to 24 hours later	1 to 3 days later	3 to 7 days later	7 days later or more
The worst case	<p>Debris of 5 million ton (7 million cubic meters) piles up in a moment, mainly due to collapse of buildings.</p> <p>Out of the debris, 150 thousand ton is required to remove for clearance of main roads.</p>	<p>The engineering subdivisions and the engineering service of CES of Yerevan commence the debris clearance works, mainly for search and rescue of missing people. But, the equipment and manpower are not sufficient, since the debris is so much.</p> <p>In order to rescue victims from debris, citizens start removal of the debris. But the removal is not progressing, since no equipment has been available in communities, and there is no trained person for debris removal.</p>	<p>Debris removal is on-going on main roads, and the removed debris is dumped on several places without control, since the stockpile areas of the debris have not been determined.</p> <p>Residents remove debris and dump the debris on roads in residential areas. Due to the dumped without control, impassable sections of roads are increase and rescue and other operation are hampered.</p>	<p>Private companies, that are directed to join the debris clearance works, do not carry out full-operation, since budget for operation such as for fuel, consumption, wedge, etc. has not been allocated.</p> <p>Since a plan for debris removal has not been well formulated, the removed debris is dumped into mountains without sorting and without control.</p>	<p>There is no plan for removal of debris dumped in residential areas, and the debris in residential areas remains untreated.</p> <p>Delay of removal of debris affected several activities for rehabilitation and reconstruction. The construction of temporary dwelling is delayed, since the areas are occupied with debris.</p>
An improved case	<p>Due to reinforcement of buildings, building collapse which is source of debris is reduced, and, the amount of debris is reduced accordingly.</p>	<p>The engineering subdivisions start the clearance of debris on priority roads, according to a disaster management plan.</p> <p>Construction companies, that have heavy equipment and manpower, join the debris clearance works, under the management of the engineering service of CES of Yerevan.</p> <p>In residential areas, debris is removed without equipment and piles up tentatively on roads.</p>	<p>Debris removal is on-going on main roads. The engineering subdivisions and the engineering service of CES of Yerevan determine primary stockpile areas, according to existing list of possible stockpile areas, so that dumping of debris should not hamper other activities.</p>	<p>Debris in the primary stockpiled areas is transferred to the secondary stockpile areas for segregation.</p> <p>The debris is divided into several kinds, such as for burning, landfill, recycling, etc.</p> <p>The procedure for recycling is determined in order to reduce the amount of debris as well as for environmental consideration.</p>	<p>Debris dumped in residential areas is transferred to the secondary stockpile areas, upon the request of the residents.</p> <p>The National Committee for Emergency Situations has decided that the cost of the transfer is covered with governmental budget.</p> <p>The segregated debris is treated properly, sending burning areas, filling areas, etc. re-use of steel and stones for reconstruction is promoted.</p>
Measures	<p><u>Reinforcement of buildings</u> should be carried out.</p>	<p>The engineering service of CES of Yerevan should prescribe <u>the procedure of debris removal, including agreement of private contractors which possess heavy equipment for requisition in an emergency and storage of own equipment</u> in a disaster management plan.</p>	<p>The engineering service of CES of Yerevan should <u>make a list of possible primary stockpile areas of debris beforehand in a disaster management plan</u>, so that the designation of the primary stockpile areas can be done smoothly.</p>	<p>The engineering service of CES of Yerevan should <u>make a list of possible secondary stockpile areas of debris and the outline of the segregation (including responsible organization), especially for recycling</u>, beforehand in a disaster management plan.</p>	

Attachment 2 Mitigation

- the present situation and focusing points in planning -

Mitigation – the present situation and focusing points in planning

	Item	Present situation	Progress	Importance	Priority	Focusing point
1	Raising awareness/ Dissemination of information on disaster management	<p>RS receives implementation plans and reports of trainings stipulated in the plans on civil defense of municipalities, districts, companies, etc. and</p> <p>Activities are been doing as followings.</p> <ul style="list-style-type: none"> - Providing information and knowledge by Emergency Channel through TV programs twice to three times a week, etc. - Providing information and knowledge through RS Website. - Tabletop and field exercises by related personnel, organized by RS and others. - Evacuation training in municipalities and districts, both for natural and technological accidents. - Education in the State Crisis Management Academy to the staffs of related organizations such as ministries, municipalities, districts, companies. - Education in regular curriculums on Emergency situations in higher education institutions (universities, collages, etc.) - Education in kindergartens and schools, organized by RS, SSP, UNDP, etc. 	B	2	I	<ul style="list-style-type: none"> - Enhancing the promotion function of RS (such as setting basic concept and target, planning for implementation, monitoring activities, and feedback of the results to the next step) for increasing effectiveness. - Particularly, enhancing function to assist voluntarily activities of people's groups (at a unit of a collective housing, a block, etc.) for raising awareness and dissemination of information, following the clarification of characteristics of their areas. - Clarifying items to be included in documents and materials for education and confirming/ providing concrete measures for the dissemination of the documents and materials, together with solution of relating issues on the dissemination.
2	Reinforcing organizational system and enhancing the voluntary activities of people's groups on disaster management	<ul style="list-style-type: none"> - Population protection in emergency situations and civil defense plans are prepared in municipalities, etc. and RS territorial subdivisions support the activities stipulated in the plans such as training on fire fighting. - RS territorial subdivisions together with SDC, provide assistance to mainly local self-government bodies in enhancing rescue capability, establishing medical units, fostering fire fighting personnel. - Assistance people's groups for voluntary activities in disaster management, such as creating the groups, planning for activities, enhancing organization system, promoting activities, etc. has not been done much. - In each company, responsible personnel of ES have been assigned and several activities are carried out. 	D	2	III	<ul style="list-style-type: none"> - Clarifying promotion function of RS on the enhancement of people's groups and their activities. In parallel, providing the contents of assistance by RS and other organizations. - Providing promotion plans for the creation of people's groups on disaster management, considering the actual situation of people's groups for civil defense, in order to enhance information dissemination to all residences and promotion of voluntary activities as well as system to collect demands and needs of the residents.
3	Collaboration and co-working with volunteers	<ul style="list-style-type: none"> - NGOs active in disaster management field exist, but the number is limited. RS has the contact list of the NGOs. - RS and State Crisis Management Academy cooperate with NGOs in education, training, etc. 	C	3	II	<ul style="list-style-type: none"> - Clarifying responsible, implementing, and related organizations, and then, providing basic concept and overall view for the collaboration and co-working with volunteers. - Providing promotion plans for the

		<ul style="list-style-type: none"> - Fostering volunteers, collaboration/ co-working with volunteers remain to be solved. 				<ul style="list-style-type: none"> - registration of NGOs/ volunteers, collaboration through co-working in activities such as education and training - Clarifying issues for the above-mentioned promotion plans
4	Prevention of fire outbreak and increasing safety of dangerous materials	<ul style="list-style-type: none"> - Activities on prevention of fire outbreak is carried out, being led by firefighting inspection of RS across the country. - Government decided to installation of gas sensors to each house, and the installation is on going. - Companies which deal with dangerous materials take safety measures, and RS and other subdivisions of MES of RA monitors the activities. 	B	3	II	<ul style="list-style-type: none"> - Enhancing promotion function of RS for the promotion of measures together with companies of gas, electricity, etc. - Providing effective measures for prevention of fire outbreak such as conducting inspection, installing safer facilities, installing gas alarm, etc., and then, clarifying issues for the implementation of the measures. - Providing feasible and concrete plans such as the installation of automatic circuit-breakers, and then, clarifying issues for the implementation of the measures.
5	Measures for assisting vulnerable people to disasters	<ul style="list-style-type: none"> - Evacuation drills are conducted in schools and kindergartens, according to the municipality plan, and RS monitors the activities. - Issues on evacuation of aged and disability persons remain to be solved, and the measures on the issues will be studied in this project. 	D	3	III	<ul style="list-style-type: none"> - Clarifying responsible, implementing, and related organizations, setting basic concept and targets on the assistance to vulnerable people, and then, developing organizational framework for the implementation of concrete measures. - Providing concrete measures such as assistance to vulnerable people in multi-story apartment buildings.
6	Preparation for economic and industrial reconstruction	<ul style="list-style-type: none"> - The existing response plan does not contain much about the preparation of economic and industrial reconstruction; this issue would be discussed in this project. 	E	3	IV	<ul style="list-style-type: none"> - Confirming the necessity of the preparation of reconstruction plan beforehand. - Preparation of basic plan, defining responsible organization and framework of reconstruction beforehand, and providing the organizational framework for the preparation with collaboration of related organizations.
7	Promotion of redevelopment and securing open space in urban areas	<ul style="list-style-type: none"> - Securing or designating evacuation areas in the vicinity of residential areas remain to be solved, and the issue would be discussed at the time of preparation of evacuation plan in this project. - There seem to be little consideration on disaster management in urban planning and securing open space, although it should be confirmed with Ministry of Urban Development and Yerevan municipality. - Consideration from viewpoint of disaster management in securing open space and roads as well as urban function seems to be not enough. 	C	2	I	<ul style="list-style-type: none"> - Establishing organizational framework, having promotion function through consultation among RS, Ministry of Urban Development, and Yerevan municipality in order to promote redevelopment and securing open space in consideration for disaster management. - Providing viewpoint of disaster management to be considered in redevelopment. - Clearly describing in disaster management plan about promotion of securing open space and roads as well as development of urban function from a viewpoint of disaster management in order to reflect the points onto the master plan of urban development.
8	Road improvement	<ul style="list-style-type: none"> - In road improvement, consideration of usage for emergency transportation during earthquake disaster seems to be not enough, although the point should be confirmed with Ministry of Transportation and Communication. 	C	2	I	<ul style="list-style-type: none"> - Establishing an organizational framework which Ministry of transport and Communication, Yerevan municipality, and RS discuss about road improvement in consideration of earthquake disaster management.

		<ul style="list-style-type: none"> - There is concern that roads will be closed due to the collapse of buildings and bridges in an earthquake, resulting in the inability of road transport. 				<ul style="list-style-type: none"> - Clearly describing about the necessity of road improvement in consideration of disaster management. - Providing the plan of designation and improvement of strategic roads for disaster management in a disaster management plan.
9	Land use in a time of disaster	<ul style="list-style-type: none"> - It seems that there is neither regulation nor plan on land use in a time of disaster, although it should be confirmed with Ministry of Urban Development. 	E	2	IV	<ul style="list-style-type: none"> - Formulating a plan for land use in a time of disaster, including a plan for securing areas for evacuation (secondary or regional), logistics, spoil bank of debris, grave site. - Proposing framework for the promotion of securing land, which RS can implement in collaboration with related organizations.
10	Seismic strengthening of buildings	<ul style="list-style-type: none"> - Ministry of Urban Development is in charge of this matter, including budget arrangement. - Ministry of Urban Development submitted to the government a list of important buildings to be strengthened, based on list from Ministry of Healthcare, etc. - Although there is financial assistance in Armenia, seismic isolation devices are installed to 36 buildings, and official financial assistance is urged for the promotion of the installation. - Construction standard was enacted in 1973, and improved through revision in 1994 and 2007. 	C	1	I	<ul style="list-style-type: none"> - Confirming framework for reflecting on-going measure on strengthening buildings into earthquake disaster management plan to be prepared in this project. - Promoting discussion among related official organizations, association of construction companies, etc. for disseminating applicable seismic strengthening method, considering cost and technology. - Promoting strengthening important buildings with lending. - Discussing about adoption of lending and subsidy for strengthening of collective and individual houses. - Confirming system of construction permit, quality control during construction, and license for design and construction and enhancing their operation.
11	Prevention of falling of objects and turn-down of furniture	<ul style="list-style-type: none"> - It seems that no measure has been taken, and this issue should be considered in this project. 	D	3	III	<ul style="list-style-type: none"> - Confirming responsible, implementing, and related organizations, and task sharing and collaboration among them for the promotion of measures. - Enhancing activities of the above-mentioned organizations such as dissemination of information on dangerousness and simple prevention measures through education materials as well as monitoring function, in order to promote prevention measures in people's groups and families.
12	Measures on elevators	<ul style="list-style-type: none"> - Yerevan municipality and "National Technical Security Center" SNCO (instead of mechanical service section) of Ministry of Emergency Situations are responsible organizations. - Although companies which provide elevators respond to mechanical troubles etc., particular measures against earthquake seem to be not taken. 	D	4	V	<ul style="list-style-type: none"> - Providing the following measures to be promoted by responsible organizations. - Installing earthquake-safe type of elevators when elevators are newly installed. - Assisting people's group activities such as confirmation of evacuation/ rescue procedures in emergency, for the existing elevators.
13	Seismic strengthening of lifeline	<ul style="list-style-type: none"> - Construction standard, including seismic resistance, has been established. - Yerevan municipality, Ministry of Urban 	D	2	III	<ul style="list-style-type: none"> - Confirming a unit or section in responsible organizations, being in charge of strengthening (renewal of decrepit ones) of

	facilities	<p>Development, and Ministry of Energy (I am not sure about the Ministry of Energy) are responsible organizations.</p> <p>Existing facilities, constructed before the establishing standard, are getting old, and thereby, they seem to be low seismic resistant. I recommend to formulate this point in the following way “Existing facilities built before 1988 were constructed by old standards which do not correspond to the current seismic situation. The seismic resistance of these facilities is low.</p> <p>The exploitation period of most of high-rise buildings has expired.”</p> <p>Water supply pipes are highly decrepit and the stock of spare pipes is limited, and thereby, it is foreseen that water supply through pipes is suspended for long time due to damage by an earthquake.</p>				<p>lifeline facilities</p> <ul style="list-style-type: none"> - Formulating a plan for accelerating renewal of facilities, based on damage estimation of lifeline network such as water supply pipes, and clarifying issues for the acceleration of the renewal. - Promoting planning and implementation of seismic diagnosis and strengthening according to the result for the core facilities of lifeline.
14	Seismic strengthening of transport and river facilities	<p>It seems to be not sufficiently estimated about road blockage due to the damage of bridges and collapse of buildings by an earthquake.</p> <p>It is possible that existing bridges constructed before 1994, when construction standard was established, are not seismic resistant.</p>	C	3	II	<ul style="list-style-type: none"> - Confirming organizational framework so that responsible organization (Ministry of Urban Development) can proceed with planning and implementation of measures in collaboration with RS, Ministry of Transport and Communication, and Yerevan municipality, for increasing seismic resistance of facilities, in consideration of the result of damage estimation and emergency transportation plan. - Designating strategic roads for disaster management, considering emergency transport during an earthquake, and then, formulating a plan for prevent road blockage such as regulating seismic diagnosis and strengthening of bridges on the strategic roads. - Clarifying issues on the implementation of the measures on the above-mentioned plan. - Formulating a plan for regulating seismic diagnosis of river structures which may cause serious damage due to an earthquake and seismic strengthening of the structures, and then, clarifying issues on the implementation of the measures.
15	Prevention of collapse of retaining walls and block walls	<p>The walls are stipulated with construction standard, and Yerevan municipality and Ministry of Urban Development are responsible organizations, and Ministry of Transport and Communication has responsibility of walls along roads.</p> <p>It seems that the identification and measures of the walls, which are not compliant to standard or aged, are not carried out.</p>	D	4	V	<ul style="list-style-type: none"> - Identifying dangerous walls which may cause damages, and then, confirming the monitoring system of them. - Providing possible measures for the dangerous walls.
16	Seismic strengthening	Ministry of Culture is the responsible organization, and it seems that measures	C	4	V	Clarifying basic concept and plans on the facilities under control of Ministry of

	of cultural properties	against earthquakes are taken by the ministry.				Culture, and then, providing plan for the promotion of measures as a part of an earthquake disaster management plan.
17	Prevention of landslides and debris flows	<ul style="list-style-type: none"> - Ministry of Urban Development and Ministry of Emergency Situations are responsible organizations, while Ministry of Transport and Communication has responsibility of landslides etc. which may affect to transport facilities. - Landslide areas have been identified, but it seems that measures have not been properly done in consideration of earthquakes. 	D	3	III	<ul style="list-style-type: none"> - Clarifying a responsible organization of each dangerous area due to landslide or debris flow. - Confirming basic concept to deal with the dangerous areas through discussion among responsible organizations, which are Ministry of Urban Development, Ministry of Emergency Situations, and Ministry of Transport and Communication. - Providing typical measures so that a suitable measure can be taken in accordance with particular condition.
18	Research and study on scenario earthquakes	<ul style="list-style-type: none"> - SSP is the responsible organization for the prevision of earthquakes and RS - for the assessment of the situation. - An earthquake disaster management plan has been prepared for each province. - Garni epicenter earthquake is considered to cause the most serious damage to Yerevan City. 	B	3	II	<ul style="list-style-type: none"> - Confirming scenario earthquakes to be used for damage estimation, based on the results of review of existing data and trench survey of active faults. - Clarifying investigation plans and issues for extending research and study in the future.
19	Research and study for damage estimation	<ul style="list-style-type: none"> - RS and SSP are the responsible organizations. - Estimation of damages to buildings and human has been done, and evacuation plans etc. have been prepared, based on the estimation. 	B	2	I	<ul style="list-style-type: none"> - Conducting detailed damage estimation on a grid cell of 250 m square, based on the results of building survey and population data, following to the calculation of seismic vibration on ground. - Clarifying plans and issues for updating in the future, and providing the solution.

Progress	Importance	Priority and Basic Concept
A: Sufficiently done	1: Very high	I: Providing comprehensive and concrete measures, including enhancement measures of promotion function of responsible organizations for the promotion of existing measures and more efficient measures, and then, providing possible solution for the issues on implementation of the measures for prompt implementation.
B: Well done	2: High	II: Providing task and basic concept/overall feature of responsible organization as well as efficient measures for promoting efficient measures, and then, clarifying issues for the prompt implementation of the measures.
C: Done	3: Moderate	III: Clarifying responsible, implementing, and related organizations and providing basic concept of measures and essential measures for promotion of the measures.
D: Little done	4: Low	IV: Obtaining consent on importance and necessity on the matter, and then, clarifying responsible, implementing, and related organizations and their tasks and providing framework of essential measures.
E: Not done	5: Very low	V: Clarifying responsible, implementing, and related organizations, confirming organizational system which responsible organization monitors the measures done by implementing organizations, and then, expanding awareness of the necessity.

Progress	Importance
A: Sufficiently done	1: Very high
B: Well done	2: High
C: Done	3: Moderate
D: Little done	4: Low
E: Not done	5: Very low

		Importance				
		1	2	3	4	5
Progress	A					
	B		1, 19	4, 18		
	C	10	7, 8	3, 14	16	
	D		2, 13	5, 11, 17	12, 15	
	E		9	6		

Attachment 3 Evacuation Plan of Yerevan City
(Mayor's decision N 6059-A, dated on August 29, 2012)



YEREVAN RESCUE DEPARTMENT OF THE ARMENIAN RESCUE
SERVICE OF THE MINISTRY OF EMERGENCY SITUATIONS OF THE
REPUBLIC OF ARMENIA

_____ 2012

Glinka 13, Yerevan 0010, RA
tel. (374-10) 553746, fax (374-10) 552892

To: Mayor of Yerevan city
Mr. T. Margaryan

Dear Mr. Margaryan

Please find attached the draft of the decision of the Mayor of Yerevan city about approving “the plan of population evacuation in case of a severe earthquake in Yerevan city” worked out with the Japanese side within the “Project of Seismic Risk Assessment and Risk Management Planning in the Republic of Armenia”.

I am asking for your direction for putting the mentioned draft into circulation in corresponding ministries, departments, departments of the Staff of Yerevan municipality and interested bodies in the possible shortest period and receiving recommendations and comments from them.

For organization the discussions in a more effective way and involving as many participants as possible I suggest that the electronic version of the draft is placed in the official web-site of the municipality.

Please find attached 108 sheets.

With respect

Head

Colonel

M.GHAZARYAN

Drafted by G. Harutyunyan, tel. 55-37-46

DRAFT OF YEREVAN MAYOR'S DECISION No--A

ABOUT APPROVING THE PLAN OF EVACUATION OF POPULATION OF
YEREVAN CITY IN CASE OF A SEVERE EARTHQUAKE

For the purposes of enforcing the laws of the Republic of Armenia about “Population Protection in emergency situations”, “Seismic protection” and implementing the decision No 919-N of the Government of the Republic of Armenia about “Approving the plan of organization of population protection of the Republic of Armenia in case of a severe earthquake”, dated on June 10, 2011, I decide to:

1. Approve

- 1) the plan of organization of evacuation of the population of Yerevan city in case of a severe earthquake according to appendix N 1 with its annexes;
- 2) functional responsibilities of the staff of temporary shelters according to appendix N 2,
- 3) plan of provision of evacuation measures according to appendix N 3,
- 4) form of the information leaflet about evacuation places and routes for the population according to appendix N 4,
- 5) guideline of involvement of volunteers according to appendix N 5,
- 6) methodology of conduct of evacuation exercises according to appendix N 6,
- 7) the list of main evacuation routes according to appendix N 7,
- 8) the list of territories envisaged for the deployment of temporary shelters according to appendix N 8,
- 9) form of the application for the provision of outfit, food, technique, lubricants and other material means according to appendix N 9.

2. To the heads of all institutions, organization and companies (irrespective of the type of ownership):

- 1) Work out documents necessary for the organization of evacuation within 12 months and agree them with Yerevan Rescue Department,

- 2) Conduct evacuation exercises at least once a year,
- 3) Carry out the provision of evacuation in permanent cooperation with the heads of administrative districts,
- 4) Make applications on necessary means for complete implementation of measures and submit them to the heads of administrative districts.

3. To the directors of hazardous facilities:

- 1) Recover and keep the population warning means in readiness.

4. To the heads of administrative districts:

- 1) Make a brief application on obtainment, accumulation and maintenance of necessary means based on the applications submitted by organizations,
- 2) Create additional places for distribution of homeless population by their own decision according to appendix N 10 and submit the documents to the approval by the head of evacuation committee within one month,
- 3) Provide information about evacuation places by means of population information leaflets,
- 4) Define the list of secondary evacuation routes by their own decision by the principle of 8 and more meters width of roads and permanently carry out improvement of evacuation routes,
- 5) Carry out, in case of necessity, reinforcement of buildings along evacuation routes encouraging the owners of buildings to do so,
- 6) Prepare open spaces for evacuation places,
- 7) Carry out improvement of facilities in evacuation places.

5. To the head of evacuation committee:

- 1) Organize the involvement of volunteers and establish a responsible body for the coordination of volunteers.

6. To the heads of Yerevan city Department of the Police of the Republic of Armenia and Department of Health of the Staff of Yerevan municipality:

- 1) Provide additional evacuation places with corresponding staff,
- 2) Organize training of the staff.

7. To the head of Communal Service Department of the Staff of Yerevan municipality, director of “Yerevan city lights” CJSC and the head of Construction and Improvement Department of the Staff of Yerevan municipality:

- 1) Provide temporary shelter places with necessary things of life provision,
 - 2) Provide lighting and passability of evacuation routes 24 hours a day.
8. To the head of Transport Department of the Staff of Yerevan municipality:
- 1) Conclude contracts with transport companies on provision of transport means,
 - 2) Define permanent control over the exploitation of evacuation routes.
9. To the head of Trade and Service Department of the Staff of Yerevan municipality:
- 1) Conclude contracts with trade and production companies on provision,
 - 2) Secure the policy of “Paying only in case of using”,
 - 3) Provide stock flow – organization of circulation and replenishment based on the term of smooth supply and maintenance of food, logistics, water and other stock envisaged for the provision of comprehensive evacuation measures,
 - 4) Use distribution places of evacuees as storing places having the head of the given place responsible for it,
 - 5) Work out the list and quantity of necessary food in storing places.
10. To the head of Nature Protection Department of the Staff of Yerevan municipality:
- 1) Prepare temporary shelter places.
11. To the head of Center of Management Technologies of Yerevan SCJSC:
- 1) Create digital evacuation map and update periodically.
12. Propose to the:
- 1) Ministry of Emergency Situations of the Republic of Armenia:
 - a) conduct permanent training of heads of evacuation bodies,
 - b) prepare a group of officials and appoint responsible people for assessing the security of damaged buildings and constructions in emergency situations by means of “Survey of Seismic Protection of MES of RA” based on territorial peculiarities.
 - 2) Director of “Armentel” CJSC:
 - a) provide communication between evacuation bodies,

- b) include the leading staff in the lists of persons to be warned.
 - 3) Ministry of Education and Science of the Republic of Armenia:
 - a) Plan lessons for the study of evacuation activities and practical implementation in the Section of “Emergency Situations” of the discipline of “Basic Military Training”.
13. Head of Yerevan Rescue Department of the Ministry of Emergency Situations of the Republic of Armenia:
- 1) Make emendations in the corresponding appendixes of the present decision once a year and, in case of necessity, work out a draft of decision about making amendments and additions,
 - 2) Encourage storing by population,
 - 3) Organize population training.
14. Put the organization of the execution of the present decision on Colonel M. Ghazaryan, the head of Yerevan Rescue Department.
15. Put the responsibility of execution of the present decision on the head of evacuation committee of Yerevan.
16. The supervision over the execution of the decision is carried out by the Mayor of Yerevan city.

K. Areyan

S. Makaryan

Z. Arakelyan

M. Ghazaryan

The draft is made by the Yerevan Rescue Department of ARS of MES of RA

of Decision N _____ of the mayor of Yerevan city, dated on «__»____ 2012

Plan

of population evacuation in case of a severe earthquake in Yerevan city

Yerevan-2012

Section 1 Definition and objective of the plan

1. The plan of population evacuation in a severe earthquake in Yerevan City (hereinafter referred as “the Plan”) defines the main tasks, organization and order of implementation of measures of population evacuation in Yerevan city in case of earthquake.
2. The objective of the Plan is to define the volumes, forces and means of measures, organization and management of population evacuation, activity of involved officials and evacuation bodies, as well as to carry out the proper actions of evacuees at emergency situations through notification of population, based on the regulated documents and mechanism.

Section 2 Main concepts used in the Plan

3. The main concepts used in the Plan are as follows:
 - 1) Dangerous area – location or separate settlement, facility where factors having negative effect on the life, health and natural vital activity of people have been or can be brought about as a result of emergency situations,
 - 2) Safe area – an area out of the dangerous territory prepared for the life provision of the local people and evacuees as well as dislocation of animals and material values,
 - 3) Evacuation – temporary transfer and distribution of people, animals and material values from dangerous area to a safe one,
 - 4) Evacuation committee (hereinafter referred to as ES) – a working group established by the decision of the relevant leader that organizes and manages the evacuation measures of population and organizations of the given area,
 - 5) Evacuation Point (hereinafter referred to as EP) – a gathering place for reception and registration of the evacuated population,
 - 6) Reception Point (hereinafter referred to as RP) – a gathering place where reception, registration and distribution of the evacuated population is carried out,

- 7) Temporary Distribution Point (hereinafter referred to as TDP) – a facility or an area, envisaged for short-term distribution of evacuated population,
- 8) Temporary shelter (hereinafter referred to as TS) – territories in the form of tent or container house areas, created in free, green areas or in similar places for distribution of evacuated and homeless people,
- 9) Long-term Settlement Point (hereinafter referred to as LTSP) – a facility envisaged for life provision and long-term settlement of the evacuated population,
- 10) Logistical Supply Base – an area established near to distribution places of the evacuated population, envisaged for comprehensive provision of population and measures which has necessary forces and means,
- 11) Evacuees assisting bodies – bodies having tasks on reception, distribution and comprehensive provision of evacuees, such as EP, TDP, LTSP and TS,
- 12) Unit of Evacuation Area (hereinafter referred to as UEA) – an area within 500 m from EP, where affected population is being evacuated for receiving official assistance.
- 13) Evacuation route – a road (part of road) connecting the settlement of evacuated population with distribution settlement,
- 14) Reserve flow – organization of uninterruptable provision of food, logistic, water and other reserves, envisaged for comprehensive provision of evacuation measures, organization of circulation based on expiration date and organization of replenishment in case of necessity.

Section 3 Legal base of the Plan

4. The Plan is developed by being guided by the Constitution of the Republic of Armenia, law of the Republic of Armenia about “Civil Defence”, law of the Republic of Armenia about “Population protection in emergency situations” and law of the Republic of Armenia about “Local self-governing and territorial governing in Yerevan city” as well as other legal acts regulating the field.

Section 4 Bodies involved in the Plan and their functions

5. The following bodies are involved in the Plan:
 - 1) Evacuation committee,
 - 2) Evacuees assisting bodies (EAB),
 - 3) Enterprises, organizations and companies (hereinafter referred to as facilities).
6. Evacuation committees are established in the following way:
 - 1) Evacuation Committee of Yerevan city – by the decision of the Mayor,
 - 2) Evacuation Committee of facility – by the decision of the Head of facility,,
7. The deputy mayor of Yerevan city is appointed as the head of evacuation committee in Yerevan city, and the deputy head of facility as the head of evacuation committee in facility (if there is no such person then the person appointed by the given chief).
8. Evacuation committees act in accordance with their charters which are approved by the heads of bodies establishing the committees. The model forms of charters are worked out by the Ministry of Emergency Situations of the Republic of Armenia.
9. The Evacuation Committee of Yerevan City was established by Mayor's Decision N 941-A dated on 03.03.2010, which defines the organizational framework of EC of Yerevan city.
10. The functions of Evacuation Committee of Yerevan city are given in Appendix 1.

Chapter 2 Preparatory measures for population evacuation

Section 5 Evacuation policy

11. Evacuation is one of the main ways of population protection in case of occurrence of such emergency situations or their direct threat, which may generate factors having negative influence on life, health and natural vital activity of people in certain territories (settlements, facilities). It is carried out by temporary transportation and dislocation of population from dangerous areas to safe ones, according

to the created situation, scopes and readiness of distribution places, time-frame of construction of shelters and other conditions.

12. Population evacuation is envisaged from:

- 1) the settlements and territories, damaged/threatened due to a severe earthquake/aftershock and in dangerous/difficult conditions for living,
- 2) dangerous or threatened areas due to secondary disasters such as inundation due to the collapse of the Yerevan lake water reservoir, landslides, chemical pollution due to accidents in chemically dangerous facilities, radioactive pollution due to accident of ANPP, fires, explosions or accident occurred during transportation of toxic materials.
- 3) infection prone areas due to spread of epidemics, poor hygiene conditions, as a consequence of earthquake disaster.

13. The schedule (activities and terms, responsible organizations, etc.) of evacuation activities are given in Appendix 2.

14. In case of disasters or their threat, such as chemical hazard, explosion, fire, radioactive hazard, landslide, and transportations, evacuation should be carried out according to corresponding evacuation estimations, developed for each disaster, taking into account the created concrete situation, impact and natural conditions (climatic, meteorological, etc.). The estimation results of number of evacuees in case of chemical hazard and explosion/fire are given in Appendix 4.

15. After the earthquake, the actual number of evacuees is estimated depending on situation in the settlement: number of damaged constructions, population possibilities, etc. Pre-estimation results are shown in Appendix 5.

16. The provision of evacuation measures and provision of assistance to population is carried out according to the laws of RA and regulations defined by the municipality of Yerevan City, based on preliminary estimations, which are given in the «Plan of life-support».

Section 6 General procedure of evacuation

17. Evacuation can be conducted by 3 stages.

- 1) In the first stage, population evacuates from dangerous areas to EP in a safe area, so that the evacuees meet family members, register and receive information for further action as well as first aid,
- 2) In the second stage, population evacuates from EP to TDP, so that the evacuees receive official supports for short-time sheltering,
- 3) In the third stage, in case of the protracted emergency situations or impossibility of returning to the permanent place of residence, population is transferred from TDP to TS or LTSP, so that the evacuees receive official supports for long-term sheltering.

18. For each category of reception of evacuees the standard of the distance, service duration and assistance are given in Appendix 2. The candidates of EP and TDP are selected beforehand. The functions and activity of each EP are as follows:

- 1) The population is gathered in EP, registered and distributed to TDP, if the latter is confirmed to be safe. One EP is designated for one UEA, so that reception and necessary assistance of suffered people can be done easily. Registration of missing persons and information on them are also done at EP. People who has own way of evacuation without official assistance, is also recommended to report about own evacuation at EP, so that official information, such as announcement on compensation for damages, reaches to all. The registered record is also utilized to avoid unnecessary search activities in residential buildings which residents have been evacuated.
- 2) Is provided in TDP for provision of official assistance and short-time sheltering. Basically, territories of schools, stadiums and constructions of official administration are designated to be TDP. For one evacuee a space of 1 m² is principally allocated in TDP. Additional places can be created by means of tents deployed in TDP. In case of evacuation from other areas the EP can also be used as a TDP after the safety confirmation.

- 3) Shelters and supports for long-term settlement are provided at LTSP, such as sanatoriums, polyclinics, resort centers, holiday facilities, tourist facilities, hotels, etc., envisaged by the Appendix 16 of the Government Decision 919-N.
19. Population can be evacuated by pedestrian columns, by car columns or other transportation means. Evacuation to EP and TDP should be done on foot. Transportation to LTSP and TS can be carried out by car columns, based on the arrangement of the Evacuation Committee. Using private vehicles is not encouraged, since it may disturb the transportation of victims, search activities, provision of supporting materials, etc.
20. The roads with the width of more than 8 meters are used as main evacuation routes, except the route to EP. Evacuation routes are selected beforehand and their improvement, placement of sign boards and strengthening of nearby buildings are continually done. Construction and renovation of buildings along the routes should be strictly controlled and maximum rate of passability in case of collapse of all the buildings should be secured. During evacuation, the routes are selected based on the situation.
21. In case of impassability of main evacuation routes they are changed by secondary routes or bypass roads by the decision of the head of column or superior.
22. Homeless population is provided with shelters in the following ways:
 - 1) In case of decentralized distribution, homeless population is distributed to live in houses fit for living – their own houses, jointly or separately,
 - 2) in case of distributing the people in camps, homeless population is taken to tents, establishing tent or container house camps,
 - 3) collective distribution is carried out by means of distributing the homeless people in public buildings located outside the destruction zone for which an evacuation of population from destroyed zones to safe areas is envisaged.
23. Evacuation and provision of homeless population of Yerevan city with shelters are organized

according to administrative districts. Intermediate points of population evacuation are established under the population protection coordination centers established in each administrative district. The population is transferred from those points to reception settlement.

Section 7 Preparation activities

24. The preparation of EP is done by the head of each EP (mostly school principals), under the management and supervision of the Evacuation Committee. The preparation of EP includes the followings:

- 1) Implementation of the policy confirmed by the Evacuation Committee as well as cooperation with related organizations.
- 2) Organization of internal management and determination of responsible staff for the following functions:
 - a) Receiving and disseminating the information from outside, such as the Evacuation Committee and TDP, as well as recording the information exchange,
 - b) Creating and controlling registries of evacuees and missing persons
 - c) Distributing water, etc.
 - d) First aid and securing sanitation
 - e) Maintaining public order, safety
 - f) Anti-fire measures and fire-fighting.
- 3) Selection of the candidates of rooms or spaces for evacuees and management
- 4) Preparation/maintenance or the procedure of the procurement of devices/materials for communication with the outside as well as for the inside of EP
- 5) Stockpiling and refreshing of medicine, water, etc.

25. The preparation of TDP is done by the head of TDP, whom the Evacuation Committee appoints. The preparation of TDP includes the followings.

- 1) Implementation of the policy confirmed by the Evacuation Committee as well as cooperation with related organizations.
 - 2) Organization of internal management and determination of responsible staff for the following functions:
 - a) Receiving and disseminating the information from outside, such as the Evacuation Committee and EP, as well as recording the information exchange,
 - b) Communication and arrangement on registration of evacuees and missing persons with EP,
 - c) Reception and regulation of inquiry/ demands/ complaint/ message from outside and inside the TDP,
 - d) Allocation of area for each evacuee and arrangement of related issues,
 - e) Consultation on medical and psychological issues and cooperation with medical institutes on the dealing of patients
 - f) Request/ reception/ distribution of water, food and other supporting materials
 - g) Securing social security and fire protection
 - h) supervision of sanitary conditions
 - i) Reception and allocation of volunteers
 - j) Recording of actions and keeping the records
 - 3) Preparation of a schematic plan on the locations of tents for evacuees as well as for implementation and management of actions.
 - 4) Preparation/maintenance or the procedure of the procurement of devices/materials for communication with the outside as well as for the inside of TDP.
 - 5) Management and refreshing of stockpiled materials and clarification of procurement process of supporting materials.
26. In each LTSP and TS, preparation measures are always being executed for increase of preparedness,

which include tasks on urban development, planning, supervision and encouragement. Those measures are:

- 1) Improvement of evacuation routes: definition of strategic roads, optimization of evacuation routes, permanent improvement and maintenance of technical condition and passability are being implemented.
- 2) Reinforcement of buildings along the evacuation routes: investigation of buildings, teardown or reinforcement of dangerous parts are being implemented to avoid their collapse and securing passability of the routes.
- 3) Preparation of open areas for evacuation places: investigation of existing free (green) areas and planning of distribution of evacuated population to those places are being implemented.
- 4) Improvement of facilities in the evacuation places: investigations and measures are taken in the planned areas for improvement and maintenance of conditions of life support and distribution of population.
- 5) Training and education of staff: training and education to staff are done for smooth and proper fulfillment of the given tasks, according to annual schedule of civil defense.

27. Detailed evacuation plan should be prepared beforehand and updated every year in all facilities. The plan may be a part of civil defense plan, and should include:

- 1) the order and terms of implementation of population evacuation, as well as forces and means provided for evacuation bodies and evacuation routes,
- 2) works in evacuees assisting bodies and evacuation routes,
- 3) calculation of evacuation for each transport vehicle type and evacuation route,
- 4) regulation of organization of distribution of evacuees and provision of water, food, and necessary materials,
- 5) the order of removal of material and cultural values.

Section 8 Public awareness on evacuation

28. Since the damage by a severe earthquake is so huge, that official assistance may not reach to all the victims, the population should take action by their own decision. Awareness and knowledge of population should be raised for the proper action through dissemination of information on the following way.

- 1) The Evacuation Committee regulates and organizes dissemination of necessary information to population, in cooperation with Ministry of Emergency Situations, Ministry of Education and Science, and Department of Education of Yerevan municipality.
- 2) Main items of information to be provided are shown.
- 3) The necessary information is disseminated through the Crisis Management State Academy of RS, Emergency Channel, schools, companies, media (TV, radio, Internet, newspaper, magazine, poster), etc.

29. Public education and training on evacuation is managed by the Ministry of Emergency Situations. Yerevan municipality, districts of Yerevan City, schools, companies and other related organizations prepare plans on civil defence issues, including education. The Crisis Management State Academy of RS, Emergency Channel, Ministry of Education and Science and other organizations prepare education materials.

Chapter 3 Organization and implementation of population evacuation

Section 9 Deployment of evacuees assisting bodies

30. In case of a severe earthquake evacuees assisting bodies are established as follows:

- 1) Basically, the establishment of evacuees assisting bodies is decided by the head of the Evacuation Committee.
- 2) According to the decision, the head of evacuees' assisting body organizes all necessary actions for the establishment and operation of corresponding body.

- 3) In case that “Information” on threat of emergency situation is issued by the head of the Evacuation Committee, the head and staff of EP should start the deployment. Residents make decision of evacuation by themselves in that case. Even if the deployment of EP has not been completed, reception of population should not be rejected. After the issuance of “Recommendation” the deployment of TDP should be started, and after the announcement of “Order” the LTSP and places envisaged for TS should be brought to readiness and the supporting system should be immediately deployed.
 - 4) The safety of the building is confirmed by the decision of corresponding responsible person or in case of his absence by the decision of the head of mentioned body before deployment of evacuees assisting bodies.
 - 5) In case that the decision of deployment does not reach to the head of evacuees assisting body, he can issue own order of deployment, receive the evacuees and report to superior, based on necessity.
- 31 The decision for termination of activity of evacuees assisting body is made by the head of the Evacuation Committee, in case of transferring the evacuees to permanent settlement or other place based on distribution terms.

Section 10 Reception of evacuees

32. Population evacuation is carried out from EP where evacuees arrive autonomously or upon hearing the signal (warning) of evacuation by means of sirens, loudspeakers and so on.
33. Each evacuee is recommended to:
- 1) have ID, water and food for three days and other necessary goods,
 - 2) cut the electricity and gas of the house or apartment and move fire and explosion prone materials and objects to safe places,
 - 3) fulfill the instructions and assignments of heads of EP and columns during evacuation.
34. If evacuation is carried out from other areas, the EP can also serve as TDP.

Section 11 Provision of evacuation measures

35. The provision of evacuation measures is carried out by forces and means of republican executive bodies, territorial governing bodies, local self-governing bodies and other official bodies and organizations according to their charters.
36. Information on damage, assistance, communication means, medical service and sanitary conditions are provided to evacuees and people in hazardous areas. Life provision of evacuees in evacuation places is carried out according to “Life provision plan of population evacuation of Yerevan city”.
37. Information on damage and necessary assistance is collected by means of reconnaissance and disseminated with the help of communication means as follows.
- 1) Damage reconnaissance
 - a) The responsible persons are the Mayor of Yerevan and the head of Yerevan City Rescue Department.
 - b) A general and specialized reconnaissance is carried out.
 - c) The reconnaissance is organized and the assessment of the results is conducted by Yerevan Rescue Department together with the appropriate departments of rescue department of MES RA, lifeline companies, etc., according to the reconnaissance groups, tasks of circles and given working zones.
 - d) The responsible persons decide the order and time of reports on the assessment results of the reconnaissance.
 - 2) Communication flow and means
 - a) Communication supply is implemented during evacuation with the assistance of the Yerevan Communication and Warning Service, according to the organizational scheme of communication.
 - b) In the evacuation committee, communication is organized in the following way.

- Direct telephone connection with the Evacuation Committee and the heads of administrative districts of the city,
 - Telephone connection with the Evacuation Committee and the heads of evacuees receiving bodies,
 - with formations with mobile and telephone and other means of connection.
- c) The warning of population is organized with a centralized way by the use of warning system: horn, radio and television, as well as through the forces of evacuees receiving bodies by the use of loudspeakers, telephone connection and portable means of communication.
- 3) Order of warning to the Evacuation Committee is issued by the head of the Evacuation Committee according to the warning scheme. Warning to the population is carried out through the Communication and Warning Service of Yerevan, as well as through all possible communication means, including media. There is a need of conclusion of pre-agreement with the latter. In case that the committee does not function due to damage, the heads of the Districts, Crisis Management Center or Ministry of ES will announce. In these cases, the contents of the announcement should be transferred to the Evacuation Committee and Crisis Management Center at the same time, so that the announcement should be concordant with other announcements made in National level. The three steps of warning (Information, Recommendation, and Order) are announced to the population as follows.
- a) “Information” on evacuation is announced, even before the collection and analysis of damage information by officially authorized body. The information (such as seismic intensity obtained with real-time seismic intensity display system and evacuation places shown in this plan as well as damage information so far as collected) should be announced so that victims can take actions by themselves without a panic, even if the authorized organizations don’t supervise the situation completely and there are possibilities of heavy damages.
- b) “Recommendation” on evacuation is announced in the course of collecting damage

information. Although analysis of damage information has not been completed, the “Recommendation” is announced to formulate reception system for proper response to evacuees at reception points, in case that certain damages are foreseen and some people seem to wish to evacuate autonomously. In case of severe earthquakes, it is possible that the “Recommendation” can be announced at the same time of announcement of “Information”.

- c) “Order” on evacuation is announced, when the situation is analyzed and clarified. The announcement is made in such case that it is judged necessary to response by all related organizations and responsible people for rescuing the victims.

38. Securing of maintenance of public order is being implemented by RA Police Yerevan Department with its subdivisions and includes the following measures:

- 1) implementation of access control;
- 2) implementation of selective control of transport means involved in the evacuation measures;
- 3) support to the persons responsible for evacuation for the purpose of mobilization of transport means for taking out the people from dangerous zone during minimum period;
- 4) maintenance of public order and security ensuring in all the phases of evacuation;
- 5) protection of facilities;
- 6) regulation of road traffic;
- 7) convoy for motorcade transporting the evacuees;
- 8) securing transport vehicle entrance regime in the dangerous zone;
- 9) struggle against the crime;
- 10) address-information work (creation of information book on distribution of evacuees);
 - a) implementation of measures aimed at prevention of panic and mass riots;
 - b) implementation of patrol service in the evacuated places;
 - c) protection measures of passability of evacuation routes and property and facilities remained in the evacuation settlements (areas);

d) report of information to population and instruction on mode of action is also implemented during evacuation with cooperation with YRD.

39. Medical provision includes organizational, medical, sanitary-hygienic and anti-epidemic measures carried out by organizations of healthcare. Medical provision measures are being executed by Healthcare Department of Personnel of Yerevan municipality by the forces and means of medical institutions of the capital. The following measures of medical provision are being implemented during the execution of evacuation.

- 1) creation of medical points and organization of duty of staff in the reception points of evacuees;
- 2) organization of service of patients;
- 3) permanent control over sanitary condition;
- 4) periodical study of anti-epidemic state, detection of patients and implementation of other measures;
- 5) provision with medical means.

40. The hygienic and anti-epidemic control of the territory of City is being implemented by regional subdivisions of the state anti-epidemic control inspection of the Ministry of Healthcare and appropriate institutions of Yerevan laboratory observation system. Sanitary groups are also being formed for transportation of dead and sanitary treatment in burial places.

41. Transport provision is a complex of measures, which includes preparation, distribution and exploitation of transport vehicles envisaged for transportations of evacuation. Transport provision of evacuation measures is being implemented by Transport Department of Yerevan Municipality, according to submitted application. All types of passenger vehicles may be used for evacuation of population. Other transport vehicles may also be used in case of necessity, which must be fitted for transportation of people beforehand. Evacuation includes all the transport means (regardless of property type), including municipal transport. Special vehicle formations are being created for organized implementation of vehicle transportations. Personal vehicles are also being involved in the

works by agreement of owners. The following transport provision measures are implemented during evacuation:

- 1) for transportation of material means, life provision and population;
- 2) for transportation of individual protection means from mobilization storehouses to distribution points.

42. Department of Trade and Services of Yerevan Municipality provides food, water, clothes, linens and shoes to evacuees through trade entertainment networks, food facilities and foodstuff, goods and water supplying mobile points, created on their basis. Food provision includes provision to population and formations during the evacuation. It can be implemented both from public food facilities and deployed and mobile supply points. Provision of food, water and goods of first necessity is implemented according to quantities defined by life-support plan.

43. Trade Department of Yerevan Municipality implements also the logistics provision, which includes organization of technical service and repair of transport vehicles, supply of spare parts, fuel-lubricant materials and goods during evacuation. Supply points are being created for the purpose of logistic provision, which implement provision of means and forces.

44. Securing of evacuation routes is being implemented by Architecture Department of Personnel of Yerevan Municipality and is aimed for creation of necessary conditions for evacuation of population from dangerous zone, and includes the following measures.

- 1) Engineering exploration, during which the state of roads, buildings, bridges and passages are being clarified,
- 2) Provision of passability of evacuation routes and roads,
- 3) Implementation of accident-recovery works of damaged bridges of high importance,
- 4) Provision of the affected with temporary shelters – construction of residential buildings by means of rapid construction,
- 5) disassembling of constructions with risk of breakage in the rescue operation sites, support to the

operations of taking the victims out from damaged or collapsed buildings (cooperating with rescuers);

Section 12 Management of evacuation

45. Planning and organization of the evacuation of population, distribution of evacuees, comprehensive life-support and their return to places of permanent residence after elimination of emergency situations are implemented by the state governing territorial and local self-governing bodies by means of evacuation committees.
46. The evacuation committee decides organizations and population to be involved and their definite tasks in the implementation of evacuation measures.
47. Action plans are formulated for accelerating the implementation of measures, after selection of important issues among the issues such as the opening of evacuation points, the reconnaissance/analysis of situations, the distribution of evacuees, special care for weak persons, the preparation of the lists of evacuees, the collection of the needs of evacuees, coordination works with related public officials/mass media, the provision of information (damage, situation, countermeasures, implementation policy, recovery of life support, etc.), the maintenance of appropriate sanitary conditions, medical service, the distribution of food and goods through cooperation with appropriate public authorities,, the reception of volunteers, the resolution of disagreements/disputes among evacuees, the preparation of various forms, etc.
48. Evacuation guidance
 - 1) Although the “Information” about the evacuation is declared immediately after a severe earthquake, it is possible that official assistance is not available for guiding the evacuation. Population who intend to get evacuated can be evacuated by own decision. For smooth and safe evacuation, population should have knowledge and skills through education and training.
 - 2) Police guidance for security during evacuation will be conducted together with the traffic control.

In case that the number of police persons is not enough for large-scale damages, police persons will be dispatched to main evacuation routes.

- 3) Officials at EP should guide the evacuees while moving from EP to TDP. The guiding includes the location of TDP confirmed to be safe, the route taking to TDP, necessary information on security while moving, assistance provided at TDP, etc.

49. Volunteers are also involved in evacuation activities and response/recovery operations.

Chapter 4 Recovery

Section 13 Temporary shelters

50. Temporary shelters are being built and distributed to homeless people to provide better living conditions than that in camps.
51. For this purpose, the implementation of life-support measures is also being organized, and at the same time, measures are being taken for solution of employment, education, and other issues.
52. Temporary shelters are operated until the provision of permanent residential places to evacuees.

Section 14 Recovery measures

53. Measures being implemented for recovery can be conditionally divided to 3 phases:

- 1) Preparation,
- 2) Implemented during evacuation,
- 3) Measures for final distribution of population.

54. Preparatory measures are:

- 1) Increase of preparedness of administrative bodies,
- 2) Technological equipment of MCES,
- 3) Improvement of 3 levels of warning,
- 4) Building reinforcement program,

- 5) Improvement of plans,
- 6) Increase of free (green) areas,
- 7) Distribution of water supply capacity
- 8) Creation of warehouses and optimal distribution,
- 9) Construction and maintenance of roads.

55. Measures being implemented during evacuation are:

- 1) Construction of temporary shelters,
- 2) Comprehensive provision.

56. Measures aimed for final distribution of population

- 1) Recovery of damaged buildings,
- 2) Construction of new buildings,
- 3) Full recovery of life-support system,
- 4) Other actions aimed at recovery of social, psychological situations, which will be implemented with the help of other recovery plans.

Appendices:

- a. Appendix No.1 of the plan: functional responsibilities of evacuation bodies,
- b. Appendix No.2 of the plan: schedule of the plan,
- c. Appendix No.3 of the plan: information on distribution places of the reception bodies of evacuees,
- d. Appendix No.4 of the plan: calculation of population evacuation in case of accident in explosive, fire-explosive, fire-prone and chemically hazardous facilities or its threat,
- e. Appendix No.5 of the plan: number of evacuees after an earthquake according to terms.

FUNCTIONAL RESPONSIBILITIES
of evacuation bodies of Yerevan city

TASKS OF EVACUATION BODIES

1. Elaboration of population evacuation plan together with YRD of RS of MES of RA,
2. Elaboration of measures aimed at protection and comprehensive provision of evacuees together with Civil Defence services,
3. Organization of preparation of administrative staff of evacuation and reception points,
4. Clarification of population evacuation plan and measures of comprehensive provision,
5. Organization of preparation of pedestrian evacuation routes,
6. Supervision over preparation of reception points of evacuees.

After receiving order on the implementation of population evacuation

Evacuation body:

1. Organizes the deployment of evacuation points,
2. Compiles and summarizes data about departure/arrival and reports to the superior evacuation committee about population distribution,
3. Organizes protection and comprehensive provision of leaving/arriving population together with relevant services.

TASKS OF ADMINISTRATIVE STAFF OF EVACUATION POINT

1. Organization of gathering, registration and dispatch of population to distribution points by means of transport and on foot,
2. Reporting the quantity and periods of arrival/departure of population to the evacuation committee,
3. Organization of the first medical aid to the population in the gathering point,
4. Maintenance of public order and population sheltering.

TASKS OF RECEPTION POINTS OF EVACUEES

1. Meeting of the arriving trains, car and pedestrian columns and provision of dropping off the population together with the administrative staff of drop off point,
2. Organization of temporary placement of people in the nearby residential areas,
3. Sending of population to permanent settlement places,
4. Reporting the quantity and periods of arrival/departure of population to the regional /city/ evacuation committee,
5. Organization of provision of the first medical aid to the population,

6. Maintenance of public order and population sheltering by means of Civil Defence signals.
7. Meeting of the arriving trains, car and pedestrian columns and provision of reception, registration and distribution of population together with the administrative staff of drop off point.

THE RESPONSIBILITIES OF THE HEAD OF PEDESTRIAL EVACUATION COLUMN OF POPULATION

1. The head of pedestrian column is appointed by the order of the head of civil defence of evacuation point /facility/.
2. The main task of the head of pedestrian column is to keep order and self-discipline in the column, provide the procession of the column by the given route and passing through exit point in time.
3. The head of pedestrian column is accountable to the head of civil defence staff, the representative of evacuation body and head of evacuation point.
4. The head of pedestrian column has to:
 - a/ know population mix and number in the column before receiving an order about the implementation of evacuation, divide the column into groups by the list, appoint chiefs of group and study the route beforehand.
 - b/ after receiving order about the implementation of evacuation:
 - Gather in the evacuation point within the defined time-period and form the column together with its administrative staff,
 - Receive an excerpt from the procession scheme and the list of evacuees from the head of evacuation committee,
 - Arrange the column for departure within the mentioned period, report to the head of the route and start moving along the route with his permission,
 - c/ during procession:
 - Take the column by the mentioned route securing the passing through the control point within the defined time-period,
 - Keep discipline and order in the column during procession and in the stopping places, take measures for gathering the people left behind and assisting the sick,
 - Inform the evacuees about the signals “Air-raid alarm” or “Attention to everybody” immediately after receiving them and take measures for people’s sheltering,
 - In case of a threat of radiation contamination hide people in place or take them out to safer areas by the instruction of the head of the route,
 - d/ report the structure and number of people in the column to the local evacuation committee and take part in the works of distribution of people upon reaching the gathering point.

THE RESPONSIBILITIES OF THE HEAD OF MOTORCADE EVACUATION OF POPULATION

1. The head of motorcade is appointed by the order of the head of civil defence of evacuation point and is accountable to the head of civil defence staff.
 2. The head of motorcade is responsible for keeping order among the population being transported.
 3. The head of motorcade has to:
 - a/ before receiving order about the implementation of population evacuation:
 - Check the structure and number of population to be transported, decide the types and number of cars to be provided, gathering point, boarding place of people, evacuation route, drop off point, transportation rules, safe area for their distribution
 - Appoint chiefs in each car and give instructions to them,
 - b/ after a decision is made about evacuation the head of evacuation point provides:
 - The list of population to be transported by motorcade,
 - Arrive at gathering point in time and check the number of people, their distribution by cars and organize their boarding together with the authorities of the gathering point,
 - c/ keep the order and rule of transportation along the route,
 - d/ secure the organized drop off of people after arriving at the point of destination.
- The head of motorcade should take the evacuees to the reception point and submit the document to the local evacuation committee.

THE RESPONSIBILITIES OF THE HEAD OF THE ROUTE OF PEDESTRIAL EVACUATION OF POPULATION

1. The head of the route is appointed by the decision of state governing and local self-governing bodies.
2. The main tasks of the head of the route are as follows:
 - Securing management,
 - Keeping public order and arranging people's movement,
 - Providing the guidance of evacuees to the final evacuation points within the defined time-period together with local evacuation bodies,
3. The head of the route is accountable to the head of Civil Defence and evacuation bodies.
4. The head of the route has the right to control the implementation of activities of the preparation of the route, provision of evacuees as well as the measures aimed at distribution of the evacuees in the final evacuation points envisaged by civil defence plans.
5. The head of the route has to:
 - Study the route and scheme of pedestrian column in advance,
 - Divide the route into parts between management groups,
 - Get the scheme of the route from the corresponding civil defence staff after a decision is made about evacuation, give tasks to the groups in charge and allocated forces and supervise the implementation of the mentioned,
 - Supervise the order of providing medical assistance to the evacuees,
 - Organize radiological and chemical observations,

- Be in touch with pedestrian columns and motorcades, reception points of evacuation and organize the warning along the route.
- Inform the columns about the signals “Air-raid alarm” or “Attention to everybody” immediately after receiving them by any means of communication and take measures for people’s sheltering.

THE STRUCTURE OF EVACUATION COMMITTEE

1. Head of the Committee, Deputy Head of Civil Defence
2. Deputy Head of the Committee
3. Secretary of the Committee
4. Representatives of Civil Defence services:
 - Warning and communication
 - Public order maintenance
 - Medical
 - Engineering
 - Communal technical
 - Energetics
 - Transport
 - Trade and service
 - Population and environment protection
5. Heads of working groups of the Committee
 - Head of registration group of removal of population from dangerous area
Deputy Head of the group
Chief guide
Guides by directions (of administrative districts)
 - Head of registration group of distribution of population in a safe area
Deputy Head of the group
Chief guide
Guides by directions (of administrative districts)
 - Head of transport provision group
Deputy Head of the group responsible for transfer of evacuees
Deputy Head of the group responsible for transportation of cargos,
Assistant to Head of the group responsible for the use of means of transport,
Assistant to Head of the group responsible for the use of railway transport,
Assistant to Head of the group responsible for the use of air transport,
 - Head of registration group of reserve for food and material values,
Deputy Head of the group
Assistant to Head of the group responsible for taking out the food reserve
Member of the group
Member of the group
 - Head of registration group of removal of hospital staff and patients into the safe area

Deputy Head of the group

Assistant to Head of the group responsible for taking out the hospital staff subject to evacuation

Assistant to Head of the group responsible for taking out the patients subject to evacuation

FUNCTIONAL RESPONSIBILITIES

of the head of the Evacuation Committee

The head of the Evacuation Committee is responsible for the organization of complex measures aimed at taking the population out of the possible disaster zone as well as distribution of evacuees in safe areas – TDPs (temporary distribution means) provided with primary life provision means.

The head of the Evacuation Committee is accountable to the Head of Civil Defence. He bears a responsibility for the full-scale and in-time implementation of tasks set before the evacuation committee.

He has to:

1. Know the members of the evacuation committee as well as the heads of subordinate evacuation committees and evacuation points,
2. Know the tasks put on the evacuation committees during the implementation of evacuation measures in case of all possible emergency situations,
3. Participate in the development and clarification of the main documents referring to population evacuation,
4. Know the number of population subject to evacuation, periods of implementation of evacuation measures, the number of cars and other means of transport involved in evacuation for transportation,
5. Carry out periodic methodical trainings with the staff of the evacuation committee aimed at studying the documents referring to evacuation plans, planning and implementation of evacuation activities.

1. In case of a threat of an emergency situation

- 1.1 Go to the Head of Civil Defence,
- 1.2 Organize the warning and gathering of the staff of evacuation committee in the set period,
- 1.3 Clarify the working schedule of the staff of evacuation committee and give tasks to the subordinate evacuation and evacuees' reception committee to have all the evacuation bodies of the capital ready for operations,
- 1.4 Establish a communication with subordinate evacuation bodies and transportation organizations,
- 1.5 Clarify the plan of evacuation committee and calculations of distribution of means of transport,
- 1.6 Organize the preparation of evacuation routes, TDPs, LTSPs and boarding points, installation of sign boards,
- 1.7 Organize the checking of readiness of communication and warning systems,
- 1.8 Set 24 hours duty service of the leading staff in all the evacuation bodies,

- 1.9 Receive the reports of subordinate evacuation bodies about their state of readiness and report to the head of civil defence.

2. In case of implementation of evacuation activities

- 2.1 Go to the head and clarify the tasks of evacuation committee during the implementation of evacuation activities,
- 2.2 Organize the gathering of the members of evacuation committee, clarify their tasks and give instructions to subordinate evacuation and transportation bodies (in accordance with the plan and the evaluation of the current situation created in the disaster zone) for the implementation of population evacuation,
- 2.3 Bring all the evacuation bodies into readiness and establish a permanent communication with them,
- 2.4 Organize the gathering of the population subject to evacuation, their preparation and transfer to safe areas,
- 2.5 Control the in-time delivery of means of transport to the boarding points,
- 2.6 Organize the primary life provision of shelterless population,
- 2.7 Organize the collection of data about the process of population evacuation and population distribution in the envisaged safe territories,
- 2.8 Organize the provision and protection of evacuees during the inter-cooperation with civil defence services of the capital,
- 2.9 Report the head of civil defence about the process of evacuation activities within the time-period mentioned in the card of schedule.

FUNCTIONAL RESPONSIBILITIES

of the deputy head of evacuation committee

Deputy Head of the evacuation committee is accountable to the head of the committee and if the latter is absent the deputy head fulfills the head's responsibilities with full scale. During the implementation of evacuation activities he becomes the direct chief of the whole staff of the evacuation committee.

He has to:

1. Know the members of the evacuation committee as well as the heads of subordinate evacuation committees and evacuation points,
2. Know the order of warning of the committee members and the tasks put on the evacuation committee during the implementation of evacuation measures,
3. Participate in the development and clarification of the plan of population evacuation together with the heads of committees,

4. Participate in the development documents of the evacuation committee,
5. Prepare the management of evacuation bodies, systems of communication and warning together with the head of evacuation committee and keep them in permanent readiness,
6. Know the number of population subject to evacuation, periods of implementation of evacuation measures, the number of means of transport involved in evacuation for transportation,
7. Work out activities aimed at provision of evacuees with food, water, electricity and staples during the inter-cooperation with civil defence services.

1. In case of a threat of emergency situations

- 1.1 Organize the warning of the staff of evacuation committee, control their gathering and report to the head of evacuation committee,
- 1.2 Prepare orders and deliver their implementation to the executors and supervise the implementation process on behalf of the head of evacuation committee,
- 1.3 Supervise the obligations of subordinate evacuation bodies,
- 1.4 Organize 24 hours duty service in the working bodies of the evacuation committee,
- 1.5 Organize reception of individual protection means for the staff of evacuation committee,
- 1.6 Participate in the clarification of the evacuation plan in case of specific emergency situations.

2. In case of implementation of evacuation activities

- 2.1 Gather the members of evacuation committee and report to the head of the committee,
- 2.2 Prepare orders and deliver their implementation to the executors and supervise the implementation process on behalf of the head of evacuation committee,
- 2.3 Check the availability of communication with transportation services of civil defence and subordinate evacuation bodies,
- 2.4 Check the readiness of evacuation bodies to participate in evacuation activities and report to the head of the committee,
- 2.5 Control the delivery of means of transport to the boarding places,
- 2.6 Control the gathering of population subject to evacuation, preparation of transportation and transportation to safe areas,
- 2.7 Generalize the data received from subordinate evacuation committees about the process of evacuation, reception and distribution of evacuees and report to the head of the committee,
- 2.8 Know the created situation and inform the members of the committee,
- 2.9 Prepare a summary sheet about the process and completion of evacuation activities within the time-period mentioned in the card of schedule.

**FUNCTIONAL RESPONSIBILITIES
of the Secretary of the Evacuation Committee**

The Secretary of the evacuation committee is accountable to the head and deputy head of the committee. The secretary delivers the information, recommendations and orders of different

characters to the staff of evacuation committee and subordinate evacuation bodies by the instruction of the head and deputy head of the committee.

He has to:

1. Know his responsibilities, the organizational structure of the evacuation committee and the tasks set before the committee,
2. Know the distribution places and the order of warning of subordinate evacuation bodies,
3. Participate in the development of the documents of the evacuation committee,
4. Report to the head of the committee about the resignation of a member from the evacuation committee and take measures to reman the staff of the committee.

1. In case of a threat of emergency situations

- 1.1 Receive the documents of the evacuation committee,
- 1.2 Check the gathering of the committee members and report to the head,
- 1.3 Prepare the order of the head of the evacuation committee for subordinate evacuation bodies,
- 1.4 Receive individual protection means and distribute among the committee members,
- 1.5 Check the readiness of the evacuation committee and report to the deputy head of the committee,
- 1.6 Check the estimation of sheltering and the order of bringing into readiness of the staff of the evacuation committee, actions of the staff in case of the signal “air-raid alarm” and deliver the mentioned items to the committee members and staff of working groups,
- 1.7 Keep the registers of received and issued orders, decrees and internal documents.

2. In case of implementation of evacuation activities

- 2.1 Check the gathering of the committee members and report to the deputy head of the committee,
- 2.2 Prepare the order of the head of evacuation committee and deliver to the subordinate evacuation bodies,
- 2.3 Keep the registers of received and issued orders, decrees and internal documents.
- 2.4 Collect and generalize the data of subordinate evacuation bodies about population evacuation, the process of reception and distribution of evacuees together with the head of the registration group of removal of population from dangerous area,
- 2.5 Know the condition of the evacuated population as well as provide them with food and staples,
- 2.6 Know the capacities of all the TDPs and LTSPs and be in permanent contact with them,
- 2.7 Report to the head of evacuation committee about the received alarms, orders and internal documents in time.

FUNCTIONAL RESPONSIBILITIES

of the head of the registration group of removal of population from dangerous area

The head of the registration group of removal of population from dangerous area is accountable to the head and deputy head of the evacuation committee. He is the direct head of the staff of the group.

He has to:

1. Know the staff of the group and their tasks,
2. Have the staff list of the group, know the order of warning and gathering of the staff of the group,
3. Know the number of population subject to removal from the dangerous area and the order of their registration,
4. Have necessary information about the quantity and distribution places of TDPs and LTSPs,
5. Have the calculations of population evacuation in case of prevision of different types of emergency situations,
6. Have the calculation of means of transport envisaged for evacuation activities,
7. Conduct trainings with the staff of the group aimed at fulfillment of their functional responsibilities,
8. Participate in the development of population evacuation plan,
9. Participate in practical trainings and exercises conducted with the staff of registration group of removal of population from dangerous area,

1. In case of a threat of emergency situations

- 1.1 Carry out the warning and gathering of the staff of the group and report the results to the secretary of the evacuation committee,
- 1.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 1.3 Receive the individual protection means and distribute them among the group members,
- 1.4 Establish a communication with subordinate registration groups of removal of population from the dangerous area,
- 1.5 Know the situation and deliver the necessary information to the subordinate officers in time,
- 1.6 Check the readiness of registration groups of removal of population from the dangerous area of the communities of the capital to participate in evacuation activities and report to the head of the evacuation committee,
- 1.7 Manage the works of the staff of the group permanently,
- 1.8 Organize the duty service of the staff.

2. In case of implementation of evacuation activities

- 2.1 Organize the gathering of the staff of the group and report to the secretary of the evacuation committee,
- 2.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 2.3 Organize a supervision over the process of implementation of evacuation activities and prepare a brief information about the results of evacuation activities,
- 2.4 Prepare a report about the process of evacuation activities for the head of the evacuation committee together with the secretary of the committee.

FUNCTIONAL RESPONSIBILITIES

of the head of the group of registration of population in a safe area

The head of the group of registration of distribution of population in a safe area is accountable to the head and deputy head of the evacuation committee. He is the direct head of the staff of the group.

He has to:

1. Know the staff of the group and their tasks,
2. Have the staff list of the group, know the order of warning and gathering of the staff of the group,
3. Know the number of population subject to distribution in safe areas and the order of their registration,
4. Have necessary information about the evacuation bodies of the community and capital - quantity and distribution places of TDPs and LTSPs,
5. Conduct trainings with the staff of the group aimed at fulfillment of their functional responsibilities,
6. Participate in the development of population evacuation plan,
7. Participate in practical trainings and exercises conducted with the staff of registration group of distribution of population in a safe area.

1. In case of a threat of emergency situations

- 1.1 Carry out the warning and gathering of the staff of the group and report the results to the secretary of the evacuation committee,
- 1.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 1.3 Receive the individual protection means and distribute them among the group members,
- 1.4 Establish a communication with registration groups of removal of population from the dangerous area of communities of the capital,
- 1.5 Know the situation and deliver the necessary information to the subordinate officers in time,
- 1.6 Check the readiness of the group of registration of distribution of population in a safe area to participate in evacuation activities and report to the head of the evacuation committee,
- 1.7 Manage the works of the staff of the group permanently,
- 1.8 Organize the duty service of the staff.

2. In case of implementation of evacuation activities

- 2.1 Organize the gathering of the staff of the group and report to the secretary of the evacuation committee,

- 2.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 2.3. Organize the distribution of evacuees in safe areas,
- 2.4 Carry out the registration of evacuees in safe areas,
- 2.5 Organize a supervision over the process of implementation of evacuation activities and prepare a brief information about the results of evacuation activities by communities,
- 2.6 Prepare a report about the process of evacuation activities for the head of the evacuation committee together with the secretary of the committee.

FUNCTIONAL RESPONSIBILITIES

of the head of the group of transport provision

The head of the group of transport provision is accountable to the head and deputy head of the evacuation committee. He is the direct head of the staff of the group.

He has to:

1. Know the staff of the group and their tasks,
2. Have the staff list of the group, know the order of warning and gathering of the staff of the group,
3. Know the number of means of transport necessary for population evacuation activities,
4. Know the bases of creation of motorcades and the order of their warning, bringing into readiness and involvement in evacuation activities,
5. Have necessary information about the evacuation bodies of the community and capital,
6. Know the distribution places of groups of transport provision and the order of being in contact with them,
7. Know the technical specification of evacuation routes,
8. Conduct trainings with the staff of the group aimed at fulfillment of their functional responsibilities,
9. Provide the preparedness to participate in evacuation activities together with transport service.

1. In case of a threat of emergency situations

- 1.1 Carry out the warning and gathering of the staff of the group and report the results to the secretary of the evacuation committee,
- 1.2 Clarify the tasks of the staff of the group, receive the individual protection means and distribute them among the group members,
- 1.3 Establish a communication with transport service and subordinate groups of transport provision,
- 1.4 Know the situation and deliver the necessary information to the subordinate officers in time,
- 1.5 Supervise the preparation of means of transport for evacuation activities,

- 1.6 In case of occurrence of emergency situations clarify the population evacuation plan and routes in accordance with the possible theory of situation,
- 1.7 Manage the works of the staff of the group permanently,
- 1.8 Organize the duty service of the staff.

2. In case of implementation of evacuation activities

- 2.1 Organize the gathering of the staff of the group,
- 2.2 Clarify the situation created in the area due to emergency situations and the condition of available means of transport and evacuation routes,
- 2.3. Check the evacuation routes and the tasks set before the evacuation bodies for the evacuation of population from dangerous areas to safer ones,
- 2.4 Provide the delivery of means of transport to TDPs, LTSPs and transport boarding points,
- 2.5 Organize a supervision over the work of means of transport. Inform the head of the evacuation committee about the violations of the working schedule of transport in time and take measures for their elimination.

FUNCTIONAL RESPONSIBILITIES

of the head of the registration group of reserves of food and material values

The head of the registration group of reserves of food and material values is accountable to the head and deputy head of the evacuation committee. He is the direct head of the staff of the group.

He has to:

1. Know the staff of the group and their tasks,
2. Have the staff list of the group, know the order of warning and gathering of the staff of the group,
3. Know the number of population and material values subject to evacuation, their distribution places and the order of registration,
4. Plan the calculations of material values subject to evacuation and means of transport envisaged for that purpose beforehand for specific cases of emergency situations,
5. Have the list and number of facilities and the reserves of material values kept in them,
6. Have necessary information about the evacuation bodies of the community and capital - quantity and distribution places of TDPs and LTSPs,
7. Conduct trainings with the staff of the group aimed at fulfillment of their functional responsibilities,
8. Participate in the development of population evacuation plan,
9. Participate in practical trainings and exercises conducted with the staff of subordinate groups of registration of reserves of food and material values.

1. In case of a threat of emergency situations

- 1.1 Carry out the warning and gathering of the staff of the group and report the results to the secretary of the evacuation committee,
- 1.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 1.3 Receive the individual protection means and distribute them among the group members,
- 1.4 Establish a communication with registration groups of reserves of food and material values of communities of the capital,
- 1.5 Know the situation and deliver the necessary information to the subordinate officers in time,
- 1.6 Check the readiness of registration groups of reserves of food and material values to participate in evacuation activities and report to the head of the evacuation committee,
- 1.7 Manage the works of the staff of the group permanently,
- 1.8 Organize the duty service of the staff.
- 1.9 Check the number of means of transport envisaged for taking the material values out of the possible place of destruction.

2. In case of implementation of evacuation activities

- 2.1 Organize the gathering of the staff of the group and report to the secretary of the evacuation committee,
- 2.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 2.3. Provide the removal and registration of reserves of material values in case of necessity of their evacuation, carry out a supervision over their arrangement and prepare a brief information about evacuation activities (by communities),
- 2.4 Prepare a report about the process of evacuation activities for the head of the evacuation committee together with the secretary of the committee.

FUNCTIONAL RESPONSIBILITIES

of the head of the registration group of removal of the staffs of hospitals and patients to a safe area

The head of the registration group of removal of the staffs of hospitals and patients to a safe area is accountable to the head and deputy head of the evacuation committee. He is the direct head of the staff of the group.

He has to:

1. Know the staff of the group and their tasks,
2. Have the staff list of the group, know the order of warning and gathering of the staff of the group,

3. Know the number of staffs of hospitals and patients subject to removal from dangerous area and the order of their registration,
4. Have necessary information about the evacuation bodies and hospitals of the community and capital,
5. Have the calculation of the means of transport envisaged for the evacuation of staffs of hospitals and patients of the capital,
6. Conduct trainings with the staff of the group aimed at fulfillment of their functional responsibilities,
7. Participate in the development of population evacuation plan,
8. Participate in practical trainings and exercises conducted with the staffs of hospitals and patients.

1. In case of a threat of emergency situations

- 1.1 Carry out the warning and gathering of the staff of the group and report the results to the secretary of the evacuation committee,
- 1.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 1.3 Receive the individual protection means and distribute them among the group members,
- 1.4 Establish a communication with registration groups of removal of staffs of hospitals and patients to a safe area,
- 1.5 Know the situation and deliver the necessary information to the subordinate officers in time,
- 1.6 Check the readiness of registration groups of removal of staffs of hospitals and patients to a safe area and report to the head of the evacuation committee,
- 1.7 Manage the works of the staff of the group permanently,
- 1.8 Organize the duty service of the staff.

2. In case of implementation of evacuation activities

- 2.1 Organize the gathering of the staff of the group and report to the secretary of the evacuation committee,
- 2.2 Clarify the tasks of the group from the head of the evacuation committee and deliver them to the staff,
- 2.3. Organize the distribution of evacuated staffs of hospitals and patients in the hospitals and other buildings planned beforehand located in safe areas,
- 2.4 Organize a supervision over the process of implementation of evacuation activities and prepare a brief information about the results of evacuation activities,
- 2.5 Prepare a report about the process of evacuation activities for the head of the evacuation committee together with the secretary of the committee.

Appendix 2
of population evacuation plan
in case of a severe earthquake in Yerevan city

Data on distribution places of evacuees reception bodies

Types	Evacuation points (EP)	Reception points (RP)	Temporary distribution points (TDP)	Long-term settlement points (LTSP)
Distance	500m	500m	2km	More than 2km
Service duration (target)	1 week	1 month	1 month	10 years
Utilities	Only water (cistern of water, mineral water, mobile toilets)	Only water (cistern of water, mineral water, mobile toilets)	Water and food, Medical services, Information, Peace and discipline, Sanitary conditions and so on	Water and food, Medical services, Information, Peace and discipline, Sanitary conditions and so on
Functions	Registration of evacuees	In temporary residence in tents and buildings	In temporary residence in tents and buildings	In temporary residence in tents and buildings
Number	132 (881477 people)	132(264000 people)	238 (203164 people)	5 (1350 people)
Capacities of shelters	Till 10000 people	Till 2000 people	200-8000 people	468514 people
				It is necessary to distribute 202817 people

SCHEDULE
of works of the evacuation committee of Yerevan city

N/N	Activities	Period of implementation	Responsible for implementation
1	2	3	4
<i>1. In case of a threat of emergency situations</i>			
1	Warning and gathering of the evacuation committee of Yerevan city	T + 10 minutes	Head of the evacuation committee of Yerevan city
2	Tasking and clarification of calculations of evacuation of population from possible dangerous zones	T + 30 minutes	Head of the evacuation committee of Yerevan city
3	Organization of supervision over the works of facility evacuation committees	Immediately	Deputy Head of the evacuation committee of Yerevan city, secretary of the evacuation committee
4	Preparation of documents of the evacuation committee of Yerevan city	T + 30 minutes	Secretary of the evacuation committee
5	Organization of communication between all the evacuation committees of Yerevan city	T + 1 hour	Deputy Head of the evacuation committee, Head of communication and warning service
6	Clarification of the order of evacuation of the bellow mentioned evacuees from possible dangerous zones: - pedestrian evacuees - evacuees from facilities and people evacuated by means of centralized delivery of means of transport provided from transport boarding places	T + 1-2 hours	Deputy Head of the evacuation committee, Heads of working groups
7	Clarification of the order of evacuation and delivery of transport to transport boarding places	T + 1-2 hours	Deputy Head of the evacuation committee, Head of transportation group, Representative of transportation service

1	2	3	4
8	Clarification of the plan of provision of the evacuees with medical staff and supplies	T + 1-2 hours	Secretary of the evacuation committee, Representative of medical service
9	Clarification of the plan of maintenance of public order in evacuation points, evacuation routes and temporary distribution points	T + 2 hours	Head of the evacuation committee, Representative of public order maintenance service
10	Clarification of the plan of primary life provision of evacuees	T + 3 hours	Deputy Head of the evacuation committee, Representative of trade and food service
11	Clarification of the places of deployment of intermediate evacuation points in case of occurrence of the source of radiation contamination	T + 3 hours	Head of the evacuation committee, Representatives of Civil Defence services
12	Clarification of the order of evacuation and transport boarding points in case of a threat of expansion of the source of radiation contamination	T + 3 hours	Head of the evacuation committee, Representatives of Civil Defence services
<u>2. Upon receiving an order of population evacuation</u>			
1	Organization of the warning of the staff of the evacuation committee of Yerevan city	T + 10 minutes	Deputy Head of the evacuation committee
2	Tasking on conduct of evacuation	T + 30 minutes	Deputy Head of the evacuation committee
3	Putting the clarified plan of evacuation into action in case of a specific emergency situation	T + 30 minutes	Head of the evacuation committee of Yerevan city
4	Bringing the evacuation bodies into readiness in all the organizations	T + 1 hour	Heads of evacuation committees of organizations
5	Organization of communication between evacuation bodies	T + 1 hour	Secretary of the evacuation committee
6	Organization of transport, technical, material and medical provision for evacuation activities	T + 2 hours	Deputy Head of the evacuation committee
7	Reception, registration and distribution of evacuees in temporary distribution points located in safe areas of the city	Always	Staff of TDPs
8	Collection and registration of data about the process of evacuation	Always	Deputy Head of the evacuation committee, heads of evacuation points
9	Organization of primary life provision of the affected	Always	Head of the evacuation committee of Yerevan city

Appendix 4
of Population evacuation plan
in case of a severe earthquake in Yerevan city

Information

on calculation of population evacuation in case of accident and its threat in explosive, fire-explosive, flammable and chemically dangerous facilities

No.	Name of the facility, address	Facility director's name, surname, tel. number (office, cell.)	Type of explosive material	Quantity of explosive material (ton or m ³)	Quantity of work and area of facilities (person / m ²)
1	2	3	4	5	6
Explosive facilities					
1. Arabkir					
1.	«Oktan» LLC	A.Avetisyan 091 40-98-00	natural gas	10 t	30 / 2500 m ²
2. Avan					
3. Ajapnyak					
2.	«NLG» LLC G.ChauSh str. 2	Edik Mkhitayan 099-80-99-99	gas	6 m ³	19 / 60 m ²
3.	«Multi Lion» LLC Shiraz-Janibekyan crossroad	Samvel Tsarukyan 094-50-00-94	gas	3 m ³	15 / 42 m ²
4.	«Kelli and Williams» LLC Shiraz str. 43	AShot Badeyan 34-16-11	gas	3 m ³	13 / 27 m ²
5.	«Robel» A/S LukaShin highway 5	D. Markapuchyan 39-91-40	gas	3 m ³	16/ 30 m ²
6.	«Khchaqar-Musa» LLC Tichina 140	Davit Davtyan 4-44-51 (Ejmiatsin)	gas	3 m ³	8 / 24 m ²
4. Davtashen					
7.	«Ara ev Aytsemik» LLC, near the Davitashen bridge Automatic Gas Pumping Station	Gevorg Ayvazyan 36-78-18	gas		5/ open area
8.	A. Mikoyan str. «Elsi stil» LLC Automatic Gas Pumping Station	Arsen Arakelyan 36-21-55	gas		4/ open area
9.	A. Mikoyan str. «Gaom Group» LLC Gas station	Garnik Shirinyan 36-82-68	gas		5/ open area
5. Erebuni					
10.	Gosh-Gas LLC crossroad of Kh.Don and Nubarashen highways	Misha Galstyan 47-04-01o.	gas	20 t	
11.	Gosh-Gas LLC Artsakh str., in front of building No.8	Misha Galstyan 62-60-06	gas	20 t	
12.	Agras-Gas LLC D.Bek str., end of cemetery	Ashot Khachatryan 57-17-00 o.	gas	40 t	

1	2	3	4	5	6
13.	Davit Artak LLC S.Davit str., No. 87,Vardavar	Arshak Yengoyan 57-34-00 o.	gas	20 t	
6. Kentron					
	-	-	-	-	-
7. Nor Nork					
	-	-	-	-	-
8. Nork-Marash					
	-	-	-	-	-
9. Nubarashen					
14.	AGPPS Nubarashen highway 97/3	A. Hovhannisyan 476679	gas	-	4 /653.6
10. Malatia-Sebastia					
15.	„V-Sank,, LLC Raffi and Babajan	Aram Avetisyan 72-66-55	gas	18	50/4
16.	„Olivesta ,,LLC Babajanyan	Karen Gevorgyan 73-40-14	gas	18	50/4
17.	„Gas-Propan,, LLC end of Tichina	Yakhanejyan Davit	gas	12	80/4
18.	„Gosh-Gas,, LLC end of Leningradyan	Haykaz Hovsepyan 74- 04-41	gas	12	50/4
19.	„Gosh-Gas,, LLC Babajanyan 54	Haykaz Hovsepyan 74- 04-41	gas	12	50/4
20.	„P/E,, Aslanyan Hrayr Babajanyan 60	Hrayr Aslanyan	gas	4	50/2
11. Shengavit					
21.	<<Di-di group>>LLC Arshakunyats 119/1	48 34 86	gas	not stored	
22.	<<Lir-Star>>LLC	48 35 67 48 34 67	gas	not stored	
23.	<<Methane gas>>LLC Artashat highway 106	094 40 10 75	gas		
24.	<<Multi lion>>LLC Isakov str.	094 50 00 94	gas	9 tons	
25.	<<Multi lion>>LLC Shirak str.		gas		
26.	«Multi lion» LLC Bagratunyats 91		gas		
27.	«Gamas» LLC Shirak	42 16 97	gas	not stored	
28.	«Gosh gas» LLC Artashisyan 62/1	24 62 90	gas		
29.	«Methane gas» Shirak 72/2	094 40 10 75	gas		
12. Qanaqer-Zeitun					
30.	<<KAMOIL>> P.Sevak and K.Ulnetsi crossroad	Edgar Pambukyan 091-19- 68-11 28-04-01	gas		
31.	Tbilisi highway 20	Argam Mkrtchyan 28-76-07 53-38-83	gas		
32.	In front of Z.Sarkavag 69h	Nairuhi Abrahamyan	gas		

33.	Myasnikyan avenue, in front of WaterWorld	Samvel Baghdasaryan 24-00-43, 091-20-68-80	gas		
34.	D.Anhaght str., in front of ABC wall	Arayik Hovhannisyan 094-05-27-88	gas		
1	2	3	4	5	6
35.	„Astghik ev Mane" LLC Tbilisi highway 30	M. Hovakimyan 28-80-91 091-42-50-54	gas		
36.	Tbilisi highway.18/4	R. Shahmuradyan 091-20-90-51 22-64-98	gas		
37.	"Ghars erkar vanq" D.Anhaght str.10/1	Suren Petrosyan 24-30-20,091-24-22-23	gas		
38.	Azatutyan 26/3	Armen Harutyunyan Armen 29-92-42	gas		
39.	"GOSH-GAS" LLC Rubinyants str.41/1	Arsen Hayrapetyan 099-11-11-26	gas		

Hrdehapytyunavtang obyektner

1. Arabkir

1.	p/e A.Markosyan, Tbilisi highway.		benzine	5 t	
2.	p/e A.Sargsyan, in front of pond of lamp factory		benzine	8 t	
3.	p/e S.Vardanyan, Khachatryan-Kalents crossroad		benzine	5 t	
4.	<Mika Armenia> LLC near the bridge, Vagharshyan str.		benzine	80 t	
5.	<Mika Armenia> LLC H. Qochar near the bridge		benzine	80 t	
6.	<Jor-Has> LLC Babayan str.		benzine	30 t	
7.	<LaShe> LLC Qochar str., near the bridge		benzine	40 t	
8.	<ATTL> LLC N. Zaryan 22		benzine	40 t	
9.	«Venlo» LLC Mamikonyants str. 44		benzine	40 t	
10.	<5 Astgh> LLC in front of Komitas str. bld.35		benzine	30 t	
11.	<Exim-Petrol> LLC Komitas 60		benzine	30 t	
12.	<Karen-Sartik> LLC Komitas 60		benzine	40 t	
13.	<Dianna-91> LLC Nazaryan-Vratsakan str. intersection		benzine	30 t	
14.	<Serojik-95> LLC in front of Qochar bld. 21		benzine	30 t	
15.	<Vasma> LLC Komitas 35		benzine	30 t	
16.	p/e M. Tonoyan, Qochar-Vagharshyan crossroad		benzine	10 t	
17.	p/e M.Mkrtchyan, Adonts 7/1		benzine	8 t	
18.	p/e A.Nazaryan, V. Papazyan-Khachatryan intersection		benzine	8 t	
19.	p/e H.Mkrtchyan, Vagharshyan-		benzine	7 t	

	Avetisyan				
20.	<Meri and Davit> LLC Gyulbenkyan-Khachatryan crossroad		benzine	40 t	
21.	p/e G. Eranosyan, Gyulbenkyan- Qochar crossroad		benzine	5 t	
22.	p/e H. Kargomtsyan, near the pond of lamp factory		benzine	5 t	
23.	<Furgon> LLC Near the pond of <Grand San> LLC		benzine	30 t	
24.	p/e J.Kirakosyan, Mamikonyants 2		benzine	4 t	
25.	p/e R.Movsisyan, Mamikonyants- Griboyedov crossroad		benzine	4 t	
26.	p/e R.Aleksanyan, in front of N. Zaryan 15 bld.		benzine	3 t	
27.	p/e G.Ghukasyan, in front of Qochar 27 bld		benzine	3 t	
28.	p/e M.Uramanov, Orbeli str.		benzine	4 t	
29.	p/e P.Zaveyan, Adonts str		benzine	5 t	
30.	p/e H.Zakharyan, V. Vagharshyan in front of 12bld		benzine	5 t	
31.	<Sivas> LLC Near H. Qochar 27bld		benzine	40 t	
32.	<Hektor> LLC N. Zaryan str.		benzine	40 t	
33.	p/e G.Grigoryan, in front of V. Vagharshyan 12bld		benzine	5 t	
34.	<Gandzasar> LLC near Qochar bridge		benzine	35 t	
35.	p/e R.Mnatsakanyan Mamikonyants-Vagharshyan crossroad		benzine	8 t	
36.	p/e A.Andreasyan, Avetisyan 36		benzine	5 t	
37.	p/e S.Gulumjyan, Griboyedov 13		benzine	5 t	
38.	p/e Yu. Nazaryan, Vagharshyan 12		benzine	5 t	
39.	p/e E.Khzanyan, Gyulbenkyan 31		benzine	8 t	
2. Avan					
40.	Gai str. <Stver> LLC	G. Mekhakyen 647574	benzine fuel, lubricating oil	10 t	6/300 m ²
41.	Acharyan str. <Flesh> LLC	V.Antonyan 093184060	benzine fuel, lubricating oil	30 t	11/100 m ²
42.	Babajanyan str. <Talin 1> LLC	Y.Melkonyan 094436793	benzine fuel, lubricating oil	10 t	7/2000 m ²
43.	Rubinyants str. <Flesh> LLC	V.Antonyan 093184060	benzine fuel, lubricating oil	25 t	10/100 m ²

44.	Babajanyan str. <Zaqinyan>LLC	A.Zakinyan 093512830	benzine fuel, lubricating oil	11 t	2/56 m ²
45.	Sevan highway <Multi group>LLC	G. Tsarukyan	benzine fuel, lubricating oil		
46.	Acharyan str. <R.Hayrapetyan>LLC	R.Hayrapetyan 618821	benzine fuel, lubricating oil	11 t	8/300 m ²
3. Ajapnyak					
47.	«NLG» LLC, G.Chaushi str. 2	Edik Mkhitaryan 099-80-99-99	benzine	60 m ³	4 / 42
48.	«Mariam» LLC, Halabyan 67	Gagik Baghdasaryan 094-01-01-61	benzine	20 m ³	3 / 14
49.	«Vikan» LLC, beginning of Leningradyan str.	Karen Mkrtchyan 091-42-05-20	benzine	35 m ³	6 / 58
50.	«Rino» LLC Shinararner str. 13/1	Mesrop Gevorgyan 229-530 (091-408-036)	benzine	6 m ³	4 / 29
51.	«Eurowagen» LLC Janibekyan 1/1	Aram Gharibyan 38-11-99	benzine	5 m ³	4 / 22
52.	«Flesh» LLC end of Halabyan str.	Yura Khachatryan 53-88- 32	benzine	40 m ³	3 / 31
53.	«Flesh» LLC Ashtarak highway left part	Yura Khachatryan 53-88- 32	benzine	8 m ³	3 / 25
54.	«Flesh» LLC Ashtarak highway right part	Yura Khachatryan 53-88- 32	benzine	20 m ³	3 / 25
55.	«Flesh» LLC Shiraz str. 2/6	Yura Khachatryan 53-88- 32	benzine	4 m ³	4 / 30
56.	Hovhannisyan Samvel LLC Shirazi 20/5	Samvel Hovhannisyan 077-49-99-78	benzine	5 m ³	1/ 16
57.	«Aragats» LLC Abelyan-Shinararner crossroad	Hovhannes Gharibyan 098-99-77-56	benzine	20 m ³	6 / 20
58.	«Aragats» LLC Janibekyan-Shinararner crossroad.	Hovhannes Gharibyan 098-99-77-56	benzine	1,7 m ³	2 / 13
59.	«EvrOil» LLC Hasratyan 12/1	Robert Azizyan 093-47-15-16	benzine	5 m ³	2 / 16
60.	«KamOil» LLC Hasratyan 10/8	Kamo Melkonyan 077-17-77-73	benzine	20 m ³	4 / 32
61.	Manvel Miqayelyan LLC Shiraz str. 7/1	Manvel Mikayelyan 077-51-99-94	benzine	17 m ³	4 / 28
62.	«Tigran Grigoryan and friend» Shiraz str. 51	Tigran Grigoryan 39-36- 72	benzine	4 m ³	2 / 15
63.	«City Petrol Group» LLC Hasratyan str. 15/5 (Tigran)	Artur Danielyan 56-52- 81	benzine	5 m ³	2 / 14
64.	«City Petrol Group» LLC Mazmanyanyan str. 5/1	Artur Danielyan 56-52- 81	benzine	5 m ³	2 / 14
65.	«KamOil» LLC Hasratyan 9/2	Kamo Melkonyan 077-17-77-73	benzine	2,1 m ³	2 / 11
66.	«Fegas Oil» LLC Margaryan str. 29/3	Sedrak Simavoryan 093-96- 66-60	benzine	10 m ³	4 / 23
1	2	3	4	5	6

4. Davtashen					
67.	«City petrol Group» LLC Gas Station (left part of Davitashen bridge)	YURA Petrosyan 52-82-81	benzine diesel fuel	20t 10t	2 open area
68.	<<Keshgisher>> LLC T. Petrosyan-1/4 Gas Station	Armen Khachatryan 36-80-08	benzine diesel fuel	15 t 10t	2 open area
69.	<<Mika Armenia.>> LLC Ashtarak highway-14 Gas Station	Vladimir Nersisyan 35-21-30	benzine diesel fuel	20 t 10t	2 open area
70.	<<RanOil>>LLC A. Mikoyan street Gas Station	Aleksan Hakobyan 093-19-32-55	benzine diesel fuel	15 t 10t	2 open area
71.	«Mika Armenia» LLC G. Chaush-Melqumov crossroad Gas Station	Edvard Ohanyan 093-95-88-16	benzine diesel fuel	30 t 10 t	2 open area
72.	«Muradyan brothers» LLC Sasna Tsrer street Gas Station	Armen Muradyan 36-76- 17 091-36-77-43	benzine diesel fuel	20 t 10t	2 open area
73.	«Deyern» LLC end of Halabyan street Gas Station	Aleksander Petrosyan 091-42-43-79	benzine diesel fuel	30t 10t	2 open area
5. Erebuni					
74.	Kotayk-91 A/S Davit Bek str. No. 136	Yeprem Yepremyan 091-41-33-74 mobile.	benzine	20 t	
75.	Davit and Elina LLC Azatamartikner and Gajegortsner	ArShak Yengoyan 57-05-90 o.	benzine	20 t	
76.	P/E Qalajyan Grigor in front of Rostovyan str. No.27 bld.	Grigor Malajyan 45-25-66	benzine	20 t	
77.	Gari LLC G.Mahari str. No.1/3	Andranik Avetisyan 094-28-59-59 mobile. 43-88-10 o.	benzine	20 t	
78.	Vardanyan-91 LLC Ayvazovski and Titogradyan	A. Danielyan 47-11-14 o.	benzine	20 t	
79.	Ran-Oil LLC Arin-Berd str. No.9	Samvel 091 40-31-33 o.	benzine	325 t	
80.	A.Purtoyan P/E Artsakh str. No.1/1	AShot Purtoyan 45-27-00 o.	benzine	50 t	
81.	Agropetrolservice LLC Artsakh str. No.23	A.Davtyan 44-52-21 o.,43-36-16	benzine	40 t	
82.	Delta Expres LLC T.Mets and Glinka intersection	Davit Gulumyan 57-04-01o.	benzine	20 t	
83.	Yerevan <<Combined food factory>>CJSC Artsakh str. No.138	Director: R.Sargsyan 47-22-03 o.	Bread-cutting powder	-	90/88000 m ²
6. Kentron					
84.	Ran Oil Brazil square	R. Galustyan 451798	benzine diesel fuel, lubricant oil	120	3/8
85.	§Flesh LLC Eznik Koghbatsi 30	Y. Khachatryan 533822	benzine diesel fuel, lubricant oil	50	5/22.5
86.	§Maxdal LLC	H. Ohanyan	benzine	50	4/12.5

	In front of Isakov 6	543124,543125	diesel fuel, lubricant oil		
87.	§Bari Voyage» LLC Heratsi 10	A. Harutyunyan 571801	benzine diesel fuel, lubricant oil	75	4/18.5
88.	§Mika Armenia Trading beginning of Athene str.	V. Aghajanyan 544104	benzine diesel fuel, lubricant oil	125	12/32
89.	§EVR OIL» LLC Leningradyan 45	R. Azizyan 391516,426467	benzine diesel fuel, lubricant oil	125	8/28.3
90.	§Aprinada» LLC Khorenatsi 148	N. Apriamova 575400	benzine diesel fuel, lubricant oil	25	1/4
91.	§Araks» LLC Myasnikyan 20-a	H. Seviklyan 524018	benzine diesel fuel, lubricant oil	50	3/9.5
92.	§Fugas» LLC Vardanants109	R. Gevorgyan 552872	benzine diesel fuel, lubricant oil	50	3/8.7
93.	§Matitsa» LLC	R. Gamalyan 412441	benzine diesel fuel, lubricant oil	120	7/22.5
94.	§Araks» A/S Qristophor 1	G. Barseghyan 542070	benzine diesel fuel, lubricant oil	50	3/13.5
7. Nor Norq					
95.	“Flesh” LLC, Vakhtangov 2/2	Yu. Khachatryan 55-88-32, 55-88-22	Benzine	-	5/-
96.	“Rena Trade” CJSC, Bagrevand 88	Vladimir Aghajanyan 67-05- 93	Benzine	-	20/-
97.	“MIKA Corporation” CJSC, 4-th massive, Gai 51/7	-	Benzine	-	3/-
98.	“Stver” LLC, Hovhannisyan 1/8	Gagik Mekhakyants Mekhakyants 64-75-74	Benzine	-	6/-
99.	“City Petrol Group” LLC, Luxenburg 36/3	Arman Sahakyan	Benzine	-	5/-
100.	“City Petrol Group” LLC, Tevosyan 97/2	Yuri Petrosyan	Benzine	-	6/-
101.	P/E Avagyan Artur, Mayak 42/3	Artur Avagyan 63-88-81	Benzine	-	2/-
102.	“KAMOIL” LLC, 7-th massive, in front of bld.28	Kamo Melqonyan 077- 177773	Benzine	-	4/-
103.	“SITRA OIL” LLC, Mikoyan 9/3	Lernik Gevorgyan 64-71- 25	Benzine	-	4/-
104.	“Karen and Nora” LLC, Gyurjyan 2/2	Igor GHazaryan 63-35-90	Benzine	-	5/-
105.	P/E Melqonyan Miqayel, Moldovakan 10	Miqayel Melqonyan	Benzine	-	2/-
106.	“Taba” LLC, 3-th massive, Gai 16/5	Tatul Eghiazaryan	Benzine	-	3/-
107.	“MBM New” LLC, Gyulikekhyants 1/3	093-08-38-08	Benzine	-	5/-

108.	Bobokhyan Davit, B.Muradyan street	Davit Bobokhyan 66-16-00	Benzine	-	1/-
109.	Muradyan Artur, D.Beki 130	Artur Muradyan 093-06-29-51	Benzine	-	3/-
110.	“Di-di Group” LLC, D.Bek 101/1	66-28-10	Benzine	-	4/-
111.	“Gosh Gas” LLC, Tevosyan 7/1	A. Hayrapetyan 24-62-90	Benzine	-	2/-
8. Nork-Marash					
112.	«Hyusis arahet» LLC	Baghdasaryan Lyova 65-03-01 093-807-070	benzine	150	3/200
113.	«Qagh. Petrol Service» A/K	Salazaryan AShot 65-14-97	diesel-fuel, benzine	200	5/180
114.	«Arg» LLC	Gevorgyan Artur 65-05-16 091-435-818	benzine	20	4/120
9. Nubarashen					
115.	Ran Oil Nubarashen 6 str.	Baghdasaryan S.	Benzine, diesel fuel	5t	3/
10. Malatia-Sebastia					
116.	„Mazinni „LLC Sebastia str.	Mahtesyan Tigran	benzine	13.5	50/1h
117.	„Gush„, LLC NSH Sebastia str.	Melqonyan Edik 73-55-66	benzine	22	80/2
118.	Melqonyan Edik «999» Sebastia str.	Melqonyan Edik 73-55-66	benzine	12	50/2
119.	„Ordi Grig„, LLC Leningradyan	Soghomonyan Gagik 39-20-10	benzine	30	100/2
120.	„Gurz„, LLC Leningradyan	Tumasyan Hrant 39-99-09	benzine	70	125/2
121.	„Derjava „LLC Ts. Isakov str	Hambardzumyan Arkadi 72-61-61	benzine	88	150/5
122.	„„Ran-Oil „, LLC Sheram str.	Harutyunyan Gagik	benzine	40	125/3
123.	„Glob-Glend„, LLC Sheram str.	Manukyan Manuk 72-19-99	benzine	25	80/1
124.	„Tovmas and FRD„, LLC Sheram str.	AShot AShotyan 74-84-34	benzine	15.5	80/1
125.	„Sokol Group „LLC Andranik str.	Aghababyan Lyova	benzine	8	50/2
126.	„P/E „Shahinyan Norik Babajanyan str.	SHahinyan Norik 73-74-70	benzine	5	50/1
127.	„P/E „Miqaelyan Hovsep Babajanyan 108	Miqaelyan Hovsep	benzine	0.8	50/1
128.	„Hovtvard „LLC Babajanyan 72	Hovsepyan Vahe	benzine	42	125/4
129.	„Poli-Petros„, LLC Babajanyan 120	Vanyan Polina	benzine	36	125/3
130.	„Qagh. Petrol „LLC Ts. Isakov 27	Salazyan AShot	benzine	36	100/3
131.	„Mik „LLC Ts. Isakov 23	Harutyunyan Martun	benzine	15.5	80/
132.	„P/E „„Zatikyan Tigran TS. Isakov 14/2	Zatikyan Tigran	benzine	2	50/1

133.	„Kam-Oil,, LLC Sebastia str.	Melqomyan Kamo	benzine	30	125/4
134.	„Kam-Oil,,LLC Andranik 24	Melqomyan Kamo	benzine	30	125/4
135.	«Flesh» LLC Sebastia 161	Gevorgyan Gevorg	benzine	110	250/10
136.	„Qagh. Petrol „LLC Sebastia 157	Salazaryan AShot	benzine	22	80/2
137.	„Hur Chrag „LLC Sebastia 96/1	Gabrielyan Tadevos	benzine	20	80/2
138.	„Flesh,,LLC Andranik 113/1	Simonyan Stepan	benzine	40	125/3
11. Shenegavit					
139.	<<Ran-Oil>>LLC Arshakunyats 28/2	099 88 06 20	benzine		
140.	Hovikyan Hmayak P/E Arshakunyats 28/7	091 37 99 13	benzine	9000 l.	
141.	<<Kam Oil>> LLC Arshakunyats 34	Melqonyan 44 27 72 56 23 48	benzine	15000l.	
142.	CPS Arshakunyats 33	077 42 55 05	benzine	6300 l.	
143.	<<CPS>> Salazaryan LLC Arshakunyats 57	077 42 55 05	benzine	6300l.	
144.	<<Flesh>> CJSC Arshakunyats 2	53 42 33	benzine		
145.	<<RAN OIL>> LLC Arshakunyats 127/3	48 08 84	benzine	17000l.	
146.	«CPS» Salazaryan LLC Bagratunyats 67/1	077 42 55 05	benzine	6300l.	
147.	<<Nesa Komfort>>LLC	48 31 01	benzine	8000l.	
148.	<<Aghayan group>>	093 77 07 01	benzine		
149.	<<Alina-Anna>>LLC	091 00 80 07	benzine	10000l.	
150.	<<Gor Nane>>LLC Bagratunyats 1/2	49 94 99	benzine	15000l.	
151.	<<MIKA>>LLC Bagratunyats 1/4	42 79 85 54 41 04	benzine	20000l.	
152.	<<Elen Baghdo>>LLC Bagratunyats 2/8	093 52 07 16	benzine		
153.	<<CPS>> Salazaryan LLC		benzine		
154.	<<CPS>> Salazaryan LLC		benzine		
155.	<<Gamas Selita>>LLC Artashesyan 77/1	093 24 53 53	benzine	30000l.	
156.	<<RAN OIL>>LLC G.Njdeh 37/2	099 90 00 97	benzine		
157.	<<Kam Oil>> group Bagratunyats 44/1	44 27 72	benzine		
158.	<<CPS>>		benzine		
159.	<<Mika>> corporation	53 87 81	benzine		
12. Qanaqer-Zeitun					

Flammable facilities					
1. Arabkir					
1.	<Galant> CJSC	A. Chiloyan 25-89-57	Woven fabrics	-	36 3500
2.	<Lambron> CJSC	A.Asposyan 23-11-63 091-43-27-02	Euro-window	-	70 8000
3.	Fundamental scientific Library Baghramyan 24d	56-44-81	-	-	86
4.	No.29 branch of Library after A.Isahakyan Komitas 6	27-22-90	-	-	5
5.	No.33 branch of Library after A.Isahakyan Kievyan 1	27-08-31	-	-	6
6.	Arabkir No. 5 library Sundukyan 26	S.Farmanyan 26-04-07	-	-	6
7.	Arabkir No. 6 library Qanaqer HES 4/1	S.Safaryan 23-25-18	-	-	7
8.	Library after Papazyan Baghramyan 40	51-27-64	-	-	8
2. Avan					
9.	-	-	-	-	-
3. Ajapnyak					
10.	Centralized System of libraries, Margaryan 1-st backstreet 11	Hakobyan Gohar / 091-52-43-41	book	--	49 / 1100
11.	Yerevan «Haybusak» University LLC, Abelyan 6	Harutyunyan Anahit 39- 06-98 / 091-40-49-13	book	--	1620 / 5315
12.	«Agricultural Universito of Yerevan», LLC, Fuchik 27/5	Azizbekyan Lianna 34- 13-00 / 091-21-07-73	book	--	1200 / 2885
13.	Yereavan branch of the Moscow State University of economy, statistics and information science, Arzumanyan 5/2	Vardanyan Sedrak 38-03- 45 / 093-27-13-49	book	--	455 / 2265
14.	Yerevan No.6 handicraft college, G. Hasratyan 3	Grigoryan Sona 35-81-25 / 099-11-05-51	book	--	302 / 1600
15.	«Private college of Kupalyan» LLC	Khanamiryan Lilit 39-89-99 / 094-41-76-80	book	--	103 / 608.5
16.	«Sh.Shahamiryan» educational complex LLC Leningradyan 4a	Jalayan Lolita 39-11-10 / 091-99-87-10	book	--	135 / 1100
17.	Music school after M. Mirzoyan PNCO, Norashen district	Sargsyan Lilia 35-15-75	book	--	262 / 1100
18.	Art school after A. Gabrielyan Arzumanyan 8a	Tonoyan Gohar 39-50-32	book	--	321 / 610
19.	Music school No.21 after A. Tsitsikyan, Sisakyan 20	Hovhannisyan SHuShanik 39-40-60	book	--	104 / 876.4
20.	«Armenia» PMC CJSC, Margaryan 6	Grigoryan Gari 31-81-02 / 091-00-66-51	material, device	--	1164 / 34620
21.	«Scientific-medical center of dermatology and sexually transmitted diseases» CJSC	Babayan Karen 34-27-10 / 091-40-86-62	material, device	--	105 / 3120

	Fuchik 32				
22.	«Ophtalmological center after S.V.Malayan» CJSC, Fuchik 30	A.Malayan 34-49-26 / 093-70-01-10	material, device	--	245 / 12500
23.	«Republican Institute of Reproductive Health, Perinatology, Obstetrics and Gynecology» CJSC Margaryan 6	Abrahamyan Razmik 34-18-83 / 091-40-54-02	material, device	--	292 / 5184
24.	Research center of radiation medicine and burns of MH RA Davtashen 25 str.	Davidyan Norayr 34-11-44 / 27-79-55	material, device	--	160 / 5545
4. Davtashen					
25.	GRATSIA LLC (Redcross hospital)	M. Mnatsakanyan Ashtaraki highway 34-41-61	Furniture, bedding	table, chair- 250 bedding-110	280 /9326
26.	Library No. 40, 4-th district	Nurijanyan Irina 36-15-93	book, furniture	book 500 pieces	9 /2400
27.	Children and youth creative center 4-th district	Qocharyan Armen 36-15-94	furniture, paper, ink	few	50 / 500
5. Erebuni					
28.	«Anania Shirakatsi» International Relations University T.Mets str. No. 65a	S.Afyan 57-11-77 o.	furniture	-	310/450 m ²
29.	Armenian Medical Institute Ayvazovski str. No.131	G.Mkhoyan 45-19-23 o.	furniture	-	400/2050 m ²
30.	Yerevan State agricultural college Burnazyan str. No.143	R.Tovmasyan 45-09-20o.	furniture	-	370/2200 m ²
31.	Tetev industrial state college Glinka str. No. 2	A.Strosyan 55-38-52 home.	furniture	-	380/4700 m ²
32.	Erebuni state medical college Titogradyan str. No.133	A.QuShkyan 47-07-70o.	furniture	-	390/1550 m ²
33.	after Tigran Chukhajyan Rostovyan str. No.23	S.Mirzoyan 45-08-80 o.	furniture	-	283/1259.84 m ²
34.	after Miqayel Maluntsyan Avanesov str. No.10	A.Melqonyan 47-02-10 o.	furniture	-	291/874.7 m ²
35.	Children and Youth creative center Erebuni str. No.15	A.RShtuni 45-54-80 o.	furniture	-	1000/3000 m ²
36.	No.8 handicraft college Avanesov str. No.1	V.Melyan 47-17-31 o.	furniture	-	27/2420 m ²
37.	No.9 handicraft college Vardashen 6-th str. No.66	A.Ghukasyan 45-13-65 o.	furniture	-	46/2700 m ²
38.	Kofoyed charity foundation Vardashen 9-th str. No.70	Sh.Khachatryan 45-58-65 o.	furniture	-	10/7700 m ²
39.	No.1 Republican special educational complex Vardashen 6- th str. No.68	L.Sargsyan 45-14-21 o.	furniture	-	70/2700 m ²
40.	Grigor Narekatsi MC Nor-Aresh str. No.22	L.Grigoryan 45-06-60 o.	furniture	-	474/3565 m ²
41.	Erebuni MC Titogradyan str. No.14	N.Mamikonyan 47-17-50 o.	furniture	-	1002/1.454.506 m ²
42.	Muratsan Hospital complex Muratsan str. No.114	K.Babinyan 45-01-50 o.	furniture	-	238/2.433.69 m ²

43.	No.1 children stomatological polyclinic Azatamartikner str. No.89	M.Sargsyan 45-46-11o.	furniture	-	360/25 m ²
44.	Erebuni historical and archaeological museum-reserve Erebuni str. No.17	G.Gyurjyan 43-26-61o.	furniture	-	48/173.9 m ²
6. Kentron					
45.	Opera and ballet national academical theatre after Al.Spendiaryan Tumanyan 54	Hovhannisyan Kamo 520241,586311 091412037			1600 / 6000
46.	State national academical theatre after G. Sundukyan G. Lusavorich 6	Davtyan Stepan 589622 091220321			1130/7188
47.	Russian state dramatic theatre after Stanislavski Abovyan 7	Davtyan Fred 583681,583962 091463742			700 / 3342
48.	State musical comedy theatre after H.Paronyan V.Sargsyan 7	Shahbazyan Karen 585423,488865 091405304			867 / 2060
49.	Dramatic theatre of Yerevan after H.Ghaplanyan Isahakyan 28	Khandikyan Armen 524713,247333			492 / 4495
50.	Youth theatre of Yerevan Municipality Moskovyan 3	Kheranyan Hayk 563127,563040 091318242			437 / 2300
51.	Musical comedy state theatre after H.Paronyan V.Sargsyan 7	Shahbazyan Karen 582795 091405304			193/2060
52.	Puppet theatre after H.Tumanyan Sayat-Nova 4	Babayan Ruben 520254 055430891			100/2400
53.	Youth chamber theatre of Yerevan Mashtotsi 58	Yernjakyan Ara 562118 091431413			170 / 1150
54.	Yerevan state circus Agatangeghos 1	Petrosyan Iosif 526300,526372 091209555			1550 / 5760
55.	Yerevan state puppet theatre Mashtots 43	Elbakyan Armen 562450,227861			106 / 200
56.	§National theatre Amiryan 23	Mkrtchyan Vardan 539415, 420989 077383845			300 / 875
57.	Artists theatre after Mher Mkrtchyan Khorenatsi 18	Badalyan Edgar 564227,565709 091492927			193 / 454
58.	Chamber musical theatre Proshyan 1 backstreet 1	Hakoby ³ Davit 521969 091405542			248 / 292
59.	Sport and concert complex after Karen Demirchyan	Tsitsernakaberd park			
60.	YSU Alex Manoogian 1	Simonyan Aram 554629			16000 / 131930
61.	Armenian state architectural university Teryan 105	Vostanik Marukhyan 524629 .583498			11885 / 26000
62.	Armenian state agrarian academy Teryan 74	Tarvedyan A. 524541,654595home.			7056 / 37355
63.	State medical university after M.Heratsi	Dumanyan Derenik 582532,581802			4900 / 11115

	Koryun 2				
64.	Armenian state pedagogical university after Kh. Abovyan Tigran Mets 17	Mirzakhanyan 526401			11000/ 36257
1	2	3	4	5	6
65.	Yerevan state university of architecture and construction Teryan 105	H. Tokmajyan 583773, 091431664			2500 / 4600
66.	Yerevan state conservatory after Komitas Sayat Nova 1a	Sh. Shahinyan 581164,573325			2050 / 11000
67.	Yerevan state economical university Nalbandyan 128	Yu. Suvaryan 521720,267441			4905 / 15620
68.	Theatre and cinema state institute of Yerevan Amiryan 26	Mazmanyany A. 536221,480043			756 / 12794
69.	Yerevan State linguistic University after V.Bryusov Tumanyan 42	Zolyan S. 530552, 534806			4200 / 12530
70.	Yerevan state art academy Isahakyan 36	Isabekyan A. 560726,581618			1100 / 3067
71.	Armenian state institute of physical culture Alex Manoogian 11	Arakelyan V. 556281,534372			2400 / 8798
72.	§Moscow LLC Abovyan 18	Martun Adoyan 523930,521270 091402102			1060 / 6295
73.	§Ulis CJSC §Nairi c/t Mashtots 50	Artur Manucharyan 542829,566110			760 / 1060
74.	§Armenian state philharmonic orchestra SNCO Aram Khachatryan's concert hall Mashtots 46	R. Sirunyan 561460 091308113			1662 / 11300
75.	„Armenian state Philharmony,, Abovyan 2	G. Manasyan 566705,567028 099240505			840 / 1760
76.	Chamber music house after Komitas Isahakyan 1	A. Tsaturyan 523275 099228812			848 / 2700
77.	Culture and sport republican palace of deaf-and-dumb Eznik Koghbatsi 69	Varagyan J. 220450,533536			1512 / 1535
78.	§Hrazdan central stadium CJSC Hrazdan valley 4/1	Jamharyan G. 585191			30131 / 14700
79.	AFF Republican stadium after V.Sargsyan, CJSC Vardanants 65	Khachatryan V. 558369 091430351			15035 / 57250
80.	Armenian national book chamber	Qochar 21			52
81.	Yerevan branch of tourism and service state institute of Russia	Isahakyan 18			92 914 m ²
82.	„Galiq,, university	Teryan 105			52 372 m ²

83.	„Gladzor,, management university	Grigor Lusavorich 7/1			90 800 m ²
84.	«Urartu» university of practical psych. and sociology	Koryun 19a			11 105 m ²
85.	„Interlingua,, linguistic university	Pushkin 21/1			30 550 m ²
86.	Yerevan humanities institute	Amiryan 26			
87.	„Medical University after Saint Teresa,,	Mashtots 54/a			60 350 m ²
88.	Northern University of Yerevan	Alex Manoogian 15			112 1721 m ²
89.	„Hrachya Acharyan,, University	Moskovyan 3			56 1620 m ²
90.	„Martig,, external economical relations university	Myasnikyan 5			56 244 m ²
91.	„Mesrop Mashtots,, university	Heratsi 2			8 500 m ²
92.	Yerevan branch of Moscow entrepreneurship international academy	Koryun 12			383 44 m ²
93.	„Culture,, university	Teryan 105			28 94 m ²
94.	Yerevan judicial expertise institute	Hanrapetutyan 19			40 280 m ²
1	2	3	4	5	6
95.	University after Movses Khorenatsi	Teryan 105			58 1730 m ²
96.	„Vilyam Saroyan,, University	Tigran Mets 42			30 150 m ²
97.	Economical and juridical university after Avetik Mkrtchyan	Shahumyan 32/1			40 291 m ²
98.	Finance, banking, exchange university	Byuzand 1/3			18 180 m ²
99.	Yerevan division of St. Petersburg foreign relations, economical relations, economy and right institute	Heratsi 7			64 730 m ²
100.	„Monte Melkonyan,, university	Khanjyan 19			-
101.	State dance college	Bayron 5			115/390 m ²
102.	State music college after Romanos Melikyan	Mashtots 11a			220/430/ 1223 m ²
103.	State base medical college	Koryun 10			308/2400/4142 m ²
104.	Finance and banking college	Amiryan 26			2/200/710 m ²
105.	College No. 2	Tigran Mets 34			60/175 200 m ²
106.	„Tashir,, trade centre	Khorenatsi 33			155/27000 m ²
107.	Armenian market/market No.2	Khorenatsi 35			200/12603 m ²
108.	market No.1	Mashtots 5			230/5300 m ²
109.	Vagharsh and sons LLC	Khorenatsi 24			79/88 m ²
110.	„Hrayr Harutyunyan ,, LLC	Abovyan 35/1			60/2300 m ²
111.	„Ayrarat ,, fair	Tigran Mets 36			500
112.	„Polyclinic No.1,, HCCJSC	Leo 17			97

					100 patient 134 bed/
113.	„Medical centre after Vl. Avagyan,,	Moskovyan 15			125 80 patient /2400 m ²
114.	„Special polyclinic,, CJSC	Teryan 129			110/150/ 1871 m ²
115.	Scientific research center of maternal and child health protection CJSC	Mashtots 22			295 103 / 97/6520 m ²
116.	Medical union No.2	Aram 54			140 143/5265 m ²
117.	Yerevan's Kentron and Nork-Marash regional expertise center of Hygiene and anti-epidemic inspection of MH RA	Leo 7			74/815 m ²
118.	RA MH Center for prevention of special dangerous infections	M. Heratsi 12			103/1434 m ²
119.	§Polyclinic No. 17 HCCJSC	Tigran Mets 36a			178 80-90 patient/3194 m ²
120.	§Firs medical aid SCJSC	Dzorap 40			227/3500 m ²
121.	University Hospitals after M. Heratsi	Abovyan 60			619/9331 m ²
1	2	3	4	5	6
122.	“Hospital of convicted persons” criminal-executive establishment of criminal-executive department of the Ministry of Justice	Arshakunyats 2			169 450 patient/2,7ha
123.	Cenetr of family planning and sexual health	Abovyan 56			278/6323.7 m ²
124.	3rd clinical hospital of Yerevan city	Dzorap 40			289/ 240-310 bed/7265 m ²
125.	„ Polyclinic No. 4,,	Moskovyan 13			119/2418 m ²
126.	„Nairi medical center,, CJSC	Paronyan 21			278/2233,30 m ²
127.	Polyclinic No. 7	Kilikia 4 th bld.			27/310 m ²
128.	„Center of urology,, CJSC	Abovyan 54			92/1379 m ²
129.	„Republican children recovery center,, CJSC	Old highway of Echmiadzin 109			87 60 20 1000 m ²
130.	„Saint Mary healthcare complex,, LLC	Abovyan 54			13 50/58 m ²
131.	Center of medical genetics and primary health care	Zakyan 5/1			27/540 m ²
132.	Medical department of RA police	Abovyan 54			225/300/ 4203 m ²
133.	Medical-healthcare multiprofile complex	M. Khorenatsi 26a			16/167 m ²
134.	Armenian-American health center	Heratsi 5			35 70/800 m ²
135.	„Manuk,, polyclinic	Abovyan 60			102/850 m ²
136.	„Artamed,, LLC	Paronyan 21			36/

					3600 m ²
137.	«Van» CJSC stomatological center	Tumanyan 23			149/80/1100 m ²
138.	Stomatological center after prof. Yeghiyan CJSC	Yekmalyan 6			25/20/3987 m ²
139.	„Arz,, stomatological center	E. Kochar 9			61/530 m ²
140.	„Beladent,, stomatological center	Paronyan 28a			58/826 m ²
141.	Ophthalmologic clinics	Abovyan 60/1			34/1665 m ²
142.	No.1 stomatological polyclinic of university	Heratsi 5			19/16/800 m ²
143.	No.1 clinical hospital	Abovyan 58			158/50 14880 m ²
144.	„Exhibition centre,, SNCO	Demirchyan 31			12
145.	„National Gallery of Armenia,, SNCO	Aram 1			150/200
146.	Natinal art museum of Armenia	Abovyan 64			34/17
147.	Museum of Parajanov	Dzoragyugh, ethnographic district 15/16			14/50
148.	„Museum of Spendaryan,, SNCO	Nalbandyan 21			11/35
149.	„Aram Khachatyryan museum,, SNCO	Zarubyan 3			29/150
150.	„Museum of A.Isahakyan,, SNCO	Zarubyan 20			17/50
151.	„Literature and art museum after Y.Charents,, SNCO	Aram 1			58/30
1	2	3	4	5	6
152.	„Museum of Y.Kochar,, SNCO	Mashtots 39/12			12/35
153.	„ Museum of Y.Charents,, SNCO	Mashtots 17			14/60
154.	„ Museum of H.Tumanyan,, SNCO	Moskovyan 40			18/100
155.	„History museum of Armenia,, SNCO	Republic Square			91/60
156.	„Museum of Russian art,, SNCO	Isahakyan 38			14/22
157.	„Service for protection of historical and cultural museum-reserves and historical environment,, SNCO	Tairov 15			41
158.	„Amaras,, publishing house CJSC Teryan 44	Asryan Arkadi 560479, 093911191			15/725 m ²
159.	Central library after A.Isahakyan Nalbandyan 4/1	Karapetyan Hasmik 589610, 093237736			164/468 m ²
160.	Natinal library of Armenia Teryan 72	Sargsyan Davit 584295, 093401725			358/7000 m ²
161.	National children's library after Khnko Aper, Teryan 42/1	Tonoyan Ruzanna 521222			127/3360 m ²
162.	„National book chamber of Armenia,, G.Kochar 21	Beqmezryan Hovhannes 527595, 093543973			51/971.7 m ²
163.	Matenadaran SRI of old manuscripts after Mashtots Mashtots 53	Tamrazyan Hrachya 583292			160/3000 m ²
164.	§Public radio company of	Amiryan Armen			

	Armenia CJSC A.Manukyan 5	551143			300/6480 m ²
165.	„Yerevan cognac factory,, CJSC Ts. Isakov 2	Grigoryan Ara 540000, 510100			223/56404 m ²
166.	„Gh-Telekom, CJSC Argishti 4/1	Yirikyan Ralf 568777, 093298001			670/ 6965 m ²
167.	Congress Hotel Italy 1	Dina Paskolini 580095			60/2925 m ²
168.	«Hotel Europe» CJSC Hanrapetutyanyan 38	Sukiasyan Varujan 546060			45/695
169.	„Shirak,, LLC Khorenatsi 13a	Ghazaryan Zoya 529915, 523989			51/1431
170.	«Veratsnund Hayrapetyan» Gr. Lusavorich 7	Hovhannisyan Haykaz 510000			14/5340.7
7. Nor Nork					
171.	Children and youth sport and technical center after A.Ghulyani, N/N 1st massive, Jugha 1	Aram Khachatryan 63-31-00	Property of cultural center	-	230pupil 15workers/ 227.0
172.	Cultural center of Nor Nork district, N/N 2nd massive, Gai str. 19	Alvina Harutyunyan 63-15-20	Property of cultural center	-	500pupil 26workers
173.	Nor Nork educational methodical scientific production center, N/N 6th massive, Luxembourg 2 backstreet	Gevorg Vardanyan 66-35-82	Property of cultural center	-	355pupil 40workers/ 2600.0
174.	Central library of Nor Nork district, N/N 1st massive, Nansen 20	Nazeni Arzumanyan 64-71-98	Property of library	-	36 workers/ 370.0
175.	“Surb Grigor Lusavorich” MC CJSC, N/N 3rd massive, Gyurjyan 10	Ara Minasyan 63-34-21	Property of hospital	-	940 workers/ 37200.0
176.	“Surb Grigor Lusavorich” MC children polyclinics N/N 3 rd massive, Gyurjyan 8	Artsruni Hakobyan 64-70-56	Property of polyclinic	-	120 workers/ 4664.0
177.	“Surb Grigor Lusavorich” MC	Artsruni Hakobyan	Property of polyclinic	-	166 workers / 4664.0
178.	Adult polyclinic N/N 3rd massive, Gyurjyan 8	64-60-03			
179.	“Surb Grigor Lusavorich” MC maternity hospital N/N 3-rd zangvats Gyurjyan 6	Vardan Rapyan 63-25-10	Property maternity hospital	-	233 workers / 7972.0
180.	No.22 polyclinic N/N 9th massive, Vilnius 46	Lyudmila Mkrtchyan 66-62-20	Property of polyclinic	-	135 workers / 150.0
181.	Nor Nork and Avan regional center of State hygienic and anti-epidemic inspection of the Ministry of Healthcare of RA, N/N 2nd massive, Moldovakan 54	Sargis GHukasyan 63-28-80	Property of inspectorate	-	18 workers / 185
182.	“Goydent” stom. center, N/N 1st massive, Lvovyan 5	Gohar Ohanyan 64-41-00	Property of stom.	-	33 workers / 896
183.	Children stom. centyer “after E. Mnatsakan”, N/N 1st massive	Elizaveta Mnatsakanyan 64-00-80	Property of stom.	-	29 workers / 392

	Nansen 1 ^a				
8. Nork-Marash					
184.	Armenakyan str. 197 ^a „Norq,, boarding house	A.Danielyan 65-27-71	wood	-	30
185.	Armenakyan str. 119 “Orphanage” No.2	L.Karapetyan 65-12-91	wood	-	25
186.	Norq gardens 193, deaf-and-dump boarding school	A.Avetisyan 65-21-14	wood	-	25
9. Nubarashen					
187.	Office of the Head of Nubarashen district Nubarashen 9str. 4	Hovhannisyan M. 476050	wooden furniture	-	26/ 81.9
188.	Nubarashen division of RA police Nubarashen 14str. 17	Karapetyan H. 476250	wooden furniture	-	
189.	Sport and cultural center of Nubarashen NGNCO Nubarashen 9str.	Hovhannisyan R. 475487	wooden furniture	-	22/377
190.	Children care and protection boarding institution of Yerevan No.2 NGNAO Chnqushi 14	Stepanyan T. 476060	wooden furniture	-	72/1926
191.	No.11 special/ school for mental defectives of Yerevan Nubarashen 6str. 1	Muradyan KH. 476120	wooden furniture	-	58/1800
192.	Nubarashen hosiery factory OJSC Nubarashen 15str	Ghadyan E. 475292	wooden furniture	-	10/1530
193.	No.34 library of Nubarashen NGNCO Nubarashen 9str.	Gorqmazyan V. 475487	wooden furniture	-	4/196
194.	Nubarashen regional center of social service Chnqushi 14	Tevosyan A. 475328	wooden furniture	-	3/500
195.	Health service LLC Nubarashen Nubarashen 1/3	Gasparyan G. 475006	Furniture, bedding	-	10/12000
196.	G.Narekatsi MC Nubarashen's polyclinic Chnqushi 4	476051	Furniture, bedding	-	34/426
197.	MH CJSC, psychiatric clinic of Nubarashen Nubarashen 1/3	Ananyan A. 475571	Furniture, bedding	-	147/8445
10. Malatia-Sebastia					
198.	<Malatia hayordats tun> Sebastia 32/2	M. Galstyan 74-69-39	property	____,____	300/70
199.	No. 19 polyclinic HCJSC Andranik 2a	S. Sargsyan 74-29-01	property	____,____	8202/180
200.	No. 9 children. Andranik 2a	E. Sargsyan 74-19-10	property	____,____	0.12/131
201.	No. 4 children stomatological polyclinic Ohanov 9	E. Harutyunyan 72-04-22	property	____,____	666.8/30
202.	<Neladent> CJSC stom. center Babajanyan 29	E. Eghikyan 72-44-00	property	____,____	2000/36

203.	<Malatia> MC Varujan 28a	A. Asatryan 77-30-00	property	____,____	3500/ 530
204.	No. 15 polyclinic, Sebastia 9	H. Harutyunyan 74-48-38	property	____,____	857/145
205.	SHAI expertise center, Sebastia 9	K. Strosyan 74-79-38	property	____,____	451.67/40
206.	„Pharmatech,,CJSC Raffi 111	V .Arushanyan 74-36-20	property	____,____	9.49/28
207.	„BETS,, CJSC Andranik 1	S. Abrahamyan 72-00-10	property cable	____,____	460/150
208.	„BETS,, CJSC „Central,, branch, Andranik 1	R. Atoyan 72-30-01	property cable	____,____	13.37/99
209.	Center for social service of handicapped and aged lonely people in home conditions Andranik 74	L. Aghajanyan 74-04-02	property	____,____	1270/74
210.	„Metaqs,, OJSC Sebastia 37	G. Qocharyan 74-30-99	property	____,____	8317.4/30
211.	„Krunk,, CJSC Shirak 15	H.Petrosyan 77-15-49	property	____,____	1180/175
212.	„Marianna,,LLC Haghtanak 6th str. house 17	T. Vardanyan 73-12-62	property	____,____	1800/38
213.	„Babik-90,, Haghtanak 4/1th str.	G. Deghoyan 73-12-77	property	____,____	1200/12
214.	„Malatia Gardening,, Jambul 29	N. Balagozyan 74-30-76	property	____,____	500/15
215.	„Anush,, LLC, Vantyan 61a	D. Soghomonyan 77-29- 11	property	____,____	0.24/85
216.	LX / TX Andranik 72. 73.74 Ohanov 50/3	A. Danielyan 54-96-58	cable property	____,____	3000/122
217.	„Yerevantrans,, CJSC Leningradyan 16	M.Hambardzumyan 39- 13-30	property	____,____	5843.73/290
218.	No1. boarding house of Yerevan Haghtanak 2-nd str.	A. Gyurjyan 72-39-10	property	____,____	3.5ha/244
219.	„Armenia IA,, CJSC Zvartnots 42	Marselo Vende 49-39-00	property	____,____	3.62/2670
220.	„Tosp,, OJSC Tichina str. 2	S. Bekirski74-20-78	property	____,____	2066/350
221.	„Nairi CF,,LLC Shahumyan 4 th str. 73	V. Aghjoyan74- 54-10	property	____,____	200/10
222.	Library system Sheram 75	L. Sargsyan 72-34-70	property	____,____	17/379m2
223.	Library G. Haghtanak 12str. bld.32	S. Gishyan	property	____,____	3/150m2
1	2	3	4	5	6
224.	„NIIP Alfa,, CJSC Shrjanayin 2/2	R. Alumyan 77-71-42	property	____,____	3930/25
225.	„Rafayel Tatev,, LLC Svachyan 1 2 / 7	K. Sargsyan 74-45-45	property	____,____	6000/1200
226.	„Holy Mother of God,, MC maternity hospital B-4 h.	N. Dallakyan 46-18-41	property	____,____	3.0003ha/ 232
227.	„Hayatom,, CJSC Isakov 50	V. Petrosyan 74-21-30	property	____,____	5000/98
228.	<Taron> aesthetic center Andranik 54	H. Tadevosyan 74-04-03	property	____,____	6 workers. 90 children/541
11. Shnegavit					

229.	Food production technical school Arshakunyats 40	A.Vardanyan 441403, home. 487668	---	--	70/679
230.	Fine art college after P.Terlemezyan, Arshakunyats 39	Arushanyan Narek 443804, 442672 442542	--	-	89/715 3600m ²
231.	Yerevan State culture college, Bagratunyats 37	Sargsyan Nadejda 480580, 480581	--	--	5 0/250 2000m ²
232.	State Industry college, G.Njdeh 23	Sargsyan Aghasi 460344, 429425	--	--	65/456 3600 m ²
233.	Pedagogy college after A.Bakunts, G.Njdeh 20	Kostanyan Vardges 440231, 443409	--	--	56/400 1838 m ²
234.	Yerevan State technology college, Bagratunyats 71	Melqonyan Anahit 480641, 487140	--	--	40/275
235.	Craftsmanship high school No.1 Arshakunyats 65	Davtyan Slavik 443701, 443200 443701	--	--	42/202 5019 m ²
236.	Children and youth sports Olympic fencing school of Armenia sport union, Noragavit 1str. bld.99	Navasardyan Aleksan 485314	--	--	23/218
237.	Cycle racing school under Aremenian State Sports Committee Bagratunyats 48	Hovhannisyan Hovhanes 441454	--	--	16/183
238.	Quantum college, Bagratunyats 23/2	Vardanyan Robert 460391, 423382 122217, 099473336 091221395	--	--	90/500 2400 m ²
239.	No. 26 «Kashi» OJSC	Manucharyan Donara	--	--	
1	2	3	4	5	6
240.	No.41 41 «Hayelektrameq» CJSC in the yard of G.Njdeh bld.5	Dallaqyan Mariam 426549	--	--	
241.	No. 82 «Kabel» CJSC G.Njdeh 12	Mnatsakanyan Svetlana 421801	--	--	
242.	No. 176 «Hayelektrameq» CJSC Shirak 15	Alanakyan Susanna 429465	-	--	
243.	No. 216 «Hayelektrameq» CJSC Eghbayrutyan 11a	Barseghyan Amalya	--	--	
244.	«Elektron» CJSC Sharur 5	Hakobyan Tamara 420891	-	--	
245.	«Viasphere» technopark CJSC Arshakunyats 41	Vardanyan Aram 442188, home. 487601	--	--	40
246.	«Neytron» SPU Bagratunyats str. 73	Badalyan Hamlet 481390, home. 571451	--	--	150
247.	«Andron» SRI of CE Manandyan str. 33	Demirchyan Galik Hrachi 423840,	--	--	150
248.	«Dvin» concern CJSC Arshakunyats 67	Sargsyan Rafik Azati 442674, home. 529533	--	--	100
249.	«Plastpolimer» SRI Arshakunyats avenue 127	Oskanyan Patvakan 488090, 077240223	--	--	34
250.	«Ariq» Applied chemistry SRI Bagratunyats street No. 70	441852	--	--	80
251.	No. 16 Arshakunyats 42	Mirabyan Gayane 440821	--	--	7

252.	No. 17 Bagratunyats 1 backstreet bld.9	Khachatryan Sofia 421292	--	--	11
253.	No. 32 N.Shnegavit 12str. house 15	Khachatryan Susanna 480601	--	--	6
254.	No. 35 Noragavit 1str. 95a	Nkrtchyan Shushan 484587	--	--	2
255.	«Holy Mother of God» MC CJSC branch (former No.6 medical union) Bagratunyats 1	Tonoyan Taron Artashesi 421183, 091411589 home. 442593	--	--	144 3550 m ²
256.	«Holy Mother of God» MC CJSC (former «Ambulance» children clinical hospital) Artashisyan 46a	Dallaqyan Nikolay Hovhannesi 461841, 461740 228189,091400714	--	--	462 0,0245 m ²
257.	«Shnegavit» medical center (former No. 3 maternity hospital) Manandyan 9	Urumyan Sergey Aleqsandri 449503, home. 523636	--	--	320 4955 m ²
258.	«Holy Mother of God» MC CJSC «Arshakunyats polycl.» (former No.18 polyclinic) Arshakunyats 43	Petrosyan Gagik Sergeyi 440223, 440123 091821835	--	--	139 5600 m ²
259.	«No. 4 medical. clinic» Bagratunyats 70	Harutyunyan V. 449162	--	--	
260.	No. 13 polyclinic SCJSC N.Shnegavit 9th str. 32	Galstyan Aram Hovhannesi 482151, home. 365240	--	--	148 0,195 ha
1	2	3	4	5	6
261.	No. 3 children stomatological polyclinic, Chekhov 14	Khachatryan Irina Levoni 461606, home. 268778	--	--	40
262.	Stomatological center «Denta elita» (former No. 3 stomatological polyclinic) Bagratunyats12	Harutyunyan Zohrab Tatuli 420162, home. 562139	--	--	82 695 m ²
263.	No. 23 polyclinic «Noragavit» SCJSC Noragavit 1str. 7	Araqelyan Sargis home. 581834	--	--	78 887 m ²
264.	Shengavit regional Center of State HASI (Hygienic and anti-epidemic Supervision Inspection) Araratyan 4	Antonyan Gayane 480501, 480040 home. 447553	--	--	60
265.	No. 14 drugstore «Aleks» PE «Devit farm» LLC G.Njdeh 29	Davtyan Aram 445672	--	--	20
266.	No. 8 drugstore «Shnegavit» PE Bagratunyats 14	Mandel Igor Aroni 421633 home. 265458	--	--	35
267.	«Holy Mother of God» Red hill (former No. 9 polyclinic) Red hill street No. 27	Sargsyan Hakob 461470 home. 583012	--	--	58
12. Qanaqer-Zeitun					
268.	CLC (Centralized library complex) NGNCO, Dro 16 ^a	Meloyan Tsovinar 28-42-66	Property of school		86/ 411m ²

269.	Yerevan special educational complex №8 for children with speech disorders	Varduhi Kheboyan 28-53-51	Property of school		176/ 3179 m ²
270.	«Zeitun culture center» NGNCO D. Anhaght 21	Sargsyants Aram 24-92-84	property		61/ 662 m ²
271.	«Museum of Kh. Abovyan» SNCO Qanaqer 2 str. 4	Zatikyan Hovhannes 28-46-86	property		22/ 7139 m ²
272.	Music college after A.Babajanyan Azatutyan 18	Harutyunyan Armen 28-53-20	Property of college		360/ 7778 m ²
1	2	3	4	5	6
273.	European college foundation in Armenia D.Anhaght 10	Gasparyan Tigran 091-43-56-65	Property of college		463/ 1500 m ²
274.	Yerevan State Humanities Technical college A.Tigranyan 21	Margaryan Aghasi 25-06-18	Property of college		447/ 4987 m ²
275.	European Educational Regional Academy D.Anhaght 10	Avetisyan Andranik 24-27-46	property of university		1500/ 3762 m ²
276.	«French University in Armenia» foundation, D.Anhaght 10	Anna-Mari Shloser 24-96-51	property of university		1040/ 3888 m ²
277.	Eurasia International University Azatutyan 24	Ohanyan Suren 24-94-38	property of university		673/ 5639 m ²
278.	Armenian State University of Economy, Faculty of informatics and statistics P.Sevak 77	Aroan Koryun 52-17-20	property of university		651/ 3361 m ²
279.	«Institute of Chemical Physics after A.B. Nalbandyan» SNCO NAS RA P. Sevak 5/2, 5th floor	Tavadyan Levon 28-14-81	Chemicals		79/8224 m ²
280.	«Institute of applied problems of physics» SNCO NAS RA Hr. Nersisyan 25	Mkrtchyan Artak 28-18-61			230/ 13265 m ²
281.	<<Scientific and technological center of organical and pharmaceutical chemistry>> SNCO NAS RA Azatutyan 26, Z. Qanaqertsu 167 ^a	Topuzyan Vigen 28-83-34	Organic and inorganic chemical substances		303/1950 m ²
282.	<<Institute of molecular biology >> SNCO NAS RA Hasratyan 7	Boyajyan Anna 28-20-61	Organic and inorganic chemical substances		128/ 11529.4 m ²
283.	Institute of problems of informatics and automatization NAS RA P. Sevak 1	Sahakyan Vladimir 28-20-80 57-70-90	Property of institute		238/ 12028 m ²
284.	Institute of Biochemistry after Buniatyan NAS RA P. Sevak 5/1	Gevorgyan Gevorg 28-18-40 28-18-01	Organic and inorganic chemical substances		158/ 13041 m ²
285.	Scientific center of zoology and hydroecology SNCO NAS RA P. Sevak 7	Sargisov Gagik 28-59-61	property		112/ 12675 m ²

286.	<<Qanaqer-Zeitun>> Medical center CJSC Hr. Nersisyan 7	Stamboltsyan Gagik 28-58-09	Property, medicine		1055/ 23500 m ²
287.	<<Saint Nerses The Great>> Scientific medical center Hr. Nersisyan blind alley 19	Avagyan Sevak 24-40-10	Property, medicine		3794/ 13.500 m ²
288.	Yerevan anti-tuberculosis dispensary Rubinyants 7	Mkrtchyan Mkrtich 62-58-72 62-59-00	Property, medicine		258/ 6300 m ²
289.	<<Hematological center after Professor Yolyan>> CJSC Hr. Nersisyan 7	Daghabashyan Smbat 28-38-93	Property, medicine		248/ 7800 m ²
290.	National oncological center after V.A.Fanarjyan CJSC Fanarjyan 76	Galstyan Hayrapet 28-69-62 28-70-22	Property, medicine		1068/ 38.113 m ²
291.	<<Mikayelyan surgical institute>> CJSC Hasratyan 9	Tamazyan Artur 28-15-51	Property, medicine		351/ 3230 m ²
292.	<<SRI of cardiology>> CJSC P.Sevak 5	Hovhannisyan Samvel 28-85-50 28-89-76	Property, medicine		296/ 380 m ²
293.	<<Gapeks>> ophthalmologic clinic Dro 3	Gabrielyan Robert 28-95-60	Property, medicine		11/ 257.5 m ²
294.	<<Normed>> MC Hr. Nersisyan 6	Altunyan Surik 28-95-28	Property, medicine		48/ 318.9 m ²
295.	<<Huys-Kyanq>> LLC, Medical center P. Sevak 5	Khachatryan Shahen 28-73-17 28-73-51	Property, medicine		83/ 1546 m ²
296.	«MTSKH» surgical medical center Hr. Nersisyan 7	Ter-Avetiqyan Zareh 28-50-99	Property, medicine		31/ 1200 m ²
297.	«Special polyclinic» CJSC of MH RA Hr. Nersisyan 7	Hovhannisyan Anna 20-93-13	Property, medicine		147/ 814.3
Chemically dangerous facilities					
Arabkir					
1	«Grand-San» LLC	R.Harutyunyan 28-22-62	technical and nitric acid	22 t 644kg	682 / 27.5 ha
Ajapnyak					
2	§Elite Shant! LLC		ammonia	3t	
3	§Yerevan Kat! LLC		ammonia	1,6 t	
Erebuni					
4	§Factory of fine iron! OJSC		ammonia acid	15t 50t	
5	§Urtu! OJSC			1,6 t	
6	§Hayk! CJSC			3t	
7	§Golden penguin! LLC			1,6 t	
Kentron					
8	«Beer of Yerevan» CJSC Isakov 8	Baghdasaryan Ashot 52-48-69	ammonia	5t	450 /20000m2
9	“Dzyunik refrigerator”, LLC Arshakunyants 9	L.Margaryan 52-62-00	ammonia	12t	200 /2.34ha
Shnegavit					
10	§Nairit factory! CJSC		ammonia chloride	112 33	
11	Grand Candy §Armenian-		ammonia	5	

	Canadian JE LLC				
Qanaqer-Zeitun					
12	«Yerevan's factory of champagnes and vines» OJSC Tbilisyan highway 20	Hakobyan Fiameta 28-54-76	ammonia		200/

In Yerevan city there are 39 explosive facilities,

 159 fire-explosive facilities,

 279 fire prone facilities,

 12 chemically dangerous facilities

of population evacuation plan
in case of a severe earthquake in Yerevan city

The number of people evacuated after the earthquake by time frame

Administrative district	Population	Population evacuated one day after the event		Population evacuated four days after the event		Population evacuated one month after the event	
		Population to be evacuated	Population living in shelters	Population to be evacuated	Population living in shelters	Population to be evacuated	Population living in shelters
Ajapnyak	108,200	58,903	38,287	57,196	37,177	52,894	34,381
Avan	51,000	35,982	23,388	34,510	22,431	31,148	20,246
Arabkir	130,800	83,171	54,061	79,102	51,416	70,464	45,802
Davtashen	41,100	16,874	10,968	15,757	10,242	12,907	8,389
Erebuni	121,900	79,235	51,503	76,502	49,726	70,835	46,043
Kentron	130,600	91,313	59,353	89,283	58,034	84,818	55,131
Malatia-Sebastia	141,800	65,341	42,471	63,418	41,222	58,007	37,704
Nor-Nork	147,000	89,769	58,350	84,574	54,973	73,089	47,508
Nork-Marash	11,300	8,174	5,313	7,917	5,146	7,403	4,812
Nubarashen	9,700	6,176	4,015	5,835	3,793	5,143	3,343
Shengavit	146,500	85,810	55,776	83,081	54,003	77,185	50,170
Kanaker-Zeytun	79,300	50,584	32,880	47,538	30,899	41,147	26,746
Yerevan city	1,119,200	671,331	436,365	644,712	419,063	585,041	380,277

Appendix 2
of Mayor's decision N _____
dated on «__»____ 2012

**FUNCTIONAL RESPONSIBILITIES
OF THE STAFF OF THE TEMPORARY SHELTER**

Yerevan 2012

Evacuation is one of the main ways of population protection. It is carried out by means of temporary transfer and distribution of people from dangerous places to safe areas. Evacuation takes place in case of occurrence or the direct threat of emergency situations due to which certain factors having negative influence on the everyday conditions of life and vital activity can arise in specific areas (residential areas, facilities).

Population can be evacuated in a pedestrian way or by means of transport, motorcades, railway rolling stock and water transport.

Evacuation bodies during emergency situations and martial law are guided by the RA law about "Population protection in emergency situations", the decisions of the RA Government N 1180-N about "Approving the order of population evacuation from a dangerous territory" dated on August 18, 2011 and N 824-N about "Approving the order of life provision of evacuees in distribution places" dated on June 24, 2010 as well as the decision of the Mayor of Yerevan city about "Evacuation of population of Yerevan city during emergency situation and martial law" dated on March 3, 2010.

The overall management of evacuation activities is carried out by the evacuation committee established by the decision of the Mayor of Yerevan city which organizes and manages the activities of evacuation and distribution of population and organizations of Yerevan city.

Temporary shelters (TS) are set up for the purposes of complete implementation of reception and distribution activities of homeless population. One or more temporary shelters can be set up in a residential area on the principle of serving as many people as possible. Temporary shelters are established in free, green areas or similar places in the form of tent or container house area. TS are provided with communication means, medical centers, rooms (tents) of mother and child and rest taking into account the requirements of 3,5m² per person, food provision, availability of utilities and anti-fire norms. It is important to envisage also means giving an opportunity to handicapped people and invalids to move.

Portions of life provision of population in emergency situations are mentioned in the plan on "Preparatory activities of the process of life provision of population in emergency situations" approved by point 1 of the decision N 2380-A of the Mayor of Yerevan city dated on March 12, 2012.

GENERAL TASKS OF THE STAFF OF TEMPORARY SHELTERS

1. During everyday activities

- Development of documents of TS and those for the planning of evacuation and their in-time clarification together with the evacuation committee,
- Planning of activities carried out TS during population reception,
- Preparation and periodic checking of the territory, forces and means.

2. Upon receiving the order of bringing into readiness

- Checking of schedule of population reception,
- Organization of bringing into readiness and activities of deployment,
- Organization of food, means of life provision and provision of first aid of population in TS,
- Maintenance of public order,
- Checking of the number of arriving population (by health, sex-age peculiarities) with the help of the secretary of the evacuation committee.

3. upon receiving the order of distribution of population

- Registration, distribution and organization of life provision of arriving population,
- Involvement of volunteers in the activities being carried out,
- Organization of medical provision of the sick in TS,
- Provision of periodic information to the evacuation committee about the activities being carried out.

Reception and registration group

- Carries out the registration of arriving population,
- Provides information to the head of TS about arriving population,
- Cooperates with working groups included in the evacuation committee permanently,
- Establishes communication with the evacuation committee, attached evacuation points, temporary distribution points and long-term settlement places.

Public order maintenance group

- Organizes patrol service in TS,
- Secures maintenance of public order in TS,
- Stays in permanent touch with other groups of TS.

Inquiry desk

- Organizes the activities of inquiry during the whole process of work,
- Cooperates with all the working groups of TS and other inquiry desks of evacuation bodies,
- Possesses corresponding information and provides the population with the information about the distributed people within its competency,
- Establishes a permanent communication with the evacuation committee,

- Reports to the head of TS about the orders and instructions of the superior evacuation bodies,
- Periodically informs the evacuation committee about the process of distribution of population.

The commandant

- Organizes and keeps the approved order in TS territory,
- Decides parking places of means of transport,
- Provides necessary equipment, devices and signboards,
- Organizes the preparation of working rooms and rooms necessary for the arriving people.

Mother and child's room (tent, container house)

- Provides the reception of nursing mothers and children, their accommodation and care,
- Organizes the order and sanitary condition of rooms (tents) in TS.

Medical center

- Organizes and provides necessary medical aid to the people in TS,
- Supervises the maintenance of sanitary condition in the building and territory,
- Takes measures for the detection and isolation of people having infectious diseases among the arriving population,
- Takes preventive measures by the instruction of the head of the medical service.

Group of acceptance and distribution of food and other material means

- Cooperates with corresponding working groups of evacuation committee,
- Carries out provision of necessary food, water and material means,
- Organizes the life provision means of the people distributed in TS.

Group of fire protection

- Organizes the fire protection in TS,
- Provides the availability and functioning of anti-fire devices,
- Carries out a permanent supervision over keeping the fire rules.

THE HAED OF TEMPORARY SHELTER

The head of TS is appointed by the decision of the head of administrative district. He is accountable to the head of the evacuation committee, the head of the administrative district and the head of the division of Yerevan Rescue Department.

He is responsible for the recruitment of the staff, its permanent readiness and organization of population distribution works. He is the direct head of the whole staff during population distribution. He has to:

1. during everyday activities:

- Know his obligations, the tasks, organizational structure of TS, the order of warning and gathering of its staff,
- Reman the TS,
- Know the order of deployment TS and bringing it into readiness,
- Decide the rooms (tents) of working groups, parking places of arrival of means of transport, maintenance and points patrol service,
- Periodically organize the preparedness of the staff by means of trainings and courses.

2. upon receiving the order of bringing into readiness

- Organize the warning and gathering of the staff, establish 24 hours duty service,
- Task the heads of TS working groups based on the created situation,
- Organize the provision of the staff with individual protection means,
- Check the list and positions of the staff and take measures for remaning,
- Organize the bringing of protective structures located in the territory of TS into readiness and carry out a supervision over the construction of simple shelters,
- Periodically report on the process of bringing into readiness and the works,
- Organize the provision of arriving population with food, water and other necessary material means.

3. upon receiving the order of population distribution

- Deploy TS and organize the works of the staff for population reception,
- Carry out the registration of the people being distributed and report about the process of works,
- Report to the head of the evacuation committee about the failures in the process of population distribution,
- Report to the head of the administrative district in written after completing the distribution of population in TS.

THE DEPUTY HAED OF TEMPORARY SHELTER

The deputy head is appointed by the order of the head of TS. He is accountable to the head of TS and fulfills the obligations of the head of TS in case of the absence of the later. He is the direct head of the staff during population distribution. He has to:

1. during everyday activities:

- Know his obligations, the tasks of TS, the order of population evacuation and distribution as well as the order of warning and gathering,
- Participate in the development of the documents of TS and know the staff of TS,
- Know the distribution places of TS groups and the places of the arrival of the transport,
- Conduct trainings with the staff by the plan approved by the head of TS,
- Know the number of facilities, population, arriving motorcades (cars) attached to the TS for evacuation.

2. upon receiving the order of bringing into readiness

- Receive tasks from TS,
- Carry out the warning and gathering of the staff,
- Organize the preparation of working rooms (tents) of the staff by means of the commandant of TS,
- Report to the head of TS about the readiness of the staff.

3. upon receiving the order of population distribution

- Receive tasks of population distribution from the head of TS,
- Establish a control over the situation and preparedness of the staff in the territory of TS,
- Prepare the reports of the head about the process and completion of population distribution to be submitted to the evacuation committee of Yerevan city, head of administrative district and the division of YRD,
- Report to the head of the TS after the completion of population distribution and periodically check the availability of staff.

GROUP OF RECEPTION AND REGISTRATION

The head of the group of reception and registration is appointed by the order of the head of TS. He is accountable to the head of TS and his deputy. He is the direct head of the staff of the group during population distribution. He has to:

1. during everyday activities

- Know the tasks of his group and obligations of the staff of the group, the order of warning during working and non-working hours as well as the territories allocated to the staff to work,
- Participate in compiling the necessary documents,
- Keep the staff of the group in permanent readiness,
- Check the number of population attached to the TS.

2. upon receiving the order of bringing into readiness

- Organize the warning and gathering of the group,
- Receive tasks from the head of TS and inform the staff of the group,
- Receive and prepare distribution documents,
- Check the schedule of the arriving documents,
- Receive individual protection means for the staff of the group and provide to the members,
- Organize cooperation with the groups of TS on the issues of information exchange,
- Report to the head of TS about the readiness of the group.

3. upon receiving the order of population distribution

- Check the readiness of the group and report to the head,
- Receive tasks from the head and inform the staff of the group,
- Carry out the reception and registration of the arriving population,
- Establish communication with the facilities attached to the TS.

GROUP OF ACCEPTANCE AND DISTRIBUTION OF FOOD AND OTHER MATERIAL MEANS

The head of group of acceptance and distribution of food and other material means is appointed by the order of the head of TS. He is accountable to the head of TS, his deputy and the head of trade and service department of the staff of the municipality Yerevan city. He is the direct head of the staff of the group during population distribution.

Addition employees from trade and service department of the staff of the municipality of Yerevan city can become members of the group during population distribution by the order of the head of the mentioned department.

The head of the group has to:

1. during everyday activities

- Know the structure of the group, its tasks and capacities, the order of recruitment of the staff,
- Have the lists of the staff and know the order of their warning and gathering,
- Improve the readiness of the staff permanently,
- Know the locations of TS and supply points,
- Have necessary facilities and means for the organization of acceptance and distribution of food.

2. upon receiving the order of bringing into readiness

- Organize the warning and gathering of the group,
- Receive tasks from the head of TS and inform the staff of the group,
- Prepare relevant working places for the work of the group inside TS building,
- Receive individual protection means and distribute them among the staff of the group,
- Report to the head of TS about the readiness of the group.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff of the group,
- Organize supply service in TS, carry out also smooth supply of hot food and other necessary supplies,
- Establish and be in permanent contact with trade and service department of the staff of the municipality of Yerevan city and supplying organizations,
- Report to the head of TS about all incidents and measures taken for their prevention.

GROUP OF MAINTENANCE OF PUBLIC ORDER

The head of group of maintenance of public order is appointed by the order of the head of TS. He is accountable to the head of TS, his deputy and the commandant. He is the direct head of the staff of the group during population distribution.

Employees from police can become members of the group during population distribution by the order of the head of Yerevan department of Police of the Republic of Armenia on the principle of one policeman per 1000 inhabitants.

He has to:

1. during everyday activities

- Know the structure of the group, its tasks and capacities, the order of recruitment of the staff,
- Have the lists of the staff and know the order of their warning and gathering,
- Improve the readiness of the staff permanently,
- Know the locations of TS and sentry posts,
- Have the complete set of traffic signs and necessary lists,
- Work out the order (schemes) of evacuation from TS and deliver it to the staff.

2. upon receiving the order of bringing into readiness

- Carry out the warning and gathering of the group,
- Receive tasks from the head of TS and inform the staff of the group,
- Prepare relevant working places for the work of the group in the territory of TS,
- Receive individual protection means and distribute them among the staff of the group,
- Report to the head of TS about the readiness of the group.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff of the group,
- Organize patrol service in the TS, install security points,
- Carry out concealing actions by a relevant decision,
- Prohibit the entry of unauthorized persons to the territory of TS,
- Establish and be in permanent contact with Yerevan department of Police of the Republic of Armenia,
- Secure maintenance of public order,
- Prevent the panic and disorders among population,
- Report to the head of TS about all incidents and measures taken for their prevention.

GROUP OF FIRE PROTECTION

The head of group of fire protection is appointed by the order of the head of LTSP. He is accountable to the head of LTSP and his deputy. He is the direct head of the staff of the group during population distribution.

Addition employees can become members of the group during population distribution by the order of the head of the Yerevan Rescue Department.

The head of the group has to:

1. during everyday activities

- Know the structure of the group, its tasks and capacities, the order of recruitment of the staff,
- Have the lists of the staff and know the order of their warning and gathering,
- Improve the readiness of the staff permanently,
- Know the location of TS,
- Have the complete set of necessary firefighting means,
- Work out the order (schemes) of evacuation from TS in case of fire and deliver it to the staff.

2. upon receiving the order of bringing into readiness

- Organize the warning and gathering of the group,
- Receive tasks from the head of TS and inform the staff of the group,
- Prepare firefighting means in the territory of TS,
- Report to the head of TS about the readiness of the group.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff of the group,
- Organize firefighting service in the TS,
- Secure the maintenance of the order fire protection,
- Report to the head of TS about all incidents and measures taken for their prevention.

INQUIRY DESK

The head of the inquiry desk is appointed by the order of the head of TS. He is accountable to the head of TS and his deputy. He is the direct head of the staff of the inquiry desk.

The head of the inquiry desk has to:

1. during everyday activities

- Know the tasks and capacities of the inquiry desk, the order of distribution organization,
- Know the order of their warning and gathering,
- Establish telecommunication with the evacuation committee of Yerevan city, head of the administrative district and district division of Yerevan Rescue Department,
- Know the data of TDPs, EPs and LTSPs attached to the TS.

2. upon receiving the order of bringing into readiness

- Receive tasks from the head of TS,
- Prepare relevant working places for the organization of works in the territory of TS,
- Stay in contact with the evacuation committee of Yerevan city, head of the administrative district and district division of Yerevan Rescue Department by telephone,
- Receive individual protection means and distribute them among the staff of the group,
- Report to the head of TS about the readiness of the inquiry desk.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff of the inquiry desk,
- Know the situation in the territory, the place of the head of TS and his deputy, organization of patrol service, the places of distribution of subdivisions,
- Establish and be in permanent contact with the evacuation committee of Yerevan city, head of the administrative district and district division of Yerevan Rescue Department by telephone,
- Report to the head of TS about the orders, signals and instructions received from evacuation bodies,
- Report to the evacuation committee about the process of population distribution and the occurred problems in time,
- Periodically check the data of involved volunteers,
- Register the received and transmitted signals and orders.

THE COMMANDANT

The commandant is appointed by the order of the head of TS. He is accountable to the head of TS and his deputy. He is the deputy of the head of the TS on security issues

He has to:

1. during everyday activities

- Know the tasks and capacities of the TS, the order of distribution organization,
- Have the lists of the staff and know the order of their warning and gathering,
- Know the location of TS and sentry posts,
- Organize the implementation anti-fire measures.

2. upon receiving the order of bringing into readiness

- Receive tasks from the head of TS,
- Prepare relevant areas for the organization of works in TS,
- Organize the distribution of individual protection means among the staff,
- Carry out anti-fire measures,
- Report to the head of TS about the readiness.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff,
- Know the situation in the TS, the place of the head of TS and his deputy, organization of patrol service, the places of distribution of subdivisions,
- Report to the head of TS about the orders, signals and instructions received from evacuation bodies,
- Report to the evacuation committee about the process of population distribution and the occurred problems in time,
- Permanently supervise anti-fire measures,
- Register the received and transmitted signals and orders.

MEDICAL CENTER

The head of medical point of TS is appointed by the order of the head of LTSP. It is recruited by the attached staff by the order of the head of Health Department of the municipality of Yerevan city. He is accountable to the head of LTSP, his deputy as well as the head of Health Department of the municipality of Yerevan city.

The head of medical center has to:

1. during everyday activities

- Know the tasks of the medical center and his functional responsibilities,
- Have the lists of the staff, know the order of their warning and gathering,
- Know the working places allocated to the medical center and the order of medical provision of measures,

- Check the place of deployment of medical point and the list of organizations providing equipment, devices and ambulance cars for works,
- Work out the order of isolation and hospitalization of the infectious patients detected among the evacuees.

2. upon receiving the order of bringing into readiness

- Receive tasks from the head of TS,
- Carry out the warning and gathering of the staff,
- Prepare medical equipment and working place for the works of medical center,
- Carry out checking of sanitary condition of the territory and rooms of TS,
- Report to the head of TS about the readiness of the medical center.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff,
- Carry out the medical treatment of patients in TS,
- Establish a supervision over the sanitary condition in the building and territory of TS,
- Take measures for the isolation and hospitalization of the infectious patients detected among the evacuees,
- Provide preventive means in case of necessity,
- Report to the head of TS and the head of Health Department of the staff of the municipality of Yerevan city about the number of detected patients, their isolation and measures for the prevention of the spread of the occurred infectious diseases.

MOTHER AND CHILD'S ROOM

The head of mother and child's room is appointed by the order of the head of TS and is accountable to the head and deputy head of TS. The head of mother and child's room has to:

1. during everyday activities

- Know the tasks of mother and child's room and his functional responsibilities,
- Have the lists of the staff, know the order of their warning and gathering,
- Know the working places allocated to mother and child's room,
- Check the place of deployment of mother and child's room and the list of organizations providing equipment and devices for works,
- Work out the order of service of nursing mothers and minor children among the population.

2. upon receiving the order of bringing into readiness

- Receive tasks from the head of TS,
- Prepare working room for the works of mother and child's room,
- Carry out checking of sanitary condition of the rooms,
- Receive individual protection means and distribute them among the staff of mother and child's room,
- Report to the head of TS about the readiness of the mother and child's room.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff,
- Provide the accommodation of nursing mothers and children and their care,
- Organize the order in the rooms and keep the sanitary condition,
- Pay a special attention to children during works,
- Organize the provision of food in distribution places in case of need.

GROUP OF RECEPTION, REGISTRATION AND DISTRIBUTION OF VOLUNTEERS

The Head of the group of reception, registration and distribution of volunteers is appointed by the order of the head of TS and is recruited by the staff allocated from the coordination body of volunteers of Yerevan municipality. He is accountable to the head and deputy head of TS as well as to the head of the coordination body of volunteers of Yerevan municipality. The Head of the group of reception, registration and distribution of volunteers has to:

1. during everyday activities

- Know the tasks of volunteers and his functional responsibilities,
- Have the lists of the staff, know the order of their warning and gathering,
- Know the allocated working places and the order of measures,
- Check the list of organizations providing equipment, devices and cars for the works of volunteer.

2. upon receiving the order of bringing into readiness

- Receive tasks from the head of TS,
- Carry out the warning and gathering of the staff,
- Prepare working rooms for the works of the groups and reception of volunteers,
- Assist the works of deployment of TS,
- Report to the head of TS about the readiness.

3. upon receiving the order of population distribution

- Receive tasks from the head of TS and inform the staff,
- Carry out reception and tasking of volunteers arriving at TS,
- Take measures for the involvement of volunteers available among the population,
- Report to the head of TS about the measures taken.

SCHEDULE

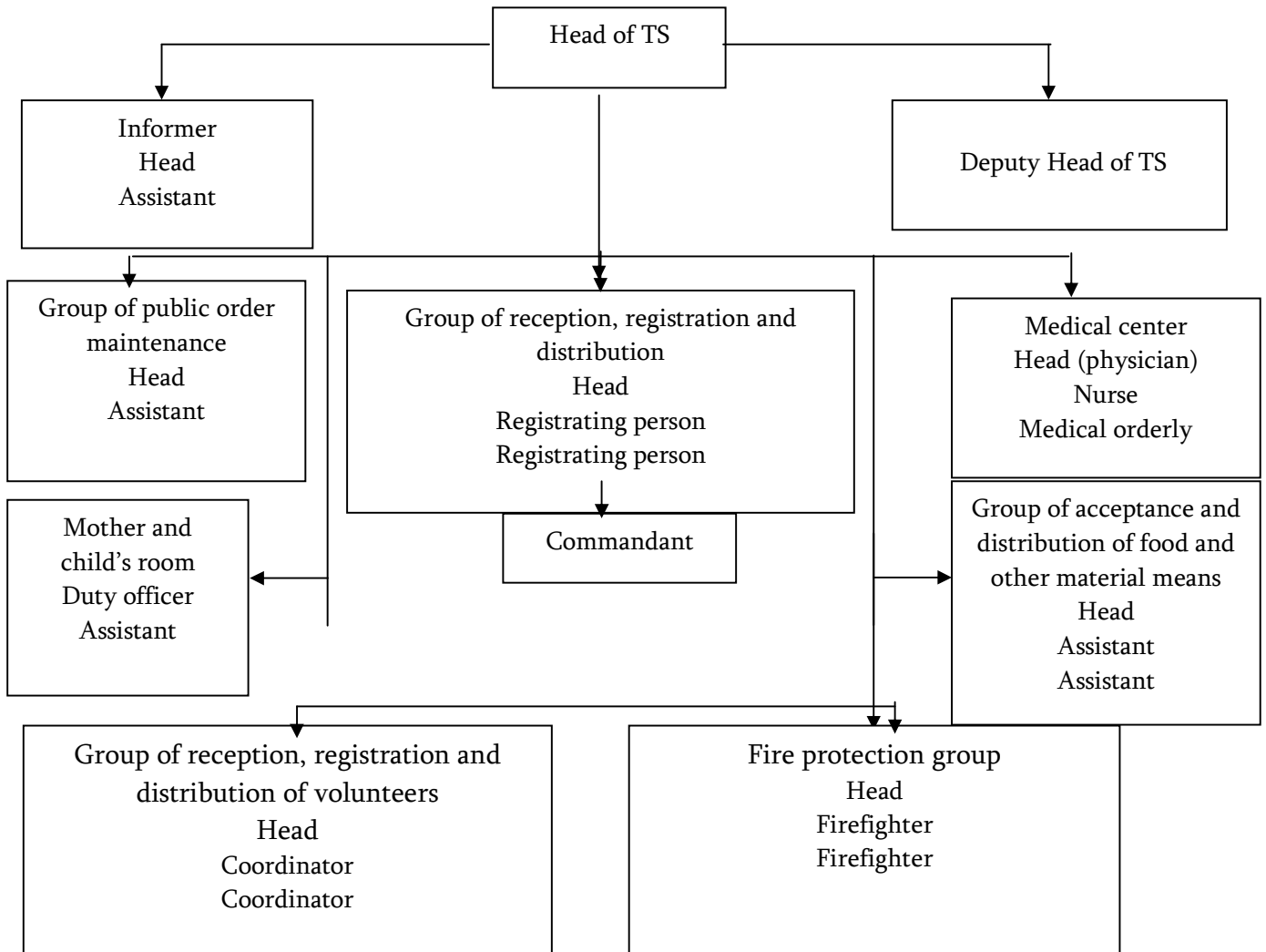
of the main activities of the temporary shelter

N/N	Activity	Period of implementation	Responsible for implementation
1	2	3	4
1. Upon receiving the order of deployment			
1.	Warning and gathering of the staff	T + 1.5	Head and deputy head of TS, heads of groups
2.	Tasking of the staff, preparation of actions for deployment of TS. Distribution of TS documents to the staff.	T + 2	Head of TS
3.	Establishment of direct communication with the division of YRD and secretary of evacuation committee.	T + 2	Deputy head of TS
4.	Checking the schedule of evacuation and distribution of population.	T + 2	Informer, deputy head of TS, commandant
5.	Checking the shelter places of evacuees located in TS in case of the signal of “Air-raid alarm”. Bringing of protective structures and simple shelters into readiness.	T + 2	Deputy head of TS
6.	Checking the level of recruitment of TS staff and reman in case of need. Furnish the working rooms of the TS staff and prepare transport boarding places.	T + 2	Head of TS, heads of groups
7.	Furnishing the working rooms of the TS staff and prepare transport boarding places.	T + 2	Commandant, heads of groups
8.	Checking the schedule of motorcades arriving at the TS.	T + 2	Head of motorcade group
9.	Checking the sanitary condition in the territory of TS, boarding points and working rooms.		Head of medical center
10.	Checking the organizational chart of public order maintenance service in TS and establish security points.	T + 2	Head of the group maintenance of public order
11.	Provision of the staff of TS with individual protection means.	T + 4	Deputy head of TS, commandant
12.	Establishment 24 hours duty service in TS.	T + 2	Commandant of TS
13.	Reporting to the division of YRD and the secretary of evacuation committee about the readiness of TS.	T + 6	Head of TS

14.	Upon receiving the signal of “Air-raid alarm” repeating it by megaphone and shelter the population in protective structures and simple shelters.		Deputy head of TS, commandant
2. Upon receiving the order of evacuation and distribution of population			
1.	Tasking of TS staff during the implementation of population evacuation and distribution.	T + 1	Head of TS
2.	Getting prepared for the works of TS deployment and reporting to the division of YRD and the secretary of the evacuation committee about the readiness of TS.	T + 2	Head of TS, heads of groups
3.	Being in permanent contact with the division of YRD, the secretary of the evacuation committee and evacuation committees of facilities under TS by means of established communication means.	T + 10 minutes	Informer
4.	Putting the schedule of population evacuation and distribution into action within the defined period.	T + 2	Head of TS
5.	Installation of security points, regulation points for patrol and traffic according to the worked out scheme.	T + 10 minutes	Head of the group of TS
6.	Organization of blackout activities in TS during night hours.		Deputy head of TS, commandant
7.	Organization of the reception and registration of population arriving at the TS and their in-time distribution by boarding points.	T + 2	Head of the group of reception, registration and distribution
8.	Distribution of evacuees by motorcades, the organized distribution of people by boarding points and their in-time leaving for safe areas.	T + 2	Head of the column group
9.	Registration of population arriving at TS, types of means of transport, staff of facilities being evacuated.	T + 2	Heads of groups, inquiry desk
10.	Provision of accommodation and care of nursing mothers and children.	T + 2	Mother and child’s room
11.	Provision of first aid to the evacuees arriving at TS and detected patients.		Head of medical center
12.	Preparation of reports for the division of YRD and evacuation committee about the process and completion of population evacuation and distribution.	T + 4	Deputy head of TS, informer
13.	Recording the orders received from evacuation committees in the register and reporting to the head of TS.	immediately	Inquiry desk

14.	Reporting to the head of TS about the violation of evacuation schedule in time.	immediately	Head of the group of reception and registration, inquiry desk
15.	Maintenance of public order and provision of population sheltering in case of the signal “Air-raid alarm” and taking of measures for the prevention of panic and disorders among evacuees.		Head of the group maintenance of public order, Deputy head of TS and commandant

CHART
OF ORGANIZATION OF TEMPORARY SHELTER N___ OF YEREVAN CITY AND ITS
WARNING



Head of N___ TS

_____ Name

STAFF LIST
OF THE STAFF OF N ____ TS

N/ N	Position held in TS	Name	Address	Civilian position held	Telephone (office/ home, cell.)	Remarks
1	2	3	4	5	6	7
1.	Head of TS					
2.	Deputy Head of TS					
Group of reception, registration and distribution						
1.	Head					
2.	Registrating person					
3.	Registrating person					
Group of public order maintenance						
1.	Head					
2.	Assistant					
3.	Assistant					
Fire protection group						
1.	Head					
2.	Firefighter					
3.	Firefighter					
Group of acceptance and distribution of food and other material means						
1.	Head					
2.	Assistant					
3.	Assistant					
Informer						
1.	Head					
2.	Assistant					
Commandant						
1.	Commandant					
Mother and child's room						
1.	Chief duty officer					
2.	Duty officer					
Medical center						
1.	Head (physician)					
2.	Nurse					
3.	Medical orderly					
Group of reception, registration and distribution of volunteers						
1.	Head					
2.	Coordinator					
3.	Coordinator					

HEAD OF N ____ TS -----

Name /signature/

CALCULATION OF EQUIPMENT, DEVICES AND PROPERTY REQUIRED FOR
N____ TS

N/N	Equipment	Who it is envisaged for									
		Head and deputy head	Registration group	Motorcade organizing group	Group of public order maintenance	Inquiry desk	Commandant	Mother and child's room	Medical center	Territory	Total
	Office furniture										
	Telephone set										
	Safe										
	Electric lantern										
	Candles										
	Megaphone										
	Red flags (30*20)										
	Red armband										
	Gas masks										
	Safety mask										
	Bandage										
	Loudspeaker										
	Sign boards of the rooms of TS (30*10)										
	Table-lists of facilities being registered										
	Notes and lists (40*20)										
	Table of TS (60*80)										
	List of TS (60*40)										
	Stationery										

HEAD OF N _____ TS -----
Name /signature/

Plan of provision of evacuation activities

N/ N	Activities	Actions	Implementing organizations	Supporting organizations	Costs	Time period	Remarks
1	2	3	4	5	6	7	8
1. Preparatory stage							
1.	Preparation of governing bodies and population	Organization of courses	Crisis Management State Academy of MES of RA	State governing and local self-governing bodies		periodical ly	___ classes per year
		Technical equipping of Management Center of Emergency Situations	Yerevan municipality	MES of AR			
		Corresponding literature	Crisis Management State Academy of MES of RA	State governing and local self-governing bodies			
		Conduct of evacuation drill	Territorial subdivisions of MES of RA, organizations	Yerevan municipality		periodical ly	Once a year
2.	Improvement of warning system	Recovery, maintenance and improvement of warning systems	Yerevan municipality, YRD of MES of RA	Ministry of Transport and Communication, telephone operators			
3.	Improvement of plans	Clarification and updating of evacuation plans	Yerevan municipality, YRD of MES of RA	organizations		periodical ly	Once a year

1	2	3	4	5	6	7	8
4.	Engineering-technical measures	Enhancement of seismic stability of buildings along evacuation routes	Yerevan municipality	Ministry of Urban Development, organizations			
		Construction and maintenance of roads (evacuation routes) according to normative documents	Yerevan municipality	Ministry of Urban Development, organizations			
5.	Organization of preparation of distribution	Planning and preparation of necessary quantity of places	Evacuation committee, YRD of MES of RA	organizations			
		Adding of free (green) areas	Yerevan municipality	Ministry of Urban Development, organizations			
6.	Organization of preparation of life-provision	Concluding of contracts on provision of stocks	Yerevan municipality	organizations			
		Distribution of water supply tanks	Yerevan municipality	organizations			
		Creation and optimal distribution of storages	Yerevan municipality	organizations			

1	2	3	4	5	6	7	8
2. During evacuation							
7.	Population warning	Warning of population and governing bodies by means of mass-medias and loudspeakers of police	MES of RA Police of RA Evacuation committee of Yerevan city	Mass-media Cell. phone operators	State budget, Budget of Yerevan city		
8.	Warning and gathering of evacuation bodies	Warning and gathering of evacuation committee of Yerevan city, tasking and clarification of calculations of evacuation of population from probable dangerous zones	Evacuation committee of Yerevan city, YRD of MES of RA	Management Center of Emergency Situations of Yerevan city, Cell. phone operators			
9.	Management of evacuation places	Deployment of evacuation bodies and bringing them into readiness, organization of 24 hour work	Evacuation committee of Yerevan city, YRD of MES of RA	Evacuation bodies			
		Organization of communication and recovery	Evacuation committee of Yerevan city	Cell. phone operators Subdivisions (radio stations) of MES and Police of RA			
		Control over the work	Evacuation committee of Yerevan city, YRD of MES of RA	Evacuation bodies			

1	2	3	4	5	6	7	8
10	Evacuation	Organization of evacuation of population from dangerous areas	Evacuation committee of Yerevan city, YRD of MES of RA	Evacuation bodies			
11	Provision of activities	Organization of transport, technical, material and medical provision	Evacuation committee of Yerevan city, YRD of MES of RA	Evacuation bodies			
3. During distribution							
12	Construction of temporary shelters	Provision of container houses and tents	Evacuation committee of Yerevan city, YRD of MES of RA	Organizations			
13	Comprehensive provision	Provision of stocks	Evacuation committee of Yerevan city, YRD of MES of RA	Organizations			
14	Provision with flats	Reconstruction of damaged buildings and construction of new ones	Yerevan municipality	Ministry of Urban Development, organizations			
15	Complete recovery of lifelines	Recovery of water, gaz and electricity supply systems	Yerevan municipality	Companies of water, gaz and electricity supply			

of the decision N ____ of Mayor of Yerevan city, dated on «__» ____ 2012



EVACUATION SHEET

Evacuation is carried out in case of emergency situations or the threat of its occurrence in the form of temporary transfer and distribution of people, animals and material values from dangerous areas to safe ones.

Warning during the evacuation is carried out by means of sirens, mass-media, loudspeakers, announcements and other ways.

Population should know the following about the evacuation

1. Safe ways (window, emergency exits and so on) for going out of the building during evacuation;
2. Safe places to be protected in case of staying in the building (earthquake, a number of chemical disasters);
3. Their gathering place and further actions after going out of the building of the organization;
4. People responsible for evacuation (director, head of staff and so on);
5. Upon receiving **“Information”** or **“Recommendation”** about evacuation one should get ready or evacuate to the attached evacuation point by own means in case one wishes;
6. Upon receiving **“Order”** about the evacuation it is necessary to take an ID, some amount, food and water for 3 days and go to the evacuation point on foot;
7. If is necessary to make **the house** or **building** safe after leaving it - cut the electricity, close the gas; water, windows and doors move dangerous and inflammable materials into safe places;

Follow the instructions of the people responsible for procession and keep traffic rules **during evacuation**;

The person responsible for your route is:

_____ (name, position)

8. Obey the orders of instructors and responsible people by all means in evacuation point;

Your evacuation point is:

_____ (address, name of organization, telephone)

9. Stay calm and assist those who need it **during distribution** and, in case of possibilities, join volunteers,
10. **Return home** after checking the security of the house.

Necessary assistance will be provided to you and your security will be guaranteed by state governing, local self-governing and other responsible bodies **during the whole process of evacuation**.

The guideline of involvement of volunteers

Section 1. Classification of volunteers

1. Volunteers can participate in the activities of prevention of emergency situations, reduction and liquidation of possible consequences, rescue and other operations.
2. Volunteers are classified into:
 - 1) general volunteers who can be any person,
 - 2) special volunteers who special knowledge and skills.
3. The followings are the main supports by government organizations for volunteer issues:
 - 1) Yerevan Municipality establishes Disaster volunteer center.
 - 2) District offices establish disaster volunteer district center.
 - 3) Disaster volunteer center registers volunteers before and after earthquakes.
 - 4) Disaster volunteer center dispatch volunteers according to the request of disaster volunteer district center.
 - 5) Disaster volunteer district center manage volunteers in their district.
 - 6) Disaster volunteer district center understand the needs and problems on volunteer issues and send those information to disaster volunteer center.

Section 2. registration of volunteers

4. Disaster management volunteer center is being established in Yerevan Municipality for registration of volunteers. Volunteers get registered prior to disasters.
5. The following is the information of volunteers for registration:
 - 1) Name,
 - 2) Age and sex,
 - 3) Contact address (address, telephone number, and e-mail),
 - 4) Specialty,
 - 5) District he/she wants to work in disaster situation,
 - 6) (In case of NGO) the number of the staffs and the organization's specialty.
6. Disaster management volunteer center prepares a registration manual.
7. Registered volunteers take part in a seminar in Crisis Management Center.
8. Registration information is shared with the district offices and schools.
9. After occurrence of earthquake, registration of volunteers is done in disaster management volunteer center.

Section 3. Coordination center

10. The roles of disaster management volunteers are as below:

- 1) Collection and dissemination of information on disasters and livelihood
- 2) Support activities for evacuees including outside cooking in evacuation places and cleaning
- 3) Distribution and transportation of relief goods and equipments
- 4) Administration on acceptance and introduction of disaster volunteers
- 5) Special works by disaster volunteers with special knowledge and skills

11. The district offices establish disaster volunteer district center immediately after earthquake involving their staff and selected and registered volunteers.

12. Disaster management volunteer center cooperates with Yerevan Municipality.

13. Disaster management volunteer district centers provide information on needs and necessary human resources to disaster management volunteer center.

14. Disaster management volunteer center collect necessary number of volunteers for each district according to requests from disaster management volunteer district centers.

15. Disaster management volunteer district center accepts dispatched volunteers and distributes to evacuation places.

Section 4. Matching needs and allocation

16. For acceptance and dispatch of volunteers, the following are considered:

- 1) Intention of evacuation places should be considered.
- 2) Disaster management volunteer district office informs volunteers about activity contents, status of affected area, volunteer insurance, and other basic knowledge and ask them to work.
- 3) It is necessary to identify and show status of volunteer to local people.
- 4) It is necessary to publicize to volunteers that they need to make the framework to work without increasing the strain to affected people and to participate in the volunteer activities.
- 5) Volunteer needs vary with the change of time. Disaster management volunteer district center makes efforts to understand requests and skills of volunteer and dispatch volunteer after giving orientation.
- 6) Disaster management volunteer district center gives volunteers, especially volunteer coordinator, time to leave working places and have temporal leave.

17. The following are skills of special volunteer:

- 1) Rescue and first aid
- 2) Medical services
- 3) Care
- 4) Determination of building damages

- 5) finger language
- 6) Information and communication
- 7) Coordination of volunteers
- 8) Transportation

Section 5. Responsibility of Volunteers

18. It is the fundamental responsibility that volunteer participate in volunteer activities with voluntary intention and responsibility in disaster affected area.

19. Persons who intend to participate in volunteer activities make a judgment whether they participate or not through collecting information in affected area by themselves. It is important that their families understand their intention.

20. Persons who intend to participate in volunteer activities contact disaster management volunteer center beforehand and confirm how to participate in volunteer activities and words of caution.

21. Due to the activities in affected area persons may be in dangerous situation and do a heavy labor. The persons need to secure their safety and health by themselves and participate in activities with understanding of it. It is important to stop participation in case the persons don't feel well.

22. It is necessary that volunteers secure their own accommodation if the government can not provide. Volunteers need to prepare water, food, and other necessary things beforehand and start volunteer activities.

23. When volunteers reach the affected area, they need to register themselves in disaster management volunteer center. Volunteers who have registered beforehand also need to register themselves again in order to start activities.

24. Volunteers confirm emergency contact number and communication network in the affected area and carry out activities with understanding geography, climate, and other information of the affected area.

25. Volunteers pay attention to the feelings and privacy of the affected people and carry out activities with good manner and appropriate vocabulary.

26. Volunteers carry out activities under instruction of disaster management volunteer center, volunteer coordinators and other organizations accepting volunteers. Volunteers refrain from solitary activities. Volunteer can have large power if they work organizationally.

27. Volunteers carry out activities which they can do and take appropriate rests. Unreasonable works lead to unexpected accidents. The accidents are a burden for affected people.

28. Volunteers take out volunteer insurance.

Methodology of conduct of evacuation trainings

The authority of each organization is responsible for the security and evacuation of the whole staff of the organization.

The decision on evacuation is made by the director of the organization and in case of his absence – by the person substituting him.

The authority of the organization should have an evacuation plan of the staff of organization where the activities are divided into three groups:

- evacuation before the disaster,
- evacuation during the disaster,
- evacuation after the disaster.

The evacuation drills can include both the whole process of evacuation and the mentioned separate stages.

In the cases when it is necessary to organize evacuation drill of staff, it is important to base on the possible situation – dangerous area (residential area), the number of people and so on according to instructions.

During the drill a special attention is paid to the activities of the evacuation committee and evacuation points of the given place, reception and registration of evacuees, organization and provision of means of transport for their evacuation as well as provision of security.

Knowledge provided during the trainings:

- 1) Preparedness for evacuation in individual level
- 2) Preparedness for evacuation in household level
- 3) Preparedness for evacuation in neighborhood level
- 4) Location of evacuation places
- 5) Process of evacuation
- 6) Roles of organizations related to evacuation plan
- 7) Differences between general people and vulnerable people
- 8) Problems and the improvement of stay in evacuation places

Knowledge provided during the education:

- 1) Preparedness for evacuation in individual level
- 2) Preparedness for evacuation in household level
- 3) Preparedness for evacuation in neighborhood level
- 4) Location of evacuation places
- 5) Process of evacuation
- 6) Differences between general people and vulnerable people
- 7) Problems and their improvement on stay in evacuation places

Targets of trainings:

- 1) Staffs of Yerevan Rescue Department
- 2) School principals
- 3) School teachers
- 4) Principal of condominium association

- 5) Volunteer groups
- 6) Registered volunteers and volunteer coordinators
- 7) Evacuees' reception bodies
- 8) Staffs of special evacuation places (e.g. staffs of social welfare facilities)
- 9) Administrators of organizations

Targets of education:

- 1) The citizens
- 2) School students
- 3) Organizations

Trainings and education providers:

- 1) Crisis Management State Academy
- 2) Non-commercial organization

Crisis Management State Academy is in charge of implementation of training and education and development of training and education materials. In case of education for the citizens, there are so many targets that Crisis Management State Academy can cover. In this case, non-commercial organization conducts disaster education for citizens in cooperation with Yerevan Municipality and the heads of district offices.

Types of the drills of evacuation:

1. Integrated – in the whole area of Yerevan City and with participation of all stakeholders
2. at the district level
3. at schools - students and teachers
4. at schools – with students' parents
5. at schools - with local community
6. with organizations
7. with volunteers
8. with personnel of evacuation gathering point

Objectives of the drills:

1. Collection of information,
2. Management at the level of government,
3. Management at the level of government for planning of long term settlement,
4. Cooperation between evacuation committee and the district offices,
5. Cooperation between the district offices and schools,
6. Cooperation among school teachers,
7. Guiding people to evacuation places,
8. Guiding people from evacuation places to long term settlements,
9. Deployment of evacuation places by school teachers,
10. Deployment of TDP, LTSP and temporary shelters,
11. Information dissemination from the government to the citizens,
12. Information exchange,
13. Management of evacuation places,
14. Management of vulnerable people in evacuation places

Encourage participation

1. Schools organize drills at the end of the day to involve as many parents as possible.
2. Condominium association publicizes drills to the community and gathers participants.
3. Organizations develop their own disaster management plan including evacuation plan and inform their staffs about conducting drills.

4. Staff of special evacuation places develop their own disaster management plan including evacuation plan. Staff of special evacuation places inform their staffs about conducting drills. If possible, staff of special evacuation places include as many people as possible in the facilities.

Evacuation training Plan includes the following items:

1. Date and time
 2. Participants and participating organizations
 3. Purposes of the drill
 4. Process and time schedule of conduct
 5. Role definition of organizers (including participants)
 6. Points to keep in mind
- Evaluation way

The way of evaluation of evacuation training:

1. Questionnaire
2. Interview
3. Workshop

Each type of evacuation training should be evaluated by higher bodies and the Head of appropriate subdivision of MES according to the Table.

The each type of drills and its evaluator

Type of drill	Evaluators
Integrated	<ul style="list-style-type: none"> • Ministry of Emergency Situation • Armenian Rescue Service
at the district level	<ul style="list-style-type: none"> • Evacuation Committee of Yerevan • Yerevan Rescue Department
at schools - students and teachers	<ul style="list-style-type: none"> • Department of Education of Yerevan Municipality • Schools
Evacuation drill at schools with students' parents	<ul style="list-style-type: none"> • Department of Education of Yerevan Municipality • Non-commercial organization • Schools
Evacuation drill at school with local community	<ul style="list-style-type: none"> • Department of Education of Yerevan Municipality • Non-commercial organization • Schools
Evacuation drill in business sectors	<ul style="list-style-type: none"> • Administrator of business sectors • Armenian Rescue Service
Evacuation drill for volunteers	<ul style="list-style-type: none"> • Volunteer coordinator • Disaster volunteer center
Evacuation drill in special evacuation center (social welfare facilities)	<ul style="list-style-type: none"> • Administrators of the facilities • Ministry of Health

Of decision N ____ of Mayor of Yerevan city,
dated on «__»____ 2012

LIST
OF MAIN EVACUATION ROUTES

1 evacuation route	Mashtots ave.-M.Baghramyan ave.- Orbeli str.- Kievyan-Halabyan
2 evacuation route	Saryan str.- Moskovyan str. – Azatutyan ave.– Komitas ave.
3 evacuation route	Nalbandyan – Koryun str. – Heratsi str. –Amaranocayin str.
4 evacuation route	Abovyan str.- Myasnikyan – Khudyakov or Rubinyants
5 evacuation route	Charents str.-Nar-Dos str. – Khorenatsi str. – Azatamartikneri str.
6 evacuation route	Hanrapetutyan str. – Tigran Mets str. – Artsakh str.
7 evacuation route	Arshakunyats ave.– G. Nzhdeh str. – Bagratunyats str.
8 evacuation route	Ad. Isakov – Sebastia str. – Raffi str.

Note: Based on the emergency situation the mentioned routes can also be used in opposite directions

LIST
Of territories envisaged for the deployment of temporary shelters

N/N	Address	Name of organization	Surface (m ²)	Remarks
1	2	3	4	5
Arabkir				
1.	Park of V. Davtyan str.	Arabkir “Kamar” CJSC	17946	
2.	HES park of Kanaker	Arabkir “Kamar” CJSC	12636	
3.	Arabkir park	Arabkir “Kamar” CJSC	35510	
4.	Grove of clock factory	Arabkir “Kamar” CJSC	3541	
5.	Grove in front of Wedding house	Arabkir “Kamar” CJSC	4901	
6.	Grove of Kanaker HES	Arabkir “Kamar” CJSC	316000	
7.	Field part of Palyana canyon	Arabkir “Kamar” CJSC	103000	
8.	Park in front of “Rosal-Armenal” CJSC	Arabkir “Kamar” CJSC	510534	
	Total		1004068	
Avan				
9.	Varuzhan district	Grove	2400	
10.	Babajanyan str.	Next to the church	11000	
11.	Hovhannisyan str.	Yard-grove	8000	
12.	Isahakyan str.	Yard-grove	10000	
13.	Sayat-Nova str.	Yard-grove	7000	
14.	Narekatsi str.	Yard-grove	6000	
15.	Charents str.	Yard-grove	8000	
16.	Duryan str.	Yard-grove	8500	
17.	Kuchak str.	Yard-grove	7500	
18.	Tumanyan str.	Yard-grove	11000	
19.	Avan-Arinj	Family park	8700	
	Total		88100	
Ajapnyak				
20.	Shiraz str.	Park	3100	
21.	Halabyan str.	Park	121100	
22.	Halabyan str.	Park	2600	
23.	Sebastia str.	Aquarium park	3100	
24.	Vahagni district	Garden	145700	
	Total		275600	
Davtashen				
25.	Davtashen 1 st district	Territory next to N 200 school	9500	Area belonging to school N 200
26.	Eghvard highway N 22	Private ownership	19900	
	Total		29400	
Erebuni				
27.	Erebuni 38	Erebuni historical-archeological reserve-museum	600000	
28.	Artsakh 75	“Maqur Erkat factory” OJSC	50000	
29.	Mushakan	Territories belonging to gardening organizations and their adjacent areas close to Mushakan residential area	200000	
30.	Territories adjacent to the road taking to Mushakan	Territories adjacent to the road taking to Mushakan	200000	
31.	Territories on the right edge of the road going from Davit Bek street to TV tower	Territories on the right edge of the road going from Davit Bek street to TV tower	250000	

32.	Territories adjacent to Nubarashen highway	Territories adjacent to Nubarashen highway	100000	
33.	Territories next to school N 47 of Sari Tagh	Territories next to school N 47 of Sari Tagh	100000	
34.	Territories next to Verin Jrashen residential area	Territories next to Verin Jrashen residential area	200000	
	Total		1700000	
Kentron				
35.	G. Lusavorich V.Sargsyan	Theatrical park	19600	
36.	Zakyan V. Sargsyan	Children's park	16900	
37.	Zoryan	Saryan grove	12710	
38.	Hrazdan canyon	Children's railway	38800	
39.	Baghramyan str.	Lovers' park	14600	
40.	Teryan Abovyan	Students' park	17770	
41.	Abovyan str.	Abovyan park	7103	
42.	Tamanyan	Garden belonging to Gafeschian foundation	6726	
43.	Ring park	1-6 parts	123700	
44.	Mashtots Sayat-Nova	Freedom square	35754	
45.	Tsitsernakaberd area	Forest-park	1191731	
46.	V.Sargsyan	Park of 2750 th anniversary	11726	
47.	Kirov park	Children's park	42715	
48.	Isakov avenue	Park of Isakov monument	3500	
49.	Conservatoire park	Park	12306	
	Total		1555641	
Malatia-Sebastia				
50.	Sebastia str.	Paros forest	310000	
51.	Hovnatan str.	In the back part of 40 th anniversary park	3000	
52.	Mirakyan str.	Forest of youth palace	47000	
	Total		360000	
Nor Norq				
53.	1 st massif	Azatomartikneri park	36600	
54.	1 st massif	Park of Gay monument	6900	
55.	1 st massif	Nansen park	45900	
56.	1 st massif	"Norq" cinema park	11800	
57.	2 nd massif	Totovents park	42100	
58.	2 nd massif	Park in the territory next to administrative building	8600	
59.	2 nd massif	Tigran Mets park	19300	
60.	4 th massif, 1 st part	Tumanyan park	7000	
61.	5 th massif	Mikoyani park	4900	
62.	7 th massif	Park next to "Hayordac tun"	55600	
63.	8 th massif	Lovers' park	3300	
	Total		242000	
Nubarashen				
64.	Nubarashen street 11	Park	5200	
65.	Nubarashen street 9	Central park	18800	
66.	Nubarashen street 7	Park of P. Nubar "Nubaryan"	1100	
	Total		25100	
Norq-Marash				
67.	Norqi Ayginer 193	Boarding school for deaf and dumb	1635	
68.	Norqi Ayginer 180	Hovard Karagyozyan medical charitable public	3000	

		organization		
69.	Armenakyan 153	“Norq” infectious clinical hospital	23960	
70.	Hovsepyan 20	Psychiatrically clinical center	7400	
71.	Hovsepyan 95	Armenian TV and Radio network	2850	
72.	Hovsepyan 91	School N 61	1000	
73.	Norq street 11, 62	School N 157	57785	
74.	Hovsepyan 6	Olympus educational complex	1151575	
75.	Norqi Ayginer 247	Auxiliary school N 2	10992	
	Total		1260197	
Shengavit				
76.	Arin-Berd crossroad	Shengavit gardening CJSC	40860	
77.	Artashat highway	Shengavit gardening CJSC	31323	
78.	Area adjacent to 6 th hospital	Shengavit gardening CJSC	35300	
	Total		107483	
Kanaker-Zeytun				
79.	Azatutyan avenue	“Haghtanak” park	335000	
80.	P. Sevak	P. Sevak grove	6800	
81.	Dro and P. Sevak streets	Grove	8700	
82.	Davit Anghaght street	Davit Anghaght grove	4900	
83.	Azatutyan avenue	Paronyani grove	1900	
84.	Cholakyan street	N 1 grove	14000	
85.	Varshavyan street	N 2 grove	10500	
	Total		381800	
	Total in Yerevan		7029389m ²	

Of decision N ____ of Mayor of Yerevan city,
dated on « __ » ____ 2012

REQUEST

of provision with outfit, food, technique, lubricants and other material means

[illegible]

(position)

(signature, name)

« » 2012

of decision N ____ of Mayor of Yerevan city,
dated on «__»____ 2012

The number of homeless population during implementation of evacuation measures by administrative districts

N/N	Administrative district	Homeless population	Remarks
1.	Avan	15450	
2.	Arabkir	15800	
3.	Ajapnyak	15700	
4.	Davtashen	9600	
5.	Erebuni	25036	
6.	Kentron	30939	
7.	Malatia-Sebastia	28207	
8.	Nor Norq	30225	
9.	Nubarashen	600	
10.	Norq-Marash	4160	
11.	Shengavit	15500	
12.	Kanaker-Zeytun	11600	
13.	Total in Yerevan	202817	

**Attachment 4 Business Continuity Plan (BCP) of Rescue Service,
Ministry of Emergency Situations**

Rescue Service

Ministry of Emergency Situations

Business Continuity Plan

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Chapter 1 Introduction

1. Preface

RS has an important task to rescue and maintain the lives, health, and properties in emergency situations, including direct assistance to inhabitants and coordination among governmental, public, and private organizations. In order to fulfill the task, RS prepares an earthquake disaster management plan to promote measures to be taken before/during/after severe earthquakes.

In case of a severe earthquake, RS also suffers damage in its staffs, facilities, and equipment, and which damage causes difficulty in proper operations to fulfill its tasks. A business continuity plan (BCP) is prepared for minimizing the internal damage and quick restoration of RS operation system as a part of the earthquake disaster management plan.

Training is required for upgrading the skills of staffs and their familiarization of this plan. Based on the result of the training and accumulation of experiences/knowledge on disaster management, this BCP should be updated every year, together with the earthquake disaster management plan.

In addition, a BCP will be prepared for each organization, since all organizations have tasks in emergency situations to fulfill the task of each organization to fulfill their tasks properly, especially at the time of a severe earthquake, as it is stipulated in the earthquake disaster management plan.

2. Basic concept

RS secures its business continuity to fulfill the tasks in severe earthquake time, based on the following basic concept.

- (1) Fulfilling emergency response activities, placing the highest priority on securing lives, health, and properties of residents.
- (2) Maintaining the management system of emergency situations in the nation as well as local authorities and communities.
- (3) Setting human resource, materials, and information of RS to be key points for the business continuity.
- (4) Securing safety of staffs of RS.

3. Result of earthquake risk assessment and its adverse influence to the operations of RS

According to the result of earthquake risk assessment, estimated damage by the Garni scenario earthquake was the most serious as summarized in Figure 1 and Table 1, and the estimated damage is the condition of this BCP.

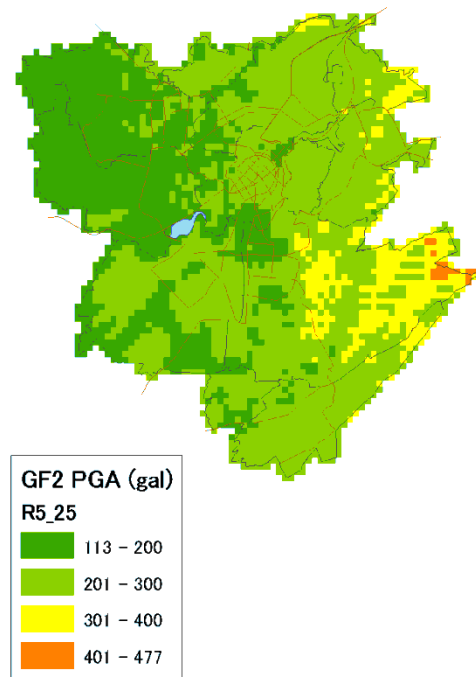


Figure 1 Seismic Intensity Map of the Garni Scenario Earthquake (M 6.5)

Table 1 Conditions of the BCP

Item		Damage
Buildings	Multi-story apartment	8,600 (20%) out of 4,370
	Individual house	12,800 (30%) out of 42,630
	Housing unit	53,700 (20%) out of 264,900
Bridge		3 out of 40
Water supply system		274 points in total length of 1,293.1 km
Sewerage system		714 points in total length of 865.2 km
Electric line	Aerial	22.4 km out of 1,950.2 km
	Underground	305.1 km out of 3,517.1 km
Gas pipeline	On-the ground	221.1 km out of 1,027.0 km
	Underground	2.9 points in total length of 67.6 km
Telephone line	Aerial	1.9 km out of 301.5 km
	Underground	0.0 km out of 301.5 km
Death toll		150,000 out of 1,119,200
Injured		205,000 out of 1,119,200
Evacuees in evacuation points	Just after	370,195
	1 day after	429,186
	4 days after	411,489
	1 month after	376,094

Chapter 2 Priority works to be continued

4. Tasks of RS

The overall tasks of RS are stipulated in the Law on Armenian Rescue Service as shown in Table 4.1.

Table 4.1 Main tasks of RS, stipulated in the Law on Armenian Rescue Service

1	Saving and maintenance of the lives and health of people in emergency situations and martial law (at war)
2	Pursuing of state joint policy in the field of civil defense and population protection in emergency situations
3	Organizing and implementing rescue, accident-rescue, urgent accident-reconstruction, firefighting and other activities
4	Participating in coordination and organization of the activities of, state/local governing bodies and organizations on civil defense and population protection in emergency situations,
5	Participating in prevention of emergency situations, reduction and liquidation of the possible consequences, processing of plans and projects of civil defense and population protection and securing the implementation
6	Participating in organization of population training on the main issues of civil defense and population protection in emergency situations,
7	Delivering state fire service,
8	Studying phenomena causing emergency situations and implementing measures aimed at prevention of emergency situations and liquidation of the consequences
9	Other competencies defined by law.

Some of tasks stipulated in Plan of Organization of Protection of Population of the Republic Armenia in Case of a Severe Earthquake (Government Decision N919) as shown in Table 4.2.

Table 4.2 Tasks of MES, stipulated in the Government Decision N919

a	Submission of a proposal to the Prime Minister of the Republic of Armenia about putting the action plans in case of a severe earthquake into action totally or partially,
b	Organization of implementation of activities envisaged by the action plan in case of a severe earthquake,
c	Organization, coordination and implementation of rescue and other urgent accident-reconstruction activities,
d	Organization of stable operability of subdivisions under its subordination,
e	Warning and awareness of population and governing bodies,
f	Organization of works of preparation of management, communication and warning systems and putting them into action,
g	Organization and coordination of reconnaissance of the territory affected by the earthquake,
h	Implementation of cooperation with the bodies involved in the plan aimed at organization and fulfillment of population protection activities,
i	Coordination of activities of state and local authorities and organization on the issue of population protection,
j	Elaboration of proposals for the establishment of financial, food, medical and other material resources and funds in advance aimed at providing assistance to the population affected by the earthquake, submission of the mentioned proposals to the Government of the Republic of Armenia as well as regulation of issues regarding their accumulation and further purposeful use,
k	Permanent provision of information about the current seismic regime, occurred seismic event (earthquake) as well as development of seismic situation to relevant bodies,
l	De-inventory and alienation of material values securing the uninterrupted works of important fields of economy and vital provision of population from state reserve fund,

m	Forecasting of weather in the required territories,
n	Organization of provision of 24-hour basis functioning of observation points of air quality,
o	Provision of firefighting security,
p	Fulfillment of other competences defined by the Legislation of the Republic of Armenia in the field of population protection.

5. Analytical result of adverse effects and selection of priority works

Major work items of RS in emergency situations are shown in Table 5.1. In Table 5.1, influence (importance) of each work items are evaluated with the criteria shown in Table 5.2 in each time scale I (0 to 1 hour after a severe earthquake), II (1 to 24 hours after), III (1 to 3 days after), IV (3 to 7 days after), V (7 days to 1 month after), and VI (1 month or more).

Table 5.1 Major work items of RS in emergency situations

	I (0 to 1 hr)	II (1 to 24hrs)	III (1 to 3 Days)	IV (3 to 7 days)	V (7 days to 1 month)	VI (1 month or more)
1. Director						
1.1 Controlling the activities of RS	4	5	3	2	2	2
1.2 Responsible for implementation of the tasks and functions of RS	3	4	3	2	2	2
2. Department of Organization of Population Protection and Liquidation of Disaster Consequences						
2.1 Developing plans on prevention of emergency situations and liquidation of the consequence	2	5	3	2	1	1
2.2 Coordinating monitoring activities on radiation, chemical, bacteriological situations	3	4	3	2	2	1
3. Department of Medical Provision						
3.1 Providing medical service to rescues and their families	2	4	2	1	1	1
3.2 Participating in provision of medical staff and medical points	3	3	2	2	1	1
3.3 Participating in reception, analysis, and evaluation of information for providing medical measures	3	3	3	2	1	1
3.4 Participating provision of Medical measures	1	3	3	2	2	1
4. Department of Rear and Logistical Provision						
4.1 Confirming, arranging, and allocating usability of materials and technical means of RS	1	3	3	2	1	1
4.2 Conducting or arranging the repair works of utilities (water, power, gas) and allocating food for the activities of RS	2	3	3	2	1	1
5. Department of Rescue Force						
5.1 Organizing and realizing firefighting and rescue works	4	5	4	3	1	1
5.2 Coordinating activities of rescue forces and rescue formations	2	4	3	2	1	1
5.3 Participating organization of rescue forces of RA with international rescue works	2	2	3	3	2	1
6. Department of Service Organization						
6.1 Participating activities in the field of population protection	2	3	2	2	1	1
6.2 Participating in the processing of agreements of legal acts with other organizations	1	1	2	2	1	1
6.3 Supervising legitimacy and discipline of RS activities	1	2	2	1	1	1
7. Personnel Department						

7.1	Safety confirmation of RS staffs and their families	5	4	2	1	1	1
7.2	Confirmation of workability of RS staffs, and reallocation of staffs, if required	3	3	2	1	1	1
7.3	Request of manpower for assistance to authorized officials and allocation of the manpower	1	3	2	1	1	1
8. Department of Organization of Civil Defense Measures							
8.1	Arranging for confirmation and repair of buildings and constructions of RS	3	2	1	1	1	1
9. Operative Management Department							
9.1	Collecting damage information, and disseminating the information and warning	4	5	2	1	1	1
9.2	Assessing damage situations for the prevention of emergency situations and liquidation of consequences	2	5	4	2	1	1
9.3	Arranging subdivisions of RS for implementation of services (damage reconnaissance, search & rescue, and other assistances)	2	5	4	3	2	2
9.4	Transferring warning and order of authorized officials to subdivisions of RS as well as organizing population warning and awareness	3	3	3	2	1	1
10. Yerevan Rescue Department							
10.1	Coordinating and supervising rescue activities in Yerevan City, and also providing information to state governing bodies	3	4	3	2	2	2
10.2	Organizing and implementing rescue, accident- recovery, and firefighting activities in Yerevan City	4	5	4	2	2	2
10.3	Supervising the implementation of measures securing the operational stability of special and important objects in Yerevan City	2	3	2	2	1	1
11. Regional (Marz) Rescue Departments							
11.1	Distaching deployment to Yerevan for assistance of RS activities in Yerevan	2	3	4	2	1	1
11.2	Receiving functions of RS that seriously damaged in Yerevan and cannot be restored in short time	1	1	2	2	1	1

Table 5.2 Criteria for evaluation of importance

Level 1	Slight Influence Although no rehabilitation work is done at the time, there is no distinct disturbance and inconvenience in society
Level 2	Small Influence There are small influences, which requires preparation for the commencement of rehabilitation works.
Level 3	Moderate Influence There are moderate influences such as inconvenience in life of residents, delay of official procedure, and delay of contract fulfillment, which requires the commencement of rehabilitation works
Level 4	Big Influence There are big influences such as violation of regulation and delay of important official procedure, which requires immediate rehabilitation works
Level 5	Serious Influence There are serious influences such as threat of human life, serious problem in safety/security, and strained conditions of most of victims, which rehabilitation work should have been commenced.

Most of major work items are evaluated to be high, and the items on Table 5.2 are in the highest

priority.

Table 5.3 The highest priority work items

Work Item	Leading department
1.1 Control the activities of RS	Director
2.1 Developing or adjusting plans on prevention of emergency situations and liquidation of the consequence	Department of Organization of Population Protection and Liquidation of Disaster Consequences
5.1 Organizing and realizing firefighting and rescue works	Department of Rescue Force
7.1 Safety confirmation of RS staffs and their families	Personnel Department
9.1 Collecting damage information, and disseminating the information and warning	Operative Management Department
9.2 Assessing damage situations for the prevention of emergency situations and liquidation of consequences	Operative Management Department Department of Organization of Population Protection and Liquidation of Disaster Cosequences
9.3 Arranging subdivisions of RS for implementation of services (damage reconnaissance, search & rescue, and other assistances)	Operative Management Department
10.2 Organizing and implementing rescue, accident-recovery, and firefighting activities in Yerevan City	Yerevan Rescue Department

In order to clarify necessary resources (human resources, Information, and Materials), the highest priority work items are arranged in a time frame as shown in Figure 5.4, considering the principle of BCP shown in Attachment 2.

As shown in Figure 5.4, the order of work items is clarified, and all the work items are overlaying, which means that several works should be done simultaneously, putting priority, according to the time frame.

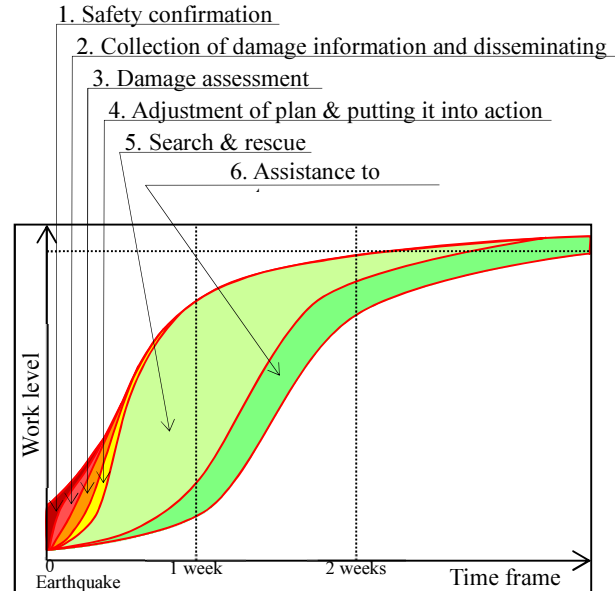


Figure 5.4 The highest priority work items in a time frame of BCP

6. Necessary resources and procedures for the continuation of the priority works

Necessary resources consist of human resources, information, and materials (including equipment and devices). Necessary procedures (or rules) are what require for the arrangement of the resources. The resources and procedures are clarified for each of the highest priority work items in the

succeeding clauses.

7. Human resources

For all the work items, securing human resources is primarily important. Especially for the continuity of the highest priority work items, the followings are stipulated in this plan.

- (1) Designation of staffs for immediate gathering
- (2) Procedure and rule of gathering
- (3) Procedure and rule of safety confirmation
- (4) Procedure and rule of allocation

The timing of the above-mentioned actions is shown in Table 7.1 The flow is divided into two cases; one is for a severe earthquake, another is for a small earthquake. The severe earthquake is defined as follows.

- an earthquake of Magnitude 5.5 or more (as stipulated in the Law on Seismic Protection) in the territory of Armenia and surroundings
- an earthquake of MSK intensity 5 or more in the territory of Yerevan and the surroundings

The earthquake information will be announced by Survey for Seismic Protection agency of MES (SSP). Although no announcement is made, staffs should gather autonomously, since there is a possibility of failure of communication devices due to an earthquake.

Table 7.1 Timing and Actions

Timing	Action	
	A severe earthquake (M 5.5, MSK 5 or more)	Another earthquake (less than M 5.5 or MSK 5.5)
Before an earthquake	- Designation of staffs for immediate gathering	
Immediate after an earthquake	- Autonomous gathering of all staffs - Safety confirmation - Staff allocation, if necessary	- Autonomous gathering of designated staffs
After warning for staff gathering		- Gathering of all staffs - Safety confirmation - Staff allocation, if necessary

7.1 Designation of staffs for immediate gathering

Each department/section designates necessary staffs, based on the estimation of the proportion of staffs who cannot gather in a severe earthquake on Table 7.2.

Basically, the heads and deputies of departments as well as the head of sections should be on the list, so that important issues on management and operation of RS can be discussed among representatives, at least one representative from each department/section.

In case of the head or deputy is the out of Yerevan due to duty trip, vacation, or others, the succeeded staff of the duty should be clarified.

The list of the designated staffs with the place of gathering for each staff should be updated at least twice a year and submitted from each department/section to the Personnel Department.

Table 7.2 Estimation of the proportion of staffs who cannot gather in a severe earthquake

Reason of inability of gathering \ Time scale	I (0 to 1 hr)	II (1 to 24hrs)	III (1 to 3 Days)	IV (3 to 7 days)	V (7 days to 1 month)	VI (1 month or more)
a. Road blockage	70	30	10	10	0	0
b. Injury of staffs and their family (10% in max)	10	10	7	5	5	5
c. Assisting activities for neighbours (30% in max)	30	30	20	10	3	0
d. Percentage of staffs unable to gather	81	56	35	23	8	5
e. Percentage of staffs gathered	19	44	65	77	92	95

Unit: %,

$$d=a+(1-a)*b+[1-\{a+(1-a)*b\}]*c$$

$$e=1-d$$

The conditions of estimation of a, b, and c are in Attachment 1.

7.2 Procedure of and rule of gathering

Basic rule for gathering is divided into two cases as follows.

- (1) In case of a severe earthquake, all staffs should immediately and autonomously gather the working points. Staffs, who are in duty at working points at the time of the severe earthquake, should continue stationing at the working points.
- (2) In case of another earthquake of less than M 5.5 or MSK 5, the designated staffs should immediately and autonomously gather the working points. Other staffs should be stand-by for gathering. Staffs, who are in duty at working points at the time of the earthquake, should continue stationing at the working points.

Related rules are as follows.

- (1) Safety first
Since many dangerous situations are foreseen during moving to a work point, staffs should pay attention to their own safety.
- (2) Participation to urgent rescue activities
In case that a staff encounters very critical situations, requiring urgent assistance especially to safe life, the staff can participate by his/her own decision, after reporting the delay of gathering.
- (3) Reporting on inability of immediate gathering
In case that a staff cannot gather immediately mentioned in the procedure above, the staff or his/her neighbors should report necessary matters as shown in Table 7.3.

Table 7.3 Reporting when unable to gather

Items to be reported
- Department/section - Name - Reason of inability of gathering - Contact information (address, telephone number, etc.)
Point of contact
- Designated staffs for immediate gathering: Personnel Department - Other staffs: Department or Section which the staff belongs to
Possible reasons of inability of gathering
- The staff or a family member is injured, requiring medical treatment or

hospitalization.

- The staff is on sick leave, annual leave, care leave. etc.
- The house of the staff, relatives or close neighbors is damaged, and the staff is evacuated or bound by restoration and arrangement of necessities.
- The staff is required to attend rescue activities on the way to the gathering point.
- The staff has no way of gathering other than walking for the distance of 20 km or more.

(4) Observing and reporting damage situations

During moving to a working point, Staffs should observe damage situations during moving to their working points and report to the head of his/her department/section when they arrive the working points, so that the head can report to the Operative Management Department to share damage information in RS and among related organizations.

(5) Bringing urgent survival bag

As far as possible without hampering moving, staffs bring an emergency survival bag, containing the goods shown in Table 7.4, since the staffs may stay in the working points for several days.

Table 7.4 Goods in an emergency survival bag

First important
- Water
- Food, eatable without cooking
- Cellular phone
Second important
- First aid kit
- Helmet
- Flashlight
- Portable radio
Third important
- Cash
- Towel
- Lighter or matches
- Knife
- Tools of writing

7.3 Procedure and rule of safety confirmation

Safety confirmation should be done on the procedure shown in Table 7.5.

Table 7.5 Procedure of safety confirmation

	Action	Remarks
1	Confirmation by each staff	Immediately after a severe earthquake or warning for staff gathering in another earthquake, each staff confirm safety of his/her family members.
2	Reporting the individual confirmation	Soon after the confirmation , each staff report to department or section to which he/she belongs. Items to be reported are as follows. a) Total number of family members, including the staff ($a=b+c+d+e+f$) b) Number of the members who are safe c) Number of the members who are slightly injured

		d) Number of the members who are seriously injured e) Number of the members who is dead f) Number of members whose safety has not been confirmed g) Conditions of injured members and * In case that the staff can not gather immediately, report on inability of gathering is made at this time.
3	Sum up of the confirmation result by each department or section	Each department or section sum up the reporting result by staffs on a form shown in Attachment 3.
4	Reporting the sum up result to Personnel Department	Within one hour after a severe earthquake or warning for staff gathering in another earthquake, each department or section submits the result on the form to Personnel Department.

In case that communication about reporting from a staff is not available, effort to make communication should be made on the following rule.

From RS side

- (1) The head of department or section appoint a staff for regular trial for communication, and the appointed staff should make regular trial for the communication with fixed and cellular telephones.
- (2) In case that number of gathered staffs is not enough for regular trial, Personnel Department assigns the staff for the trial, according to the request of the head of department.
- (3) Considering the implementation status of urgent works, Personnel Department sends a staff to confirm safety of staff unable to have contact.

From staff side

- (4) In case that a family member of a staff is in serious condition, the staff should take care the family member. The staff should report the situation by means of any communication means.
- (5) In case that the staff evacuated with family members, the staff can report the situation from an evacuation point, where communication means are available.
- (6) In case that no communication means is available, the staff can send a message to the department/section.
- (7) In case that the staff can proceed to the working point, trial for communication can be done by a cellular phone or other means on the way. The staff can report at least at the time of arrival of the working point.

7.4 Procedure and rule of allocation of staffs

Minimum required number of staffs for the highest work items is estimated, based on the necessary work details, number of staffs of responsible department/section, and percentage of staff gathering as shown in Table 7.6.

The rule relating to allocation of staffs is as follows.

- (1) The head of each responsible department/section should adjust the number of necessary staffs, based on the actual situation and actual work to be done.
- (2) In case that number of gathered staffs is not sufficient in a department/section, the department/section should report to Personnel Department for arrangement and assignment of

staffs among departments/sections.

- (3) In case that number of gathered staffs is not sufficient in RS after the arrangement and assignment, Personnel Department should report to the Director of RS for his further arrangement among other related organizations.

Table 7.6 Minimum required number of staffs for the highest work items

Work item		Dept. or sec.	* ¹	Time (hour or D:day)								No. staffs
				1-	2-	3-	6-	12-	24-	3D-	7D-	
1	Control the activities of RS	Director		1	1	1	1	1	1	1	1	1
2	Safety confirmation	Personnel Dept.		5	5	3	3	3	2	1	1	10
3	Collection of damage information and disseminating	OM Dept. (CMC)	M O	5 20	5 20	5 20	5 20	5 20	5 20	3 10	1 5	15 50
4	Damage assessment	OM Dept.			5	5	5	5	5	3	1	15
5	Adjustment of plan & rutting into action	Dept. OPL				5	5	5	5	5	3	50
6	Search & rescue	Dept. RF YR Dept.	M O O				30 150 200	40 180 240	40 200 260	60 300 300	40 150 100	100 450 (700)
7	Assistance to evacuees, etc.	YR Dept.	M O							10 100	30 350	700
	% of staff gathering			19	22	27	35	40	44	65	77	

*¹ M: for management, O: for operation

8. Information

Information to be collected for the fulfillment of the highest priority work items is shown in Table 8.1.

Table 8.1 Information to be collected

Work item		Dept. or sec.	Information to be collected	Form	Source of the information
1	Control the activities of RS	Director	Safety of staffs	Attachment 3	Staffs (by telephone, message, oral)
2	Safety confirmation	Personnel Dept.			
3	Collection of damage information and disseminating	OM Dept. (CMC)	Base map (Topomap with locations of objects mentioned below)	S=1:5,000 to 10,000	(beforehand)
			Human damage	Attachment 4 and locations on the map	Reconnaisance teams, YEMC, CMC (Call center)
			Damage to important facilities	Attachment 5 and locations on the map	
			Damage to dangerous facilities	Attachment 6 and locations on the map	
			Damage to medical facilities	Attachment 7 and locations on	

				the map	
			Damage to infrastructures	Attachment 8 and locations on the map	
			Damage to buildings (Mainly for ollapsed and heavily damaged)	Attachment 9 and locations on the map	
			Damage to supporting facilities	Attachnent 10 and locations on the map	
4	Damage assessment	OM Dept.	Base map (Topomap with damaged objects arranged the above works (3))	S=1:5,000 to 10,000	OM Dept.
			Damage information	Collected and arranged the above works (3)	OM Dept.
			Distribution of seismic intensity	Seismic intensity distribution map	NSSP through CMC
			Existing damage estimation result	Map and tables	(beforehand, RS GIS section)
5	Adjustment of plan & putting into action	Dept. OPL	Base map (Topomap with damaged assessment resultls arranged the above works (4))	S=1:5,000 to 10,000	OM Dept.
			Summary of safety confirmation of RS staffs	Attachment 3	Personnel Dept.
			Damage assessment	Assessed result, prepared in the above work (4)	OM Dept.
			Instruction	Instruction made by the leaders	The head of RS, Minister of ES, CMC, YEMC, etc.
			Request and demand	Issued request by other ministries, etc. and arison demand of population	CMC, YEMC
			Existing plan and related regulations	Attachment 11	(beforehand)
6	Search & rescue	Dept. RF YR Dept.	Base map (Topomap with damaged assessment and adjusted plan in the above works (5))	S=1:5,000 to 10,000	Dept. OPL
			Summary of safety confirmation of RS staffs	Attachment 3	Personnel Dept.
			Damage assessment	Assessed result, prepared in the above work (4)	OM Dept.
			Adjusted plan	Adjusted plan, prepared in the above work (5)	Dept. OPL
			Depled forces and safety in operation	Attchment 12	YR Dept.

			Progress, request, and result of search & rescue	Attachment 13	YR Dept.
			Instruction	Instruction made by the leaders	The head of RS, Minister of ES, CMC, YEMC, etc.
			Request and demand	Issued request by other ministries, etc. and arising demand of population	CMC, YEMC
7	Assistance to evacuees, etc.	YR Dept.	Base map (Topomap with damaged assessment, adjusted plan, and search & rescue result done in work in (6))	S=1:5,000 to 10,000	Dept. RF YR Dept.
			Instruction, related information, etc. on assisting work to be done	Instruction made by the leaders	The head of RS, Minister of ES, CMC, YEMC, etc.

9. Materials and infrastructures

Materials required for immediate actions are shown in Table 9.1.

Table 9.1 Materials and facilities for immediate actions

Estimated situation	To be done	
	Just after a severe earthquake	Beforehand
A. Building and rooms		
Buildings of RS may be damaged and rooms may not be safe.	<ul style="list-style-type: none"> - Safety confirmation of buildings and rooms of RS 	<ul style="list-style-type: none"> - Fixing shelves and furniture to prevent their turn down - Prepare a procedure of building diagnosis and safety confirmation of rooms - Reserving repairing tools of work area
B. Power		
Availability of public power supply 3 days after: 0% 1 week after: 10% 1 month after: 60%-70%	<ul style="list-style-type: none"> - Safety confirmation of electric facilities and devices - Repairing of broken parts and devices - Emergency power supply with generators 	<ul style="list-style-type: none"> - Reserving back-up power system at least for 1 week - Generators with fuel and lubricant (a generator of 2kVA with fuel of 10 lit./day, for office work with two computers and lighting) - Making a contract with suppliers of fuel and lubricant for priority delivery in an emergency - Reserving repairing kits of power supply system
C. Water		
Available public water supply 3 days after: 0% 1 week after: 50% 1 month after: 100%	<ul style="list-style-type: none"> - Leakage check - Repairing of broken parts - Reserved water delivery 	<ul style="list-style-type: none"> - Reserving water in bottles or tanks for 10 days (5 lit./day/staff) - Making a contract with water suppliers for priority delivery in an emergency - Reserving repairing kits of water

		supply system - Remind gathering staffs to bring water in an emergency survival bag
D. Gas		
Available public gas supply 3 days after: 0% 1 week after: 0% 1 month after: 0%	- Leakage check and safety confirmation of gas facilities and devices - Repairing of broken parts and devices	- Reserving <u>repairing kits of gas supply system</u>
E. Communication means		
Due to black out, communication by telephone is not available. Dedicated wireless communication means also does not function, because of no backup power supply as well as damage to antennas and lead-in lines.	- Repairing broken parts and devices - Emergency power supply with generators	- Reserving <u>wireless communication means</u> (walky talkies) with batteries and <u>loud speakers</u> for internal announcement. - Reserving <u>repairing kits of communication means</u>
F. Digital data		
Some computers are turned down, and broken. Due to black out, digital data cannot be used, and some data under processing are disappeared.	- Emergency power supply with generators	- Fixing computers to avoid their shutdown - Installing UPS to desktop computers - Increase number of laptop computers - Installing data portable digital data backup devices - Keeping hard copies of important information such as the list of communication
G. Food		
Most of food shops are closed, and no food is available in opened shops.	- Confirmation of available food	- Reserving <u>food</u> at least for 10 days (The list of the food is in Annex 17 of Government Decision N 919) - Making a contract with food suppliers for priority delivery in an emergency - Remind gathering staffs to bring food in an emergency survival bag
H. Facilities of rest and sleeping		
Some staffs stay in office for long time, because of the loss of their houses and busyness of emergency works.	- Arrangement of safe space and facilities for rest and sleeping of staffs	- Reserving <u>portable beds and blankets</u> - Making a contract with hotels for staffs needing to stay
I. Toilet		
Since there is no water for flushing. Toilets in buildings can not be used.	- Normal use of toilets is prohibited. - Setting portable toilets, such as that utilizing manholes - After installation of collecting tools of human waste, toilets may be open to use.	- Reserving <u>tools for human waste collection or materials of portable toilets</u> .
J. Tools for rescue and repair		
Some staffs may be injured or confined in a room.	- Damage reconnaissance and confirmation of function of	- Reserving <u>tools for rescue and repair</u> . Crowbars, hammers, steel wires, nails,

Facilities may be broken.	facilities.	nippers, adhesive tapes, first aid kits will be resered.
K. Tentative office facilities		
Buildings of RS may be damaged and be in dangerous condition.	Safety confirmation of buildings of RS.	<ul style="list-style-type: none"> - Establishing the procedure of building diagnosis for safety confirmation. - Reserving tents for tentative offices in open spaces, in case that buildings are in dangerous conditions.

Chapter 4 Other Considerations

10. Formulation of detailed plan/rule in each department and section

All departments and sections of RS should formulate detailed plan and rule, such as designation of staffs for immediate gathering. The detailed plans and rules should be approved by the head of RS and kept in each department and Operative Management Department.

11. Education, training, and updating the plan

11.1 Understanding the contents of this plan

All staffs should go through this plan to understand the contents of this plan, so that all staffs can take initial response properly. Leading departments for the highest priority work items should clarify tasks of each staff.

11.2 Training and seminar

For the business continuity, it is a key point that all staffs should understand the importance of the continuity, even in ordinary times, which can be said that all staffs should have “Culture of Disaster Management”. Training and seminar should be carried out so that all staffs have images of emergency situations and proper response.

The training can be divided into followings

- Comprehensive training on an earthquake disaster management
- Training on gathering without using transportation means
- Training on communication without public power supply
- Training of initial response without public power supply
- Training on arrangement of materials for initial response

The evaluation result should be used for the betterment of response, communication, reserves, etc.

11.3 Updating BCP

Based the result of training and daily activity, BCP should be updated at least once a year. Working group with advisors from other organizations will be manage the updating.

11.4 Formulation of BCP of other organizations

RS should promote and support for the formulation of BCP of other organization. In the course of the formulation of BCP of other organizations, RS should clarify the tasks and responsibility among the related organizations.

Attachment 1 Condition of estimation of number of gathering staffs

- a. Road blockage
 - Due to the road blockage, no transportation mean is available, and thereby, walking is noly the way of gathering.
 - General working speed is set to be 4 km/hour, and accordingly, staffs stay within 4 km from the gathering points can be gathered in 1 hour. The percentage of staffs who do not stay within 4 km from the gathering points is estimated to be 70%.
 - Staffs who live in the areas of 10 km or more from the gathering points cannot gather due to complete blockage of roads before the clearance of debris. The percentage of staffs who cannot gather due to the road blockage is estimated to be 30% in 24 hours and 10% in 7 days.
- b. Injury of staffs and their family
 - 5% of staffs may be injured.
 - 20% of family members of staffs may be injured (5%/family and 4 members in a family) and one fourth of the staffs may be bound for the care of the injured member up to 3 days after.
- c. Assisting activities for neighbors
 - 30% of staffs may be bound for search and rescue activities for the neighbors, based on the result of interview of victims of Kobe earthquake.
 - The percentage may decrease to be 20% in 3 days, 10% in 7 days, and 3% in 1 month.

Reference: Actual records of gathering of officials in case of Kobe earthquake

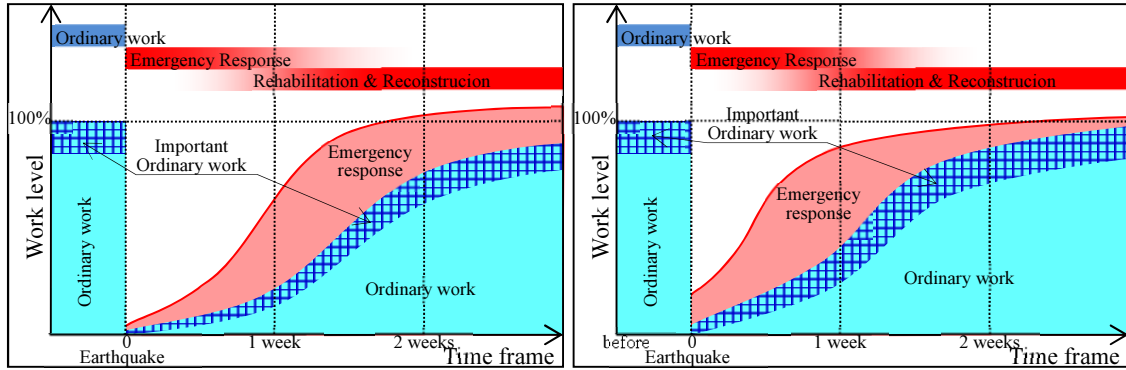
Table Percentage of staffs who could not gather

Office	1 day	2 days	3 days	4 days	5 days or more
Hyogo Prefecture	80%			30%	
Kobe City	59%	40%	30%	20%	10%
Itami City	25%	20%	17%	15%	
Nishimoniya City	49%	34%	31%	22%	
Ashiya City	58%	48%	40%	39%	
Takarazuka City	40%				

Source: Japanese Cabinet Office HP

Attachment 2 Principle of BCP

BCP shows procedure and preparation for the quick restoration of indispensable work in a severe disaster, based on the estimation of damages, focusing on resources (human resources, information, and materials).



Without BCP (pre-defined procedure and preparation), initial response is delayed. Accordingly, the restoration of ordinary work is delayed due to the delay of emergency response as shown in the left-side figure.

Attachment 3 Form and sample of summarized result of safety confirmation

Safety Confirmation Report																
Department or Section																
Prepared by	(Name) Person in charge in the dept.	Date & Time														
Checked by	(Name) Head of Dept.	Date & Time														
Received by	(Name) Personnel Dept.	Date & Time														
Position	Name	Report		Safety			Gathering			Family (excluding the staff)					Remarks	
		Y	N	S	I	D	G	F	U	T	S	I	D	M		
Head, Dept	AAA	✓		✓			✓			4	4	0	0	0		
Deputy head	BBB	✓			✓			✓		6	4	1	0	1		
Assistant	CCC	✓		✓			✓			3	3	0	0	0		
Sub total		3	3	0	2	1	0	2	1	0	13	11	1	0	1	
Section or subsection (A)																
Head, section	DDD	✓		✓			✓			5	4	0	0	1		
Deputy	EEE	✓		✓				✓		4	4	0	0	0		
Staff	FFF		✓	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	No communication to the staff	
Staff	GGG	✓		✓				✓		2	0	1	0	1		
Sub total		4	3	1	3	0	0	1	2	0	11	8	1	0	2	
Section or subsection (B)																
Head, section	HHH	✓		✓				✓		3	2	0	0	1		
Deputy	III	✓		✓				✓		5	5	0	0	0		
Staff	JJJ	✓		✓			✓			7	4	1	0	2		
Sub total		3	3	0	3	0	0	1	2	0	15	11	1	0	3	
Section or subsection (C)																
Head, section	KKK	✓			✓				✓	3	0	2	1	0		
Deputy	LLL	✓		✓				✓		▲	▲	▲	▲	▲	No communication to family	
Staff	MMM	✓		✓				✓		3	3	0	0	0		
Sub total		3	3	0	2	1	0	0	2	1	6	3	2	1	0	
Grand total		13	12	1	10	1	0	4	7	1	45	33	5	1	6	

“Report” Y: Yes, N: No, “Safety” S: Safe, I: Injured, D: Dead, “Gathering” G: Gathered, F: will gather, N: Unable to gather, “Family” T: Total number, S: Safe, I: Injured, D: Dead, M: Missing

Attachment 4 Summary sheet of human damage

[illegible]

*1: number of "hospitalized" and "to be hospitalized" should be included in "Injured"

Attachment 5 Summary sheet of damage to important facilities

Summary sheet of damage to important facilities								
Prepared by		(Name) Person in charge in Operative Management Dept.					Date & Time	
Checked by		(Name) Head of Operative Management Dept.					Date & Time	
	Name	Building	Staff	Communi- cation	Water	Power	Function	Remarks
1	President office							
2	Parliament							
3	Ministry of ES							
4	M. Defense							
5	M. Healthcare							
6	M. Transport & Com.							
7	M. Energy & NR							
8	M. Foreign Affairs							
9	M. Urban Develop.							
10	M. Territorial Adm.							
11	M. Finance							
12	M. Economy							
13	M. Natural Prot.							
	(to be continued)							
	CMC							
	YEMC							
	Yerevan City office							
	Ajapnyak administrative district office							
	Avan administrative district office							
	Arabkir administrative district office							
	Davitashen administrative district office							
	Erebuni administrative district office							
	Kentron administrative district office							
	(to be continued)							
	Rescue Service							
	RS Ajapnyak							
	RS Avan							
	RS Arabikir							
	RS Davitashen							
	(to be continued)							
	Police, Yerevan							

	Police in districts							
	(to be continued)							

Attachment 6 Summary sheet of damage to dangerous facilities

Summary sheet of damage to dangerous facilities														
Prepared by		(Name) Person in charge in Operative Management Dept.								Date & Time				
Checked by		(Name) Head of Operative Management Dept.								Date & Time				
		Toxic material	Qt. (ton)	Acci- dent	Damage					Expected time/ date of repair	Operation		Expected time/ date of operation	Action to be taken
					Building	Staff	Commu- nication	Water	Power		Y	N		
1	«Maqur Erkat factory» CJSC	Ammonium HC acid	40 50	No	OK	2 injur ed	Difficu t	Stop	OK	-		✓	13:00/ 6 May	-
2	«Voske Pingvin» Ltd.	Ammonium	1.6	No	OK	OK	Difficu lt	OK	OK	-	✓		-	-
3	«Urartu» OJSC	Ammonium	-	No	OK	OK	OK	Stop	OK	-	✓		-	-
4	«Champagne-wi ne factory» OJSC	Ammonium	1.5	Small accident	Crack (not serious)	4 injur ed	OK	Stop	Stop	12:00/ 7 May		✓	10:00/ 15 May	Monitoing only by RS team
5	«Nairit factory» CJSC	Ammonium Chlorine Nitric acid HC acid	102 225 20.5 121.6											
6	«Cocal-Cola bottlers Armeia» CJSC	Ammonium	3											
7	«Grand-san» Ltd.	Nitric acid	28.7											
8	«Yerevan Beer» OJSC	Ammonium	5											
9	«Dzyunik refrigerator» Ltd.	Ammonium	18											
10	«Grand Candy» Ltd.	Ammonium	15											
11	«Hayk» CJSC	Ammonium	3											
12	«Shant-plus» Ltd.	Ammonium	8											
13	«Yerevan milk» CJSC	Ammonium	1.6											
14	Yerevanyan Rese	-	-											
15	Vardavari Reservoir	-	-											
	(Fuel stations) if reported													

Attachment 7 Summary sheet of damage to medical facilities

Summary sheet of damage to medical facilities													
Prepared by	(Name) Person in charge in Operative Management Dept.								Date & Time				
Checked by	(Name) Head of Operative Management Dept.								Date & Time				
Name	Urgent premedical assistant team	Urgent medical assistant team	Ambulance team	Additional deployed beds	Building	Staff	Communication	Water	Power	Function	Action to be taken	Remarks	
A Ajapnyak	/19	/10	/4	/605									
1 Armenia medical center	/5	/5	/4	/400									
2 Ophthalmogy center after Malayan	/3	/1		/70									
3 Perinatology obstetrics gynecological center	/3			/45									
4 Dermatology and sexual disease medical center	/3	/2		/30									
5 Eurodent dental clinic		/2											
6 Radiological medicine Combustiology scientific center	/5			/60									
B Avan	/16	/17		/180									
N 12 polyclinic	/6	/6											
(to be continued)													

Attachment 8.1 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (1) Road													
Prepared by	(Name) Person in charge in Operative Management Dept.										Date & Time		
Checked by	(Name) Head of Operative Management Dept.										Date & Time		
	Road	Blockage		Blocked section	Obstacle					Action to be taken	Taken by Time (h:m)	Estimated time open	Remarks
		N	Y		D	R	B	V	O				
1	Strategic No.1 (North)												
	Sayat-Nova	✓		-	-	-	-	-	-	-	-	-	-
	Baghramyan		✓	56-58	✓					Debris clearance	AAA (16:30)	6 h	Ask to Eng. Dept.
			✓	12-20				✓		Traffic control	BBB (16:45)	0.5 h	Ask to Police
	Kasyan	✓		-	-	-	-	-	-	-	-	-	-
	Komitas (part)	✓		-	-	-	-	-	-	-	-	-	-
	Sasna Tsres (part)												
	Yeghvard (part)												
	H4												
2	Strategic No.2 (South)												
	Tigran												
	Artsakh												
3	Strategic road No.3 (West)												
	Beirut												
	Argishiti (part)												
	Isakov												
4	Strategic No.4 (East)												
	Abovian												
	Saralanji												
	Azatutyan												
	Tbilisyan												
	M4												
5	Strategic No.5 (Northeast)												
	Sebastia												
	Hasratyan												
	Shiraz												
	Chaush												
	Ashtarak (M 1)												

“Blockage” Y: Yes, N: No, “Obstacle” D: Debris, R: Road surface, B: Bridge, V: Vehicle, O: Others

Attachment 8.2 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (2) Bridge									
Prepared by		(Name) <u>Person in charge in Operative Management Dept.</u>					Date & Time		
Checked by		(Name) <u>Head of Operative Management Dept.</u>					Date & Time		
	Bridge	Pass-ability		No	Damage		Action to be taken	Estimated time open	Remarks
		Y	N		Yes				
					Superstructure	Substructure			
1	Friendship Square								
2	Vatutin str.								
3	Riga str.								
4	Saralanji HW near Riga str.								
5	Komitas ave.								
6	Avan 1st bridge								
7	Avan 2nd bridge								
8	Yerevan - Sevan HW								
9	2nd road								
10	Central Davtashen transport								
11	7th road								
12	Arin-Berd str.								
13	Davtashen bridge								
14	Kiev bridge								
15	near the Kiev bridge								
16	near the Yerevan HES								
17	Haghtanak bridge								
18	New highway								
19	New highway								
20	Heratsi str.								
21	Charents str.								
22	Khanjyan str.								
23	Tigran Mets ave.								
24	Khorenatsi str.								
25	Subway over Kristapor str.								
26	G. Lusavorich str.								
27	Near the Hrazdan Stadium								
28	Isakov ave.								
29	Argavand bridge								
30	Isakov ave. to Echmiadzin HW								
31	near Nubarashen								
32	Galshoyan str.								
33	Jrvejh river bridge								
34	Garegin Nzhdeh str.								
35	Subway over Shahamiryanner str.								
36	Subway over Tamantsineri str.								
37	Subway over railway								
38	Shirak str. 1st bridge								
39	Araratyan str.								
40	Shirak str. 2nd bridge								

Function ×: not functioning, Δ:partly functioning, ○:functioning

Attachment 8.3 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (3) Railway, subway, and airport												
Prepared by		(Name) Person in charge in Operative Management Dept.							Date & Time			
Checked by		(Name) Head of Operative Management Dept.							Date & Time			
	Facility	Operation		Damage						Action to be taken	Estimated time/ date of operation	Remarks
		Y	N	No	Building	Staff	Communication	Water	Power			
1	Railway managing facility											
2	Yeravan railway station											
3	Railway tracks											
4	Other railway facilities											
5	Subway managing facility											
6	Subway stations											
7	Subway tracks											
8	Other subway facilities											
9	Zvartnots airport managing facility											
10	Zvartnots airport navigation facilities											
11	Zvartnos airport runway											
12	Zvartnos airport terminal facilities											
13	Zvartnots airport cargo facilities											
14	Zvartnots logistics facilities											
15	Erebuni airport managing facility											
16	Erebuni airport navigation facilities											
17	Erebuni airport runway											
18	Erebuni airport terminal facilities											
19	Erebuni airport cargo facilities											
20	Erebuni logistics facilities											

Attachment 8.4 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (4) Gas								
Prepared by		(Name) Person in charge in Operative Management Dept.				Date & Time		
Checked by		(Name) Head of Operative Management Dept.				Date & Time		
	Accident		Damage		Action to be taken	Estimated time/date of repair	Estimated time/date of operation	Remarks
	Location	Situation	Location	Situation				
1	Gas supply managing facilities							
2	Gas storage facilities							
3	High pressure gas network							
4	Gas pressure regulating facilities							
5	Gas distribution network							
6	Lead-in facilities and other facilities inside factories, houses, etc.							

Attachment 8.5 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (5) Electricity								
Prepared by		(Name) Person in charge in Operative Management Dept.					Date & Time	
Checked by		(Name) Head of Operative Management Dept.					Date & Time	
	Accident		Damage		Action to be taken	Estimated time/date of repair	Estimated time/date of operation	Remarks
	Location	Situation	Location	Situation				
1	Hydro-power station managing facilities							
2	Yerevan hydro-power station							
3	Kanakaner hydro-power station							
4	High voltage transmission network							
5	Substations							
6	Distribution network							
7	Lead-in facilities and facilities inside factories, houses. etc.							

Attachment 8.6 Summary sheet of damage to infrastructures

Summary sheet of damage to infrastructures (6) Water supply								
Prepared by		(Name) Person in charge in Operative Management Dept.				Date & Time		
Checked by		(Name) Head of Operative Management Dept.				Date & Time		
	Accident		Damage		Action to be taken	Estimated time/date of repair	Estimated time/date of operation	Remarks
	Location	Situation	Location	Situation				
1	Reservoirs and springs							
2	Major water ways and water lines							
3	Regulating ponds							
4	Pulification facilities							
5	Major water tanks, towers or booster stations							
6	Distribution network							
7	Lead-in facilities and facilities inside factories, houses. etc.							

Attachment 9 Summary sheet of damage to buildings

Summary sheet of damage to buildings (Mainly for collapsed and heavily damaged)										
Prepared by	(Name) Person in charge in Operative Management Dept.					Date & Time				
Checked by	(Name) Head of Operative Management Dept.					Date & Time				
District/Area	Adress	Building type*	No. of stories	Damage grade	No of confined/missing	No. of injured	No. of dead	Related accident	Action to be taken	Remarks
A. Ajapnyak										
Block 1										
Block 2										
Block 3										
Block 4										
B. Avan										
Block 5										
Block 6										
Block 7										

Building type O: Official (Republican), F: Factory, S: Shops or for only commercial, C: Collective, I: Individual

Related accident F: Fire, G: Gas leak, W: Water leak, E: Explosion, O: Others (description)

Attachment 10 Summary sheet of damage to supporting facilities

Summary sheet of damage to supporting facilities										
Prepared by	(Name) Person in charge in Operative Management Dept.						Date & Time			
Checked by	(Name) Head of Operative Management Dept.						Date & Time			
Name of of facility or comany	Adress	Situation of damage to the supporting materials	Building	Staff	Communi-cation	Water	Power	Related accident	Action to be taken	Remarks
A. Food										
B. Water (Drinks)										
C. Medical supplies										
D. Cloths, shoes, goods for sleeping, etc.										

Attachment 11 Plans and regulations to be followed in emergency response

Category	Status	No.	Title	Year
Overall	Law	AL 265	Law on Population Protection in Emergency Situations	1998
	Law	AL 309	Law on Civil Defense	2002
	Law	AL 367	Law on Seismic Protection	2002
Warning	G_Decision	N 1304 N	Decision on Approving the Order of Reception of Information and Warning about Occurrence of Emergency Situations in the Territory of Republic of Armenia	2003
	G_Decision	N 1494	Decision about Defining the Order of Warning of Population and Governing Bodies	2004
	G_Decision	N 1925 N	Decision on approving the procedure of the population warning about emergency situations in the territory of the Republic of Armenia	2005
Plan	G_Decision	N 919	Plan of Organization of Protection of Population of the Republic of Armenia in Case of Severe Earthquake	2010
	M_Decision	N 941 A	Evacuation of Population of Yerevan City during Emergency Situations and Martial Law	2010
			Plan of population evacuation in case of a severe earthquake in Yerevan city	

Attachment 12 Deployment and safety of staffs in search and rescue operation

Group	Leader	No. of staffs	Purpose	Area	Duration	Communication means	Safety information	Remarks
A. Ajapnyak								
No.1								
No.2								
No.3								
B. Avan								
No.4								
No.5								

**Attachment 5 Analytical Hierarchy Method (AHP) for Prioritizaation
of Projects, Procedure and Result**

AHP
(Analytical Hierarchy Method)
for
Prioritization of Projects

Procedure and Result

1. Evaluation items
2. Evaluation of criteria
3. Weighting of evaluation items
 - 3.1 Level 1
 - 3.2 Level 2
 - 3.3 Total weight
4. Projects to be prioritized
5. Evaluation of projects
6. Prioritization of projects

1. Evaluation items

Two levels of items for evaluation were determined as shown in Table 1.

Level 1 consists of four items; A. Validity, B. Direct Effect, C. Indirect Effect, and D. Sustainability.

Each item of Level 1 consists of four or three sub-items in Level 2.

Table 1 Items for evaluation

Item (Level 1)		Item (Level 2)		Remarks
A	Validity	1	Conformity with policy, regulations, and plans	Whether necessity or validity has been stated in existing policy, regulations, or plans?
		2	Needs and consensus of residents and communities	In the level of residents, enterprises, and schools, is there demand for improvement or implementation? and is it easy to formulate consensus?
		3	Initial investment (Budget)	Scale of initial investment (budget) and the possibility of securing the amount
		4	Implementing organization and its human resources	Is an implementing body clear? Can human resources be secured for the implementation?
B	Direct Effect	5	Risk reduction	The scale of target risk to be reduced in the project and the degree of reduction of the risk by the project
		6	Awareness raising	The degree of effectiveness in terms of raising awareness of related personnel and residents
		7	Capacity development	The degree of capacity development in disaster management of the related personnel and residents in the course of and as the result of the project implementation
		8	Implementation of similar project	Has a similar project been in implementation? Is there any limitation in effectiveness due to duplication in targeting result?
C	Indirect Effect	9	Autonomous development (in the implementing project)	Is there effect on further promotion of implementing project in terms expansion of targeting personnel, objects, and areas?
		10	Impact (to related projects or activities)	Is there effect on promotion of related projects or activities?
		11	Economic effect to other projects	Is there effect on promotion in development of related industry and local society?
D	Sustain-ability	12	Operational expense	Can monetary resources be secured for operation, maintenance, and management?
		13	Organizational Framework for operation	is it possible to arrange regulation and organization and to secure manpower for the operation?
		14	Effort and ambition for the operation	Is there effort and ambition in the operating organization and personnel for continuity and expansion of the project/

2. Evaluation criteria

Criteria for the evaluation of each sub-item are shown in Table 2. Evaluation was done, based on the point on the upper column in Table 2.

Table 2 Evaluation Criteria

Item (Level 1)	Item (Level 2)	Remarks	1	2	3	4	5
A Validity	1 Conformity with policy, regulations, and plans	Whether necessity or validity has been stated in existing policy, regulations, or plans?	No related statement in policy, regulations, or plans	Somewhat related statement in policy, regulations, or plans	Related statement in policy, regulations, or plans	Well related statement in policy, regulations, or plans	Clear statement in policy, regulations, or plans
	2 Needs and consensus of residents and communities	In the level of residents, enterprises, schools, is there demand for improvement or implementation? and is it easy to formulate consensus?	small demand and difficulty in formulating consensus	(intermediate)	Moderate situations in demand and formulating consensus or one of the two is in good situation	(intermediate)	Big demand and easy for formulating consensus
	3 Initial investment (Budget)	Scale of initial investment (budget) and the possibility of securing the amount	500 ml. or more; no source so far	50-500 ml.; no source so far	500 ml. or more; possible source	5 ml. or less; no source so far	5-50 ml.; possible source
	4 Implementing organization and its human resources	Is an implementing body clear? Can human resources be secured for the implementation?	An implementing body is unclear and difficulty in securing human resources	(intermediate)	Moderate situation in implementing body and human resources or one of the two is in good situation	(intermediate)	An implementing body is clear and human resources are secured
B Direct Effect	1 Risk reduction	The scale of target risk to be reduced in the project and the degree of reduction of the risk by the project	Target risk is small and the degree of reduction is small	(intermediate)	Moderate situations in the scale of risk and the degree of reduction or one of the two is in good situation	(intermediate)	Target risk is big and the degree of reduction is big
	2 Awareness raising	The degree of effectiveness in terms of raising awareness of related personnel and residents	A small number of personnel and small degree of the effectiveness	(intermediate)	Moderate in number of personnel and effectiveness or one of the two is in good situation	(intermediate)	Raising awareness can be effectively done for many of the object personnel
	3 Capacity development	The degree of capacity development in disaster management of the related personnel and residents in the course of and as the result of the project implementation	A small number of personnel and small effectiveness in terms of capacity development	(intermediate)	Moderate situation in number of personnel and effectiveness in terms of capacity development or one of the two is in good situation	(intermediate)	A lot of personnel develop the capacity effectively
	4 Implementation of similar project	Has a similar project been in implementation? Is there any limitation in effectiveness due to duplication in targeting result?	A similar project has been implemented, and targeting results are duplicated	(intermediate)	Although a similar project has been implemented, there is no duplication in the targeting results	(intermediate)	A similar project has not been implemented, and targeting result can be efficiently obtained
C Indirect Effect	1 Autonomous development (in the implementing project)	Is there effect on further promotion of implementing project in terms of expanding targeting personnel, objects, and areas?	The above-mentioned "B Direct Effect" is not expanded in terms of targeting personnel, objects, and areas?	(intermediate)	Expansion of the effects is moderate or the expansion is available to some parts of the targeting personnel, objects, and areas	(intermediate)	The above-mentioned "B Direct Effect" is expanded in terms of targeting personnel, objects, and areas
	2 Impact (to related projects or activities)	Is there effect on promotion of related projects or activities?	Few possibility in promotion of related projects or activities, other than the implementing project	(intermediate)	There is possibility on the promotion of related projects or activities or the projects or activities are promoted to some extent	(intermediate)	Related projects or activities are promoted sufficiently
	3 Economic effect to other projects	Is there effect on promotion in development of related industry and local society?	There is no effect on promotion in development of related industry and local social	(intermediate)	There is a little or limited effect on promotion in development of related industry and local society	(intermediate)	There is a big effect on promotion in development of related industry and local society
D Sustainability	1 Operational expense	Can monetary resources be secured for operation, maintenance, and management?	It is difficult to secure the monetary resources	(intermediate)	A big amount of the resources is required and it can be secured OR a small amount of the resources is required and there is a little possibility to secure it	(intermediate)	The monetary resources can be secured, regardless of the amount
	2 Organizational Framework for operation	Is it possible to arrange regulation and organization and to secure manpower for the operation?	A part or all of the arrangement and securing for operation has not been done, and there is difficulty in the arrangement and securing	(intermediate)	A part or all of the arrangement and securing for operation has not been done, and there is a possibility for the arrangement and securing	(intermediate)	The arrangement and securing has been done already done
	3 Effort and ambition for the operation	Is there effort and ambition in the operating organization and personnel for continuity and expansion of the project?	There is neither effort nor ambition in the operating organization and personnel for the continuity and expansion of the project	The effort and ambition is not expectable in the operating organization and personnel for the continuity and expansion of the project	The effort and ambition is expectable in the operating organization and personnel for the continuity and expansion of the project	The effort and ambition is expectable in the operating organization and personnel for the continuity and expansion of the project	There is enough effort and ambition in the operating organization and personnel for the continuity and expansion of the project

3. Weighting of evaluation items

3.1 Level 1

For the weighting of each item, relative importance of items in Level 1 was determined in each pair of items as shown in Table 3.

Table 3 Relative importance of each pair of items of Level 1

Item	Left side Item is more important									Right side Item is more important									Item
	5	4	3	2	1	1/2	1/3	1/4	1/5	5	4	3	2	1	1/2	1/3	1/4	1/5	
Validity	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Direct Effect
Validity	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Indirect Effect
Validity	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Sustainability
Direct Effect	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Indirect Effect
Direct Effect	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Sustainability
Indirect Effect	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Sustainability

The weight of each item of Level 1 is calculated as shown in Table 4.

Table 4 Weight of items in Level 1

	Viability	Direct Effect	Indirect Effect	Sustainability	Geometric average	Weight
Viability	1	3	2	1	1.5651	0.3535
Direct Effect	1/3	1	1/2	1/2	0.5373	0.1214
Indirect Effect	1/2	2	1	1/3	0.7598	0.1716
Sustainability	1	2	3	1	1.5651	0.3535
sum					4.4273	1.0000

$$CI = 0.0341$$

CI : Consistency Index

3.2 .Level 2

On the same way, the weight of sub-items in Level 2 is calculated as shown in Tables 5.

Table 5 Weight of sub-items in Level 2

Validity

	Conformity with policy, regulations, and plans	Needs and consensus of residents and communities	Initial investment (Budget)	Implementing organization and its human resources	Geometric average	Weight
Conformity with policy, regulations, and plans	1	3	1/2	1	1.1067	0.2558
Needs and consensus of residents and communities	1/3	1	1/2	1/2	0.5373	0.1242
Initial investment (Budget)	2	2	1	2	1.6818	0.3888
Implementing organization and its human resources	1	2	1/2	1	1.0000	0.2312
CI= 0.0390				sum	4.3258	1.0000

Direct Effect

	Risk reduction	Awareness raising	Capacity development	Implementation of similar project	Geometric average	Weight
Risk reduction	1	2	1	3	1.5651	0.3545
Awareness raising	1/2	1	1/2	1	0.7071	0.1602
Capacity development	1	2	1	3	1.5651	0.3545
Implementation of similar project	1/3	1	1/3	1	0.5774	0.1308
CI= 0.0069				sum	4.4146	1.0000

Indirect Effect

	Autonomous development (in the implementing project)	Impact (to related projects or activities)	Economic effect to other projects	Geometric average	Weight	
Autonomous development (in the implementing project)	1	1	1/2	0.7937	0.2599	
Impact (to related projects or activities)	1	1	1	1.0000	0.3275	
Economic effect to other projects	2	1	1	1.2599	0.4126	
CI= 0.0268				sum	3.0536	1.0000

Sustainability

	Operational expense	Organizational Framework for operation	Effort and ambition for the operation	Geometric average	Weight	
Operational expense	1	1/2	2	1.0000	0.3108	
Organizational Framework for operation	2	1	2	1.5874	0.4934	
Effort and ambition for the operation	1/2	1/2	1	0.6300	0.1958	
CI= 0.0268				sum	3.2174	1.0000

3.3 Total weight

Total weight is calculation, multiplying the weights of Level 1 and Level 2 as shown in Table 6.

Table 6 Total weight of evaluation items

Item in Level 1	Weight (level 1)	Item in Level 2	Weight (level 2)	Total Weight
Viability	0.3535	Conformity with policy, regulations, and plans	0.2558	0.0904
		Needs and consensus of residents and communities	0.1242	0.0439
		Initial investment (Budget)	0.3888	0.1374
		Implementing oraganization and its human resources	0.2312	0.0817
Direct Effect	0.1214	Risk reduction	0.3545	0.0430
		Awareness raising	0.1602	0.0194
		Capacity development	0.3545	0.0430
		Implementation of similar project	0.1308	0.0159
Indirect Effect	0.1716	Autonomous development (in the implementing project)	0.2599	0.0446
		Impact (to related projects or activities)	0.3275	0.0562
		Economic effect to other projects	0.4126	0.0708
Sustainability	0.3535	Operational expense	0.3108	0.1099
		Organizational Framework for operation	0.4934	0.1744
		Effort and ambition for the operation	0.1958	0.0692
			sum=	1.0000

4. Projects to be prioritized

Projects to be prioritized were selected, utilizing contingency scenario and evaluation of the present situation on mitigation and preparedness, as shown in Table 7.

Table 7 Projects selected for prioritization

	No	Project
Basic Considerations	1	Training of staffs on emergency response
	2	Training of staffs on information and communication systems
	3	Conservation of important documents
	4	Clarifying disaster prevention goal in a long term plan
	5	Evaluation on existing plans and projects
	6	Betterment of a law on earthquake disaster management
	7	Clarifying methods to disseminate information by TV, radio, homepage
	8	Establishment strong motion observation network
	9	Assessment of quake resistance on existing building and infrastructure
Mitigation Plan	10	Reviewing and implementing measures and policies for promotion quake resistance of buildings
	11	Review of building code
	12	Seismic reinforcement of important buildings
	13	Formulation of an urban development plan, considering earthquake disaster management
	14	Designating development area for disaster prevention and hub of rescue activity
	15	Designating evacuation points
	16	Promotion of disaster management activities by local residents
	17	Implementation educational activity about earthquake disaster prevention for pupils and residents
	18	Development of earthquake engineering and aseismic technology as well as the cultivation of engineers of those fields
Preparedness Plan	19	Formulating BCP and emergency response manual of the government
	20	Making agreement between government and business enterprises for emergency response
	21	Clarifying and formulating communication chains inside and outside government
	22	Preparation of emergency communication means such as satellite phones and establishment of organizational network on communication
	23	Preparation of facilities of emergency management headquarters
	24	Preparation of hardware such as emergency back-up power supply system for emergency response as well as tools and materials for the repair facilities
	25	Designating and constructing strategic roads for emergency response
	26	Reserving water and foods as well as formulating distribution plan of water and foods
Emergency Response Plan	27	Improving plan and policy for search of missing persons and rescue
	28	Improving capacity of search and rescue
	29	Establishment of the system and procedure for urgent diagnosis on buildings and infrastructures
	30	Betterment of collection and assessment of damage information
	31	Formulating a plan for maintaining social security
	32	Improving emergency medical service
	33	Establishing psychological care in emergency situations and preparation of plan for the implementation
	34	Promoting safety diagnosis of bridges
	35	Formulating a traffic control plan
	36	Formulating an evacuation plan and its dissemination to the public
	37	Clarifying acceptance methods of international help
	38	Clarifying management method of volunteers
	39	Formulation of plan for the dealing of dead bodies and burial
	40	Formulating a plan and policy for treatment of garbage and debris in emergency
	41	Creating information sharing system, including damage estimation system
	42	Formulating emergency re-construction plan for lifeline utilities such as water-supply, electricity-supply and gas-supply
	43	Formulating emergency re-construction plan of communication facilities
Rehabilitation/ Reconstruction	44	Evaluation of existing disaster records
	45	Formulating the basic plan for reconstruction
	46	Formulating a plan for establishment of headquarters for reconstruction
	47	Formulation of guideline on compensation of disaster damages and dissemination of the guideline
	48	Fulfillment of evaluation on actual response as well as training results
	49	Formulation of mechanism for shearing disaster information
	50	Developing a plan for proving temporary houses
	51	Formulating financial supporting schemes for local residents

5. Evaluation of projects

Evaluation value for each project was calculated; 1) multiplying weight and point in each sub-items, and 2) summing up the multiplied value for each project as shown in Table 8 and Figure 1.

Table 8 Evaluation result

Category and Project No.	Evaluation item and Weight	A. Viability				B. Direct Effect				C. Spread Effect			D. Sustainability			Evaluation Value	Priority
		1. Conformity with policy, regulations, and plans	2. Needs and consensus of residents and communities	3. Initial investment (Budget)	4. Implementing organization and its human resources	1. Risk reduction	2. Awareness raising	3. Capacity development	4. Implementation of similar project	1. Autonomous development (in the implementing project)	2. Impact (to related projects or activities)	3. Economic effect to other projects	1. Operational expense	2. Organizational Framework for operation	3. Effort and ambition for the operation		
		0.090	0.044	0.137	0.082	0.043	0.019	0.043	0.016	0.045	0.056	0.071	0.110	0.174	0.069		
Basic Considerations	1	3.75	2.75	2.44	2.75	2.78	3.38	2.75	2.88	3.00	3.00	2.56	2.13	3.00	3.63	2.861	15
	2	3.57	2.63	2.00	3.13	3.13	3.38	2.63	2.86	3.25	2.75	2.38	2.50	2.38	3.78	2.745	25
	3	3.25	2.44	2.25	4.11	2.22	3.00	2.56	2.29	3.00	2.57	2.43	2.75	2.88	3.13	2.817	20
	4	3.13	2.71	2.71	3.25	2.86	3.00	3.11	2.33	2.57	2.43	2.67	2.00	2.63	3.67	2.764	24
	5	3.13	2.78	3.25	2.88	3.00	2.25	2.63	2.71	2.50	2.63	2.63	2.88	2.75	3.33	2.886	14
	6	4.00	2.67	2.89	3.25	2.88	3.13	3.13	3.38	2.88	3.13	3.38	2.63	3.13	3.25	3.115	4
	7	2.75	2.63	2.50	3.00	2.75	3.38	3.11	3.00	3.00	2.88	2.75	2.50	2.89	3.63	2.838	18
	8	3.63	2.63	3.11	3.25	3.22	2.63	3.56	3.43	3.13	3.38	3.13	2.63	3.25	3.67	3.193	2
	9	2.78	2.22	2.56	3.00	3.22	2.33	2.78	2.29	2.63	2.38	2.50	2.00	2.50	3.38	2.602	39
	10	2.88	2.11	2.75	2.78	2.89	2.33	2.78	2.13	2.33	2.38	2.44	2.38	2.38	3.22	2.589	41
	11	2.78	2.56	2.67	3.00	3.00	2.25	2.67	2.71	2.25	2.22	2.00	2.33	2.78	3.50	2.656	34
	12	3.22	2.89	2.44	2.56	2.67	2.89	2.89	2.50	2.33	2.78	2.75	2.33	2.44	3.33	2.666	33
	13	3.38	2.25	2.25	2.56	2.75	2.00	2.50	2.25	2.38	2.11	2.67	2.13	2.38	3.50	2.526	43
	14	3.67	3.13	2.89	3.50	3.00	2.75	3.25	2.71	3.13	3.38	2.75	2.75	3.38	3.22	3.155	3
Mitigation Plan	15	3.00	3.00	3.13	3.56	3.00	2.88	2.63	3.00	3.11	2.25	2.56	2.38	3.67	3.75	3.075	5
	16	2.63	2.67	2.38	2.63	2.44	3.25	2.50	2.71	3.00	2.63	2.38	1.75	2.00	2.88	2.404	49
	17	3.38	3.25	2.38	3.00	3.00	3.11	3.25	3.13	3.11	2.67	2.89	1.88	2.89	3.56	2.848	16
	18	3.50	2.63	2.57	2.71	2.86	3.29	3.13	2.88	2.57	2.86	3.14	2.43	2.57	2.86	2.785	21
	19	3.25	3.11	2.50	3.44	2.75	3.38	2.88	3.00	2.88	2.67	2.75	2.44	3.00	3.38	2.909	12
	20	2.75	2.50	2.22	2.67	3.00	3.00	2.75	3.43	3.67	2.88	2.88	2.44	2.75	3.13	2.735	26
	21	2.50	3.00	2.22	3.50	3.25	3.25	3.11	2.38	3.25	3.22	2.38	2.50	2.75	3.75	2.832	19
	22	2.75	2.38	2.38	2.22	2.63	2.56	2.67	2.38	2.38	2.38	2.38	2.25	2.13	3.25	2.426	47
	23	3.38	2.88	2.88	2.88	3.50	3.25	3.13	3.57	3.00	2.88	3.25	2.50	3.13	3.63	3.063	6
	24	3.11	3.00	2.88	2.63	2.88	2.78	2.67	2.71	2.38	2.25	2.75	2.25	2.67	3.38	2.731	28
	25	3.25	2.78	2.78	2.88	3.00	2.75	2.67	2.43	3.00	3.38	3.00	2.25	3.00	3.88	2.943	11
	26	3.50	2.38	2.38	2.75	2.67	2.67	2.63	2.57	2.50	2.50	2.50	2.44	2.63	3.50	2.690	31
Preparedness Plan	27	3.78	3.13	2.50	3.63	3.38	3.56	3.13	3.00	3.25	3.13	2.63	2.63	2.63	3.67	3.022	8
	28	3.13	2.56	2.44	3.22	2.56	2.78	2.67	2.57	2.78	2.78	2.11	2.44	3.00	3.56	2.781	22
	29	3.33	2.67	2.11	2.33	2.56	2.22	2.44	2.57	2.22	2.44	2.22	2.00	2.22	3.22	2.423	48
	30	3.11	3.44	2.44	2.56	2.22	2.56	2.67	2.88	1.78	2.44	2.44	2.44	2.56	3.44	2.626	35
	31	3.56	2.78	3.11	3.13	2.78	3.33	3.00	2.57	2.56	2.78	2.88	2.56	2.89	3.50	2.981	10
	32	3.88	2.88	2.78	3.25	2.89	2.67	3.44	3.38	3.33	3.00	3.00	2.13	2.89	3.38	3.003	9
	33	2.78	2.56	2.33	2.78	2.89	2.11	2.00	2.38	2.56	2.78	2.00	2.22	2.67	3.33	2.552	42
	34	3.50	2.88	2.67	2.89	3.38	2.78	2.67	2.86	3.11	3.11	3.00	2.63	2.56	3.50	2.907	13
	35	4.00	3.67	3.22	3.00	3.00	2.63	3.13	3.29	2.75	2.88	3.00	1.88	2.88	3.67	3.035	7
	36	4.13	2.75	3.33	3.22	3.25	3.22	3.11	3.25	2.56	3.56	3.00	2.89	2.89	3.78	3.212	1
Emergency Response Plan	37	2.88	2.88	2.50	2.88	2.38	2.63	2.50	2.63	2.50	2.50	2.75	2.63	2.63	3.50	2.703	30
	38	3.50	3.11	2.67	3.00	2.56	2.89	2.67	3.13	3.13	3.00	2.38	2.38	2.63	3.63	2.841	17
	39	2.88	3.00	2.25	3.11	2.44	2.33	2.33	2.71	2.67	2.75	2.13	2.44	2.67	3.13	2.623	36
	40	2.67	2.78	2.44	2.88	2.22	2.56	2.56	2.14	2.50	2.50	2.33	2.13	2.25	3.22	2.490	45
	41	3.00	2.50	2.13	2.13	2.33	2.44	2.44	2.71	2.38	2.78	2.44	2.13	2.50	3.50	2.490	44
	42	3.22	2.67	2.78	2.89	2.38	2.44	2.75	2.86	2.75	2.56	2.75	2.44	2.63	3.67	2.781	23
	43	2.88	2.78	2.75	2.88	2.75	2.56	2.25	2.43	2.50	2.75	2.75	2.50	2.63	3.50	2.734	27
	44	2.86	2.71	2.29	2.71	2.38	2.43	2.50	3.13	2.86	2.71	2.13	2.29	2.86	3.14	2.618	37
	45	3.00	3.38	2.38	2.89	2.33	2.75	2.75	3.14	2.63	2.63	2.44	2.11	2.78	3.22	2.681	32
	46	3.00	2.89	2.44	2.89	2.22	2.56	2.89	2.50	2.56	2.44	2.33	1.88	2.67	3.33	2.598	40
	47	2.50	2.78	2.44	1.78	2.33	2.22	2.22	1.86	2.11	2.22	1.88	1.78	2.50	3.00	2.289	50
Rehabilitation/ Reconstruction Plan	48	2.88	3.25	2.56	2.78	2.44	2.88	2.89	3.00	3.00	2.89	2.63	2.13	2.63	3.50	2.730	29
	49	2.89	2.63	2.11	2.33	1.75	2.67	2.44	1.88	2.22	2.44	1.89	2.22	2.67	3.56	2.445	46
	50	2.63	2.38	2.00	2.88	2.38	2.63	2.75	2.57	2.88	2.63	2.63	2.38	2.75	3.63	2.617	38
	51	2.86	2.29	1.57	2.43	2.14	2.43	2.14	1.86	2.14	2.14	2.29	1.86	1.86	3.00	2.148	51

6. Prioritization of projects

Prioritization can be done, simply arranging the evaluation results in order of priority as shown in Figure 2.

Figure 1 Evaluation Result

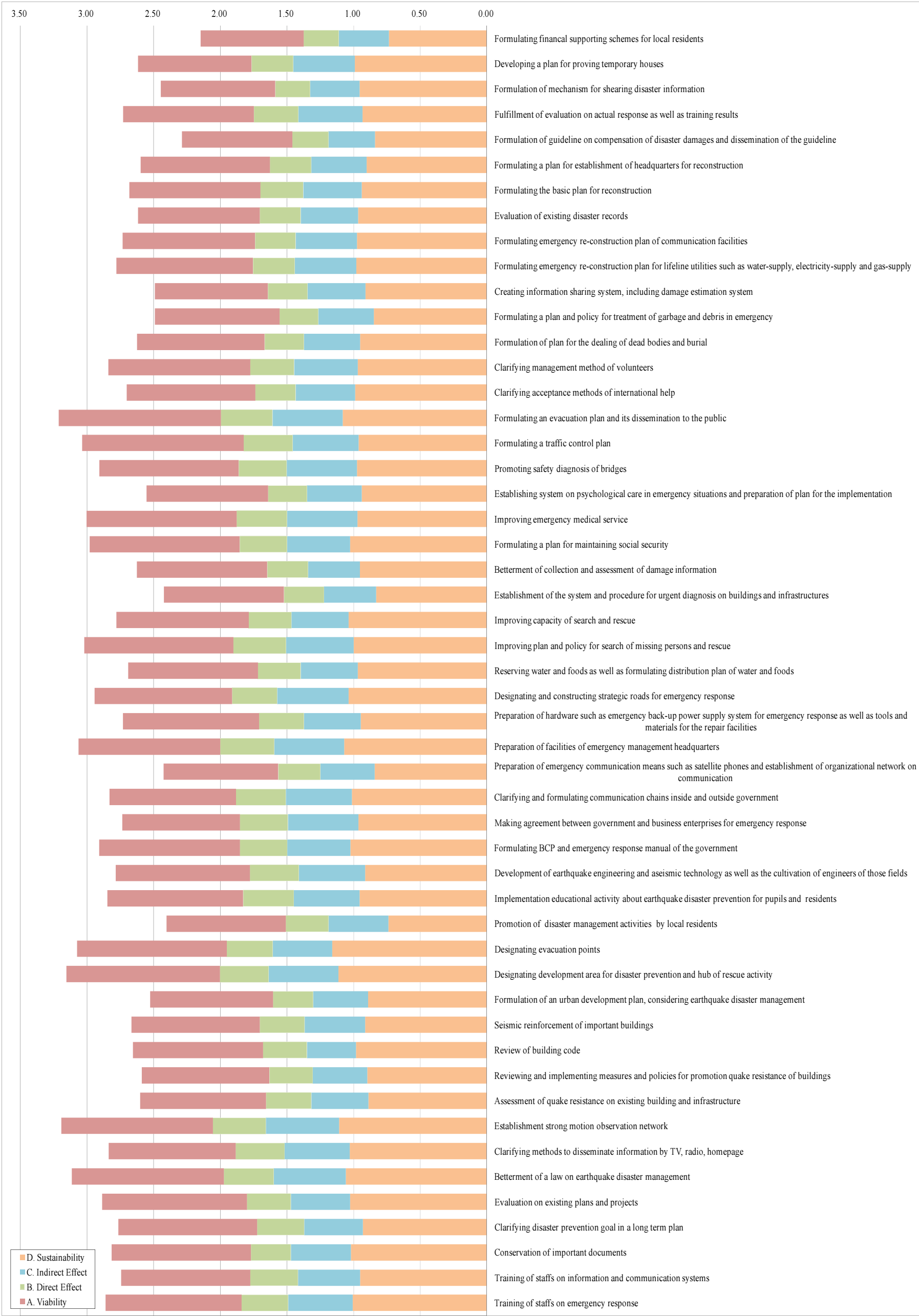
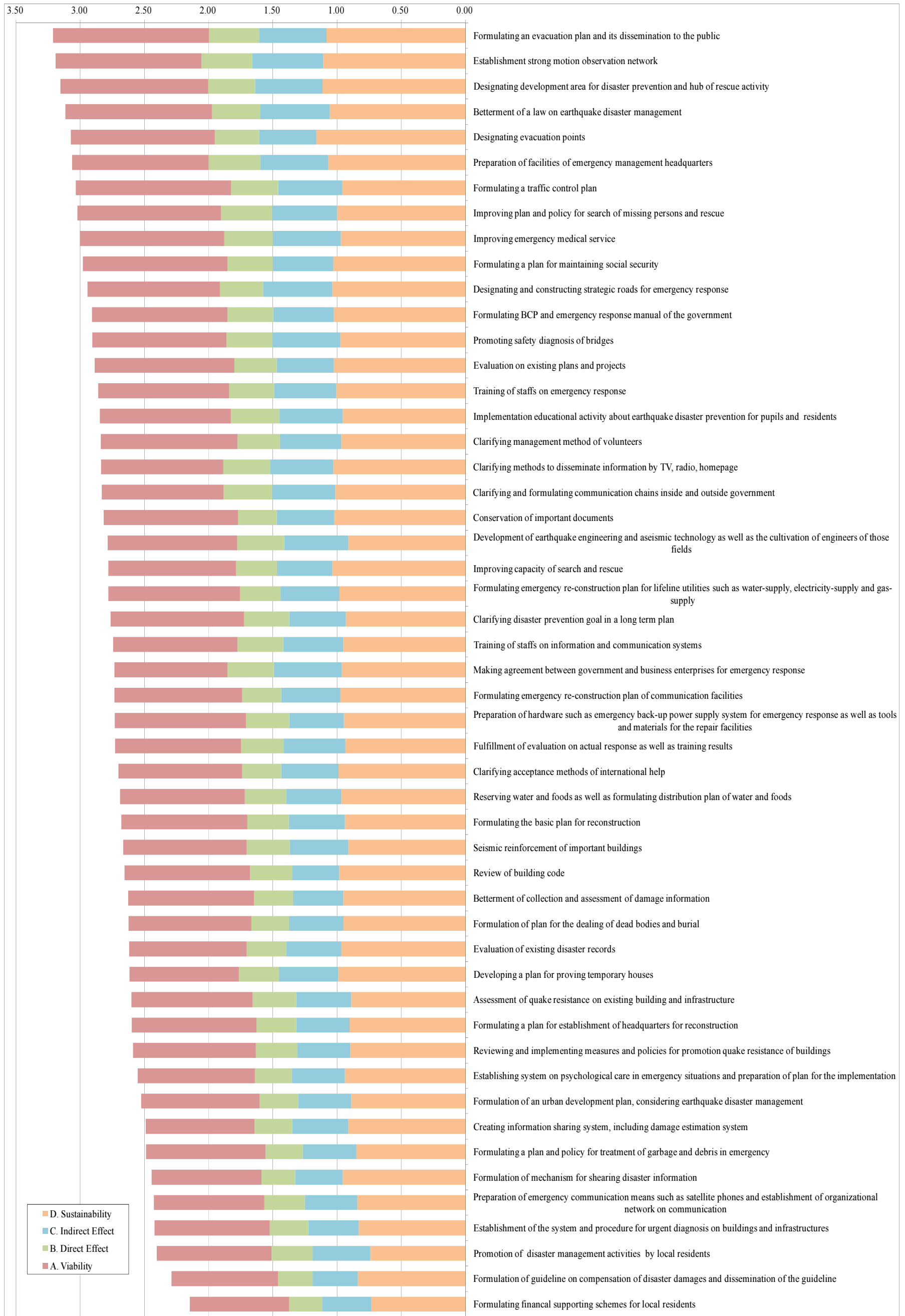


Figure 2 Prioritization Result



Attachment 6 Action Plan

Work flow on formulation of plan

Earthquake risk management plan, prepared in this project, covers various field and items and presents necessary measures as well as implementing organizations.

On the other hand, action plans are prepared, based on the actual situations in Yerevan City, in order to implement efficient measures step by step from what can be done.

Work flow of formulating the above-mentioned two kinds of plans are shown in figure below.

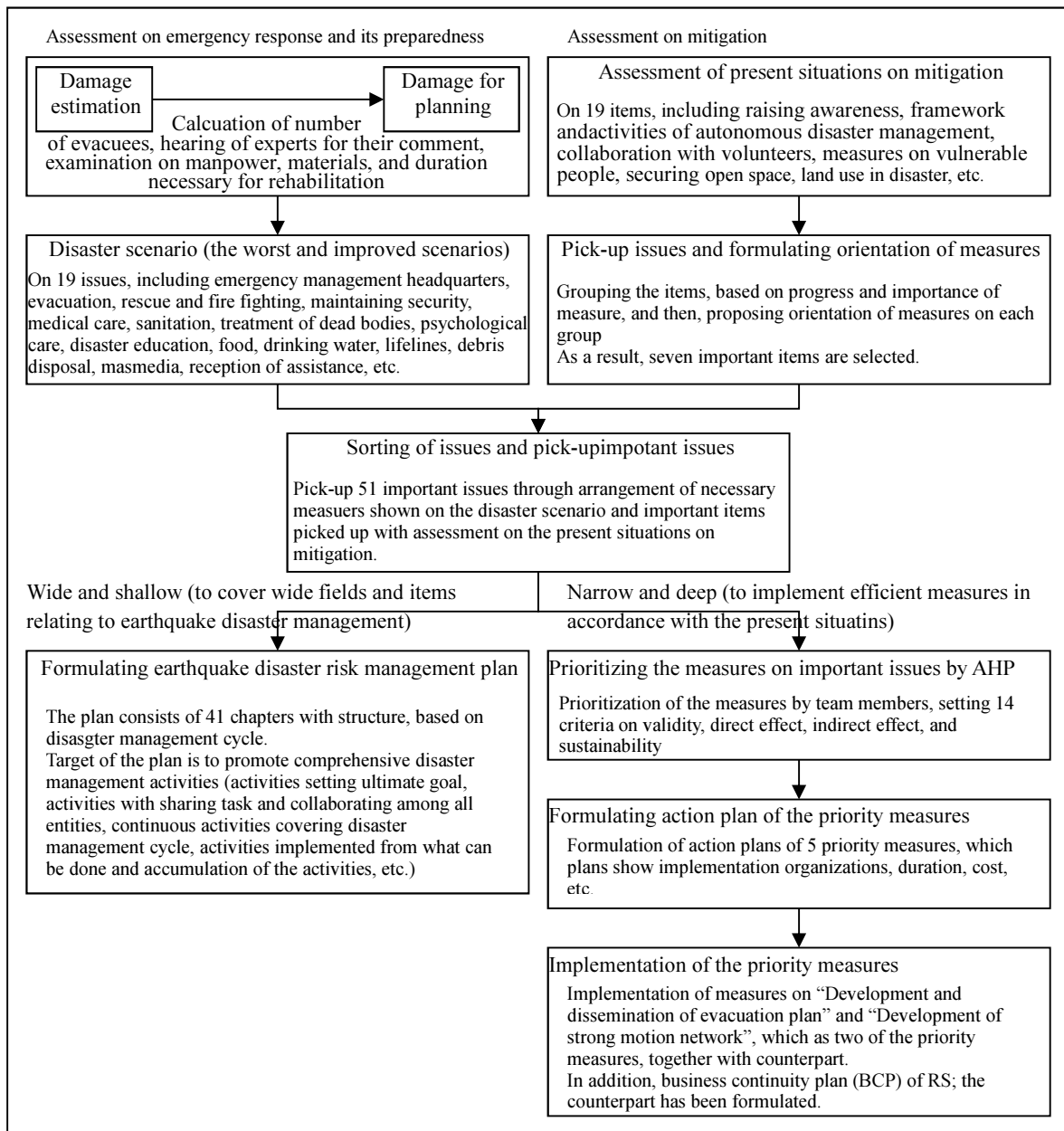


Figure Flowchart of formulation of plan

Formulation of action plan

Purpose

Action plans are formulated step by step from efficient measures which can be done, in order to reduce earthquake risks in Yerevan City.

Formulation of plan

Important measures on 51 issues were picked up, based on the result of assessment on emergency response and mitigation.

The important measures are prioritized by means of analytical hierarchy method (AHP). The evaluation process and result of AHP are shown in Attachment 5. Measures on five issues are selected as priority measures (see table below) as a result of the assessment, and action plan for the measures are prepared.

Table Measure assessed to be in high priority

1.	Development and dissemination of evacuation plan
2.	Development of strong motion network
3.	Designation and development of priority areas on disaster management and assistance bases
4.	Betterment of regulations and standards on earthquake disaster management
5.	Designation and development of evacuation points and promotion of the related preparation

Framework of operation, implementation organizations, and budget

As a result of weighting on evaluation criteria in AHP, weighting on framework of operation, implementation organizations, and budget are high. It can be considered that the items are important in implementation of the measures, the contents of those items are clearly described in the action plans.

Since the national budget of Armenia is about one trillion drams and budget of Ministry of Emergency Situations and RS is about 6.5 billion drams, it is necessary to consider about budget other than national budget for implementation of measures which require much budget.

Action Plan 1 Development and dissemination of evacuation plan (already done in this project)

Purpose	Formulating an evacuation plan in time of earthquake disaster which has not been prepared yet, and dissemination of the plan, aiming at promoting preparation and proper actions at the time of earthquake disasters to be taken by related organizations, communities, and residents.																																																																																																											
Method	Under the direction and supervision of responsible organization, the team and implementing organization prepare draft of the plan, and then, the plan is approved by Mayor and disseminated, after circulation and consultation by related organizations.																																																																																																											
Organization	Managing organization: RS, Ministry of Emergency Situations Implementing organization: Yerevan Rescue Department, RS Main related organizations: Yerevan City, Ministry of Emergency Situations, Armenia Police																																																																																																											
Contents	(1) Review of existing evacuation plan (2) Setting up of the framework of the plan in working group of this project (3) Preparation of the draft of the plan by Yerevan Rescue Department and the team, together with the related organizations (4) Explanation of the contents and consultation with Yerevan City and other related organizations (5) Application to Mayor for his approval (6) Circulation of the draft in related organizations for receiving comments (7) Approval by Mayor and dissemination the plan to the public																																																																																																											
Schedule	<table><tr><th>Item</th><th>Year, month</th><th>2011 12</th><th>2012 1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th></tr><tr><td>(1)</td><td>Review of the existing plan</td><td colspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(2)</td><td>Setting up of the framework of the plan</td><td></td><td colspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(3)</td><td>Preparation of the draft</td><td></td><td></td><td colspan="3"></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(4)</td><td>Explanation of the contents and consultation</td><td></td><td></td><td></td><td></td><td></td><td colspan="2"></td><td></td><td></td><td></td></tr><tr><td>(5)</td><td>Application to Mayor for approval</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(6)</td><td>Circulation of the draft for commnet</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="2"></td><td></td></tr><tr><td>(7)</td><td>Approval as Mayor's decision and dissemination</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Item	Year, month	2011 12	2012 1	2	3	4	5	6	7	8	9	(1)	Review of the existing plan											(2)	Setting up of the framework of the plan											(3)	Preparation of the draft											(4)	Explanation of the contents and consultation											(5)	Application to Mayor for approval											(6)	Circulation of the draft for commnet											(7)	Approval as Mayor's decision and dissemination																					
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(7)	Approval as Mayor's decision and dissemination																																																																																																											
Cost	Man-day (MD) of the members of the working group and sraffs of related organizations, necessary for implementation of the above-mentioned items is for (1): 4 MD, (2):5 MD, (3): 30 MD, (4): 4 MD, (5): 3 MD, (6): 10 MD, (7): 3 MD, and in total 58 MD. The above-mentioned works are included in regular assignment of each member or staff, and thereby, no additional cost is required for the implementation of this measure.																																																																																																											
Notes	The prepared draft of the plan are shown in Attachment 3.																																																																																																											

Action plan 2 Development of strong motion network (already done in this project)

Purpose	Contributing to prompt and proper response of disaster management organizations, by means of installing strong motion observation network and data transmission/analysis system for clarification of distribution of earthquake intensity immediately after earthquakes. Contributing to prompt and proper action of residents, by means of disseminating information of earthquake intensity.																																																																																																													
Method	<ul style="list-style-type: none">- Installation of strong motion network, data transmission/analysis system, and SMS information dissemination system by the team and NSSP- Preparation and putting up posters by the team and Yerevan Rescue Department, RS for the promotion of preparation and proper action by residents																																																																																																													
Organization	Managing organization: Ministry of Emergency Situations Implementing organization: NSSP, Yerevan Rescue Department Main related organizations: cellular phone companies, Yerevan City																																																																																																													
Contents	(1) Feasibility study on installation of the system (2) Basic design of the system (realtime earthquake intensity display (REID) and SMS) (3) Procurement of equipment (4) Development of software (relatime earthquake intensity display and SMS) (5) Installation of the equipment (6) Installation of the system (relatime earthquake intensity display and SMS) (7) Operation test (relatime earthquake intensity display and SMS) (8) Preparation and putting up posters																																																																																																													
Schedule	<table><tr><th>Item \ Year, month</th><th colspan="2">2010</th><th colspan="3">2011</th><th colspan="4">2012</th></tr><tr><th></th><th>7</th><th>10</th><th>1</th><th>4</th><th>7</th><th>10</th><th>1</th><th>4</th><th>7</th><th>10</th></tr><tr><td>(1) Feasibility study</td><td></td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(2) Basic design (REID and SMS)</td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td>■</td><td></td></tr><tr><td>(3) Procurment of equipment</td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td><td></td></tr><tr><td>(4) Developing software (REID and SMS)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td></td></tr><tr><td>(5) Installation of the equipment</td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td></tr><tr><td>(6) Installation of the system (REID and SMS)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td>■</td></tr><tr><td>(7) Opeation test (REID and SMS)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td>■</td></tr><tr><td>(8) Preparation and putting up of posters</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td></tr></table>	Item \ Year, month	2010		2011			2012					7	10	1	4	7	10	1	4	7	10	(1) Feasibility study		■									(2) Basic design (REID and SMS)						■			■		(3) Procurment of equipment						■					(4) Developing software (REID and SMS)							■	■	■		(5) Installation of the equipment							■				(6) Installation of the system (REID and SMS)								■		■	(7) Opeation test (REID and SMS)								■		■	(8) Preparation and putting up of posters									■	■
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(8) Preparation and putting up of posters									■	■																																																																																																				
Cost	<p><u>Manpower cost:</u> No additional manpower cost is required, since the works to be done by the staffs of NSSP, the team, and related organizations are included their regular assignment of each staffs. Man-month (MM) of staffs for the works is for (1): 1 MM, (2): 2 MM, (3): 1 MM, (4): 3 MM, (5): 2 MM, (6): 1 MM, (7): 1 MM, (8): 1 MM, and in total 13 MM.</p> <p><u>Equipment cost:</u> Network facilities (5 mil. AMD), seismographs (62.5 mil AMD), server (5 mil. AMD), software development (1.5 mil AMD), SMS software development (5 mil.AMD), and in total 92.5 mil.AMD.</p>																																																																																																													
Notes																																																																																																														

Action plan 3 Designation and development of priority areas on disaster management and assistant bases

Purpose	For the promotion earthquake disaster management activities efficiently, priority areas on disaster management and assistant bases are designated and developed in high risk areas, considering vulnerability and importance.																																																																																																																								
Method	Following to the designation of priority areas and assistant bases by management organization, implementation organization determines ground design and important issues in each area, and then, assists improvement of park, reinforcement of buildings, and promotion of disaster management activities in residents' associations and schools.																																																																																																																								
Organization	Managing organization: RS Implementing organization: Yerevan Rescue Department, Ministry of Urban Development, and Architect and Urban Development Department of Yerevan City Main related organizations: Developers, district branches of RS, National Academy of Crisis Management, and schools																																																																																																																								
Contents	<div>(1) Designation of Priority areas and assistant bases, based on earthquake vulnerability, importance</div> <div>(2) Preparation of ground design of the priority areas and assistant bases</div> <div>(3) Determination of important issues for the development</div> <div>(4) Improvement of parks, roads, assistant facilities</div> <div>(5) Reinforcement of important buildings</div> <div>(6) Assistance for organizing residents' associations and autonomous activities on disaster management</div> <div>(7) Assistance for disaster education and training in schools</div>																																																																																																																								
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Action plan 4 Betterment of regulations and standards on earthquake disaster management

Purpose	Although regulations and standards have been prepared for promoting disaster managemtn activities after the Spitak Earthquake, some of them do not meet the present situations, not conform each other, have duplicate with others, and need new regulation for necessary measures. Following review of existing regulations/ standards, updating, combining, and addition of those are done, so that measures can be implemented efficiently.																																																												
Method	Following to the principle determined by managing organization, implementing organization clarifies issues on existing regulations/ standards, and then, updates/ combines/ adds to those regulations/ standards, according to the present conditions. After revision, based on comments from related organizations, the contents are checked by legal department of the managing organizations, and then, those are approved as new regulations/ standards.																																																												
Organization	Managing organization: Ministry of Emergency Situations Implementing organization: RS, Emergency Situations Committee of Yerevan City, responsible organizations of related regulations/ standards Main related organizations: Yerevan City, Yerevan Rescue Department of RS																																																												
Contents	(1) Hearing with related organizations and well-informed people, clarifying issues on existing regulations/ standards, and determing the principle for the betterment (by managing organization) (2) Review on existing regulations/ standards and pick-up matters necessary for improvement (by implementing organizations) (3) Updating, combining, or adding of regulations/ standards (by implementing and related organizations) (4) Circulation of the draft and adjustment of the contents, according to commnets (5) Checking and examining by legal department (managing organization) (6) Approval by the head of responsible organization and promulgation as regulations/ standards																																																												
Schedule	<table border="1"> <thead> <tr> <th rowspan="2">Item</th><th colspan="4">Year, month</th><th colspan="2">2014</th></tr> <tr> <th>2013</th><th></th><th></th><th></th><th>1</th><th>4</th></tr> </thead> <tbody> <tr> <td>Hearing, (1) determination of principle, etc.</td><td>1</td><td>4</td><td>7</td><td>10</td><td></td><td></td></tr> <tr> <td>(2) Review and pick-up necessary matters</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>Updating, (3) combining, and adding</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>(4) Circulation and adjustment</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>(5) Checking and examining by legal department</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>Approval by (6) responsible organizations</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>						Item	Year, month				2014		2013				1	4	Hearing, (1) determination of principle, etc.	1	4	7	10			(2) Review and pick-up necessary matters							Updating, (3) combining, and adding							(4) Circulation and adjustment							(5) Checking and examining by legal department							Approval by (6) responsible organizations						
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Cost	Manpower cost: No additional manpower cost is required, since the works to be done by the staffs of Ministry of Emergency Situations, RS, and others are included their regular assignment of each staff. Man-month (MM) of staffs for the works is for (1): 2 MM, (2): 9 MM, (3): 21 MM, (4): 3 MM, (5): 3 MM, (6): 1 MM, and in total 39 MM.																																																												
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Action plan 5 Designation and development of evacuation points and promotion of the related preparation

Purpose	For prompt and proper evacuation in time of earthquake disaster, evacuation points are designated in accordance with evacuation plan, formulated in consideration of characteristics of earthquake disaster, and then, the points are informed to residents for their preparation.																																																							
Method	Following to the designation of evacuation points by implementing organization, explanatory materials for residents and operators of evacuation points are prepared and distributed, operation system of evacuation points is confirmed, stored equipment/ materials in evacuation points are arranged, and then, lectures and training are done for promotion of preparation for residents and pupils.																																																							
Organization	Managing organization: RS, Evacuation Committee of Yerevan City Implementing organization: Yerevan Rescue Department RS, Evacuation Committee of Yerevan City Main related organizations: Yerevan City, schools, District branches of Yerevan Rescue Department, and national Academy of Crisis Management																																																							
Contents	(1) Review of existing evacuation points and necessary chaging and addition of evacuation points (2) Preparation and distribution of notice boards, explanatory materials, leeflet, etc., showing the location of evacuation points, method of evacuation, and necessary knowledge on evacuation for residents (3) Confirmation of responsible person in each evacuation point, staffs to be dispatched to evacuation points, operation staffs in evacuation points and their tasks (4) Arrangement of equipment/ materials to be stored in evacuation points and confirmation of the usage manners (5) Arrangement of data such as evacuation maps, a list of residents, communication chains, response manual, etc. (6) Organising lecture and training, aiming at confirmation/ operation/ improvement of the above-mentioned preparation																																																							
Schedule	<table><tr><th>Item \ Year, month</th><th>2013 1</th><th>3</th><th>5</th><th>7</th><th>2014 9</th><th>11</th></tr><tr><td>Review, chnge, and addition (1) of existing evacuation points</td><td colspan="2"></td><td></td><td></td><td></td><td></td></tr><tr><td>(2) Preparation and distribution of explanation material</td><td></td><td colspan="2"></td><td></td><td></td><td></td></tr><tr><td>(3) Confirmation of operation staffs and their tasks</td><td></td><td></td><td colspan="2"></td><td></td><td></td></tr><tr><td>(4) Arrangement of equipment/ materials, etc.</td><td></td><td colspan="4"></td><td></td></tr><tr><td>(5) Arrangement of datasuch as evacuation map</td><td></td><td colspan="2"></td><td colspan="3"></td></tr><tr><td>(6) Lecture and training for operation and improvement</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>							Item \ Year, month	2013 1	3	5	7	2014 9	11	Review, chnge, and addition (1) of existing evacuation points							(2) Preparation and distribution of explanation material							(3) Confirmation of operation staffs and their tasks							(4) Arrangement of equipment/ materials, etc.							(5) Arrangement of datasuch as evacuation map							(6) Lecture and training for operation and improvement						
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Cost	<p><u>Manpower cost:</u> No additional manpower cost is required, since the works to be done by the staffs of RS, Evacuation Committee of Yerevan, and others are included their regular assignment of each staff. Man-month (MM) of staffs for the works is for (1): 4 MM, (2): 2 MM, (3): 2 MM, (4): 12 MM, (5): 18 MM, (6): 15 MM, (7): 15 MM, and in total 68 MM.</p> <p><u>Cost for equipment, etc.:</u> Subletting cost for investigation of evacuation points (15 mil. AMD), Preparation of explanatory materials for residents (5 mil. AMD), procurement of equipment/ materials (20 mil. AMD), Materials for training (5 mil. AMD), Others such as arrangement of data and publication (10 mil. AMD), and in total 55 mil. AMD.</p>																																																							