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Office of Critical Infrastructure Protection and Emergency Preparedness

Bureau de la protection des infrastructures essentielles et de la protection civile

Evacuation Procedures in Densely Populated Areas - List of Planning Responsibilities

GENERAL PLANNING MODEL

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This is an abridged version of the report

PHASE ONE: PLANNING

1. **Characterizing the system at risk (city/metropolitan area):**

Depending on the planning scale concerned (district, city or metropolitan area), it is essential to know the environment, and this means describing the city or urban area, and its physical, spatial, environmental and demographic components. Since no two municipal areas --particularly metropolitan areas - are alike, the first thing to do is to map the area into planning sectors. This first stage is threefold: identify the components of each of the sectors for which an evacuation response is being planned; characterize their components very specifically; and identify and characterize the risk in each set of components (in order to be aware of where a disaster is likely to occur).

2. **Identifying and analysing high-risk areas**

Depending on the high-risk indicators detected during the first stage (risk analysis), it is necessary to pinpoint the sectors in the city or urban area where a disaster is most likely to occur. Identification involves two steps: identifying and evaluating the help/hindrance factors of the sectors for each type of risk (i.e. check the local factors which might reduce or increase the impacts of each threat exposing the area to a disaster); studying and assessing possible means of mitigating each threat (i.e. the mechanisms or procedures reducing the effects of a threat).

PHASE TWO: DECISION-MAKING

3. **Simulating/analysing the stricken area(s) and the threat causing the disaster**

At this stage, the disaster has either occurred or is about to occur and the manager has to start making decisions. Is evacuation warranted in view of the kind of disaster and secondary effects observed? During this third stage, managers can simulate the development of the situation by analysing and making projections on the basis of the way in which the threat develops.

4. **Developing emergency response scenarios in view of the disaster and its actual/potential threats and secondary effects**

Once the effects of the disaster have been identified and characterized, it is time to determine the most efficient response in case evacuation proves necessary. In other words, once it has been determined how the threat is evolving, how will the safety of the population be ensured? This is when a decision must be made on what means to take to protect people and relocate them if this option is recommended.

5. **Establishing the ideal response scenario according to the nature of the disaster and its actual/potential threats and secondary effects (assessing the alternatives)**

We are now in a way entering the phase preparatory to recommending or making the decision to evacuate. The ideal response scenario will have to be implemented in the section affected. In order to do so, we suggest the following five steps: study all possible evacuation response scenarios; analyse the secondary effects noted and how they evolve; choose the ideal response scenario; study mitigation measures for secondary effects from the disaster; suggest mitigation measures in accordance with the selected scenario.

6. **Making the decision or recommendation**

Finally, the planning and development stage of the decision-making process is complete when the final recommendation is submitted to the decision-maker for protecting the public (whether to evacuate, confine, confine and evacuate later; procedure to be followed). Thus, the official decision-maker will be responsible for determining or approving the final choice of response.

THIRD PHASE: THE ACTUAL RESPONSE

7. **Announcing/implementing the decision**

In the seventh stage, the official decision on dealing with the actual disaster is posted and implemented. This necessarily involves two different steps: Announcing the decision internally and externally; and putting in place the logistics to support the evacuation operations (coordination centre, warning and communication procedures, etc.).

8. **Monitoring/assessing the evacuation strategy selected**

Once implementation of the evacuation strategy has begun, managers must immediately initiate follow-up procedures by closely monitoring whether the strategy is working as planned and by observing how the threat is developing at various times. If the threat is not developing as expected, this follow-up stage will make it possible to see what exactly is going wrong so that the appropriate remedial action can be taken.

9. **Reviewing the decision or recommendation**

Depending on the evolution of the situation, decision-makers have to take the necessary action to correct errors and shortcomings - particularly as far as resources are concerned - -and solve all other inadequacies which might surface during the evacuation strategy implementation process. At this point, the initial decision must be reassessed and amended accordingly.

The following duties are listed by category of participant or responder and then divided into the different stages where their services may be required during the process. This list of municipal services is generic and must be customized to fit the actual municipal or urban context in each case. These responsibilities are merely basic guidelines which can of course be amended as needed.

A. <u>Emergency Response Director or Municipal Officer</u>

First, the municipal council, concerned with adequately ensuring public safety in all circumstances, should decide who will be responsible for coordinating the overall response and the team participating in an emergency situation, including possible evacuation. This choice reflects not only the need to appoint a coordinator for the overall operation, but also the municipality's intention to plan its emergency response adequately, including the problem of evacuation. Furthermore, the municipal council should vote a resolution on the issue and make an official decision as to its intention of planning special measures for emergency evacuation.

During the planning process, the coordinator has overall responsibility for supervising the coordination of the whole procedure eventually leading to evacuation. The coordinator's specific duties at each stage of the process are as follows:

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Map the area (city/metropolitan area) into sectors for the purpose of planning the evacuation. The coordinator can, of course, delegate this task to another department, such as one dealing with urban or regional planning;

- Draw up a list of all parties concerned (municipal, metropolitan, governmental and community) which the coordinator can plan to call upon for help should the need for evacuation arise in the municipal or metro area for which the coordinator is responsible;

- Prepare memoranda of agreement with responders, to specify the roles and responsibilities that are intended to be assigned to each of them during an evacuation. The coordinator must, therefore, plan the following resources:

- **Security**:
  - police
  - fire department

- **Health:**
  - medical care
  - public health

- **Environment**

- **Transportation:**
  - ambulances
  - public transit

- traffic

- **Urban and regional planning**
- **Communications**
- **Relief services**

- Have a comprehensive knowledge of the measures and plans that the participants intend to implement concerning every aspect of an evacuation;

- Conduct brainstorming sessions with the various participants to try and define the threats in each planning area;

- Establish an agreement with the provincial ministry in charge of public safety with respect to the assistance and support the ministry can offer to the municipality during a disaster.

STEP 2: Identifying and analysing high-risk areas:

- Hold meetings to reach a consensus among municipal participants concerning high-risk areas;

- Organize simulations, training seminars and workshops to bring participants closer together.

STEP 3: Simulating/analysing:

- Implement emergency and/or evacuation plans according to the pre-established procedure;

- Subsequently, coordinate overall operations.

STEP 4: Developing emergency response scenarios:

- Supervise the development of possible response scenarios depending on the nature of the disaster and the risks arising from the situation (conduct meetings with those in charge of each function).

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

- Establish a team analysis procedure with the participation of various participants, and suggest the following initiatives:

- Studying possible evacuation scenarios;
- Analysing the secondary effects observed and their evolution over time;
- Choosing the ideal response scenario;

- Studying measures to mitigate the secondary effects of the disaster;
- Suggesting appropriate mitigation measures for the selected scenario.

STEP 6: Making the decision or recommendation:

▪The coordinator can make the decision personally or negotiate a consensus concerning the final choice of response.

STEP 7: Announcing/implementing the decision:

▪Implement the emergency plan and inform all participants of the strategy to be followed;

▪Ensure that implementation takes place as planned with all necessary resources (human/material/logistic);

▪Initiate the public communication plan and ensure with those in charge of communications that the implementation plan is carried out properly.

STEP 8: Monitoring/assessing the evacuation strategy selected:

▪Ensure that the selected response scenario is properly implemented by everyone involved;

▪Update the status of the situation with those involved and assess the performance of the strategy and personnel in the field.

STEP 9: Reviewing the decision or recommendation:

▪Revisit the situation with decision-makers or councillors - according to the decisionmaking structure in place;

▪Inform all participants of any alterations to the initial decision.

B. <u>Urban/Regional Planning</u>

STEP 1: Characterizing the system at risk (city/metropolitan area):

▪The municipal or metropolitan area must be subdivided into planning sectors. The urban or regional planning department should perform this task, unless decided otherwise. Once the sectors have been mapped, the department will fulfil the following responsibilities:

▪In each of the planning sectors concerned, identify:

a) residential areas;

b) office areas;
c) commercial areas;
d) institutional areas (community centres, hospitals, churches, schools, jails, etc.);
e) public areas;
f) public utility networks (telephone, electricity, natural gas and drinking water, cable broadcasting, etc.);
g) industrial areas;
h) road network and public access routes;
i) vacant or unused spaces.

- Identify the features of each component, in each category, in each section, namely:

a) for buildings and lots: - size (area, volume, height, population density, population day and night, hosting capacity (for host areas));
b) for traffic routes: - physical and statistical features are key elements (length, width, number of lanes, average and maximum volume of traffic they can handle, etc.);
c) or data on the population: - the usual socioeconomic variables should be included: language, ethnic background, religion, age, sex, size of household, individual and household revenue, education, occupation, number of cars per household, number of TV sets and radios, population density according to spatial/temporal factors (daytime vs. night-time population), population concentration by area or neighbourhood according to these variables, number of people employed in areas of activity requiring skilled labour, etc.

- Identify the risks in each previously established set of components for each planning sector of the area under study.

STEP 2: Identifying and analysing high-risk areas

- Identify high-risk areas;

- Identify help and hindrance factors in planning sectors:

a) Help factors:
   - emergency resources available in the stricken area;
   - communication and warning means available in the stricken area;
   - infrastructures and urban utilities which could mitigate the threat;
   - relevant characteristics of the area and/or facilities or equipment available there.
b) Hindrance factors:
   - size of buildings;
   - building features;
   - certain infrastructures and public utilities.

▪Identify possible mitigation measures: The following questions have to be answered in order to define mitigation measures:

- What can be done to maximize the effect of help factors in a disaster?
- What can be done to minimize the effect of hindrance factors in a disaster?
- Can disaster risks be predicted (that is where, when, how long, how big)? What can be done to limit risk?
- How soon can the effects of the disaster be contained? How can they be eliminated altogether or at least significantly reduced?

STEP 3: Simulating/analysing:

▪Determine where (in which planning section or area) the risk has been detected;

▪List and cross-reference urban, environmental and demographic components of the stricken area(s);

▪At the request of the public safety director or emergency measures coordinator, establish, the effects of the threat on the urban components in the disaster area;

▪At the request of the public safety director or the emergency measures coordinator, develop scenarios for the evolution of the situation from an urban planning viewpoint, taking into consideration the effects and evolution of the disaster.

STEPS 4 TO 9 (Inclusively):

The city planning department - or other regional planning department - should ensure the updating of available information and post any new data or changes as they arise.

C. <u>Local Police Force</u>

STEP 1: Characterizing the system at risk (city/metropolitan area):

▪Identify police resources and components in the system at risk (urban or metro area) for each planning sector: vehicles, buildings, arms and instruments, safety equipment and protective gear, etc.;

▪Identify and characterize the components of the police force. At this point, it is advisable to present the distribution of resources (human and material) across the municipal or metro area concerned;

▪Identify and characterize section-specific risks which might hinder police work: pinpoint the spots where police are most likely to encounter problems and where risk factors might reduce the effectiveness of their response.

STEP 2: Identifying and analysing high-risk areas:

▪In conjunction with other departments, identify the planning sectors where it is anticipated that the response will require greater resources or more extensive planning due to higher risk potential;

▪Evaluate the help and hindrance factors for each threat identified:

Help factors:

- human and material resources available to the police;
- time available to the police to warn the population and organize early evacuation;
- human and material resources available to another police force in the vicinity of the section or city affected by the disaster;
- the time of year (spring or summer), the time of day (early evening) or the time of week (weekend) when the disaster takes place.

Hindrance factors:

- anticipated problems in terms of conflicting use of road and traffic networks with other emergency services (fire-fighters, ambulances, public transit, etc.);
- shortage or inadequacy of safety equipment preventing police action; - human limitations in overly long response operations.

▪Study and assess the means to mitigate each threat;

The following questions have to be answered:

- What can be done to maximize the effect of help factors in a disaster?
- What can be done to minimize the effect of hindrance factors in a disaster?
- Can disaster risks be predicted (that is, where, when, how long and how big)? What can be done to limit risks?
- How soon can the effects of the disaster be contained? How can they be eliminated altogether or at least significantly reduced? (e.g.: as far as human resources are concerned, is it possible at this stage to plan the shifts in a way that ensures that personnel remain physically and psychologically alert?)?

STEP 3: Simulating/analysing:

The duties of the police force at this stage are as follows:

▪Determine where (in which planning sector or area) the risk has been detected;

▪List and cross-reference urban, environmental and demographic components of the stricken area(s);

▪At the request of the public safety director or emergency measures coordinator, establish the effects of the threat on the urban components in the stricken area;

▪At the request of the public safety director or the emergency measures coordinator, develop scenarios relating to the evolution of the situation from a logistical point of view, and taking into consideration the effects and evolution of the disaster;

▪At the request of the director of public safety or the emergency measures coordinator, participate in the simulation of the evolution of the situation (dynamic scenario assessment);

▪Analyse the sectors concerned and the threat observed, determining what is the most likely scenario.

STEP 4: Developing emergency response scenarios:

Once the most plausible situations have been listed in detail, the police force must draw up a list of the response alternatives that are available to them. According to the most likely projections, they should then be able to indicate their response capabilities in the scenarios which are most likely to be implemented.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

▪The police have no duties to fulfil at this stage. However, they might be called upon to participate in the recommendation process leading to the best choice of response. If so, they - as well as the others - proceed as follows:

- Study possible evacuation response scenarios;
- Analyse secondary effects observed and their evolution over time;
- Choose the ideal response scenario;
- Study the impact of mitigation measures on secondary disaster-related risks;
- Recommend mitigation measures appropriate to the selected scenario.

▪The police force must act as an ongoing source of information, briefing emergency response officers as needed.

STEP 6: Making the decision or recommendation:

The police have no duties to fulfil at this stage. They may, however, be asked to give a detailed account of their activities or make recommendations in order to help decisionmakers in their final choice.

STEP 7: Announcing/implementing the decision or recommendation:

- The police force may be called upon to inform the public of the decision or recommendation to evacuate;

- They will then, in accordance with the emergency plan implemented, lead the evacuation process by directing traffic and monitoring the stricken area;

- They will subsequently inform managers about the outcome of events and the evacuation procedure implemented; or proceed with the strategy.

STEP 8: Monitoring/assessing the evacuation strategy selected:

- Keep emergency response officers informed on the progress of the evacuation so that they can assess whether the appropriate decision has been taken.

STEP 9: Reviewing the decision or recommendation:

- Inform decision-makers about the status of events;

- Make recommendations in the event that a shift from the original decision is warranted.

D. <u>Fire Department</u>

STEP 1: Characterizing the risk system (city/metropolitan area):

- Identify fire department resources and components in the risk system (urban or metro area): vehicles, buildings and instruments, safety equipment and protective gear, etc.;

- Identify and characterize the components of the fire department: the distribution of resources (human and material) by district across the municipal or metro area, is critical to all emergency measures or evacuation procedures planning;

- Identify and characterize planning sector-specific risks which might hinder fire department work: pinpoint the spots where the fire department is most likely to encounter problems and where power and other breakdowns might reduce the effectiveness of their response.

STEP 2: Identifying and analysing high-risk areas:

- In conjunction with other departments, identify the planning sectors where it is anticipated that the response will require greater resources or more extensive planning due to higher risk potential;

▪Evaluate the help and hindrance factors for each threat identified:

Help factors:

- human and material resources available to the fire department;
- time available to the fire department;
- human and material resources available to another fire department in the vicinity of the section or the city affected by the disaster;
- the time of year (spring or summer), the time of day (early evening) or the time of week (weekend) when the disaster takes place.
- height of the buildings and space occupied at ground level

Hindrance factors:

- anticipated problems in terms of conflicting use of road and traffic networks with other emergency services (police, ambulances, public transit, etc.);
- shortage or inadequacy of safety equipment; - human limitations in overly long response operations; - the nature of the disaster *per se*;
- presence of hazardous materials in a highly exposed area.

▪Study and assess the means to mitigate each threat:

The following questions have to be answered:

- What can be done to maximize the effect of help factors in a disaster?
- What can be done to minimize the effect of hindrance factors in a disaster?
- Can disaster risks be predicted (where, when, how, how long and how big)?
- How soon can disaster impacts be contained? How can they be eliminated altogether or at least significantly reduced?

STEP 3: Simulating/analysing:

The duties of the fire department at this stage are as follows:

▪Define where (in which planning section or area) the risk has been detected;

▪List and cross-reference urban, environmental and demographic components in the stricken area(s);

▪Establish, at the request of the public safety director or emergency measures coordinator, the effects of a threat on the urban components of the stricken area;

▪At the request of the public safety director or emergency measures coordinator, develop scenarios relating to the evolution of the situation from a logistical point of view, taking into consideration the effects and evolution of the disaster;

▪At the request of the director of public safety or emergency measures coordinator, participate in the simulation of the evolution of the situation (dynamic scenario assessment);

▪Analyse the sectors concerned and the threat observed, determining what the most likely scenario.

STEP 4: Developing emergency response scenarios:

▪Draw up a list of the response alternatives available;

▪Indicate, according to the most likely projections, the response capabilities in the scenarios which are most likely to be implemented.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

▪The fire department has no duties to fulfil at this stage. However, they might be called upon to participate in the recommendation process leading to the best choice of response. If so, they - as well as the others - proceed as follows:

- Study possible evacuation response scenarios;
- Analyse secondary effects observed and their evolution over time;
- Choose the ideal response scenario;
- Study the impact of mitigation measures on secondary effects of the disaster;
- Recommend mitigation measures appropriate to the selected scenario.

▪The fire department must act as an ongoing source of information, briefing emergency response officers as needed.

STEP 6: Making the decision or recommendation:

The fire department have no duties to fulfil at this stage. They may, however, be asked to make recommendations to help decision-makers in their final choice. The chief may also be appointed to make the decision himself, depending on the response plan.

STEP 7: Announcing/implementing the decision:

▪The fire department may be called upon to inform the public of the decision or recommendation to evacuate;

▪They will subsequently inform the managers about the outcome of events and the evacuation procedure implemented.

STEP 8: Monitoring/assessing the evacuation strategy selected:

▪Keep emergency response officers posted on the progress of evacuation so that they can assess whether the appropriate decision has been taken.

STEP 9: Reviewing the decision or recommendation:

▪Inform decision-makers about the status of events and issue recommendations in the event that a shift from their original decision is warranted.

▪Depending on the response plans and practice, the fire chief may also be asked to make a new decision if he is empowered to do so.

E. Traffic Department

STEP 1: Characterizing the system at risk (city/metropolitan area):

▪Identify and map the road networks of the urban area and specify its components (location, length and width of the streets, of rights of way, etc.);

▪Identify and characterize the components of the road network according to each planning section: number of local roads, collector highways, regional or metropolitan boulevards, highways, location of streets, statistics on the level of performance of each road (service life and level of maintenance, degree of deterioration and quality of road surfaces as well as other physical and technical features, traffic capacity and estimated and observed levels of service, etc.), location of intersections and interchanges, areas interfacing with other means of transportation (trains, airplanes, etc.), restricted access corridors or constrained zones where traffic is funnelled;

▪Identify and characterize the risks along or across the road network.

STEP 2: Identifying and analysing high-risk area:

▪In conjunction with the city planning service, the public transit and the provincial Ministry of Transportation, the municipal department in charge of traffic establishes which parts or areas of the municipal or urban road systems are especially vulnerable to an eventual disaster;

▪Evaluate the help and hindrance factors of the roads in each section according to each identified risk:

Help factors:

- identification of the roads with the smoothest traffic flow, the interfaces and traffic points which can be quickly served in a normal situation;

- immediate proximity of alternative roads to allow traffic flow.

Hindrance factors:

- condition of roads (holes, cracks, obstacles, other signs of damage);
- physical obstacles to movement (bridges, overpasses, interchanges, etc.);
- areas of conflict or difficult traffic flow in the stricken area, caused by the simultaneous use of certain roads by emergency vehicles (police, fire-fighters, ambulances, etc.);
- size of buildings (height, width, depth, configuration, layout, space occupied at ground level, etc.) and number of people inside the premises at the time of the disaster;
- urban facilities along certain roads; - weather conditions and their impact on road conditions.

▪Review and assess means to mitigate the threats pertaining to the road network:
The questions to be asked, depending on the findings established under the previous point, are as follows:

- What can be done to maximize the effect of help factors when a threat is detected?
- What can be done to minimize the effect of hindrance factors when a threat is detected? Can they be completely avoided?
- To what extent can risks be predicted? What can be done to prevent them?
- How soon can risk impacts be contained? How can they be eliminated altogether or at least significantly reduced in order to limit the emergency response and, if possible, avoid evacuation?

STEP 3: Simulating/analysing:

(This step can also be carried out with the participation of the provincial Ministry of Transportation since they can offer information beforehand):

▪Establish where (in which part of the municipal or metro road network) the threat causing the disaster has been detected;

▪List and cross-reference the components of the affected road network;

▪Establish the effects of the threat on the components of the road network and on traffic flow (to provide access to emergency vehicles, as well as to evacuees in their private vehicles);

- Develop scenarios concerning the evolution of the situation and subsequent population displacement according to the effects and evolution of the threat;

- Simulate the evolution of the situation (dynamic scenario assessment);

- Analyse the sectors affected and the threat detected, establishing the most likely scenario.

STEP 4: Developing emergency response scenarios:

- Provide as accurate and complete a picture as possible of the situation in the stricken area to decision-makers;

- Establish, in light of this information, possible operational scenarios for safeguarding the population, and the various conditions required for evacuation implementation according to the topography of the affected area.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

Although it is not really part of their mandate, the traffic department may be called upon to participate in establishing the best scenario for safeguarding the population. During this step, this and other departments will implement, broadly speaking, the following procedures:

- Study all possible evacuation response scenarios from the traffic and traffic flow viewpoint;

- Analyse the secondary effects detected and their evolution over time for each scenario;

- Select the ideal response scenario;

- Study ways to mitigate the secondary effects of the disaster;

- Recommend mitigation measures appropriate to the selected scenario.

STEP 6: Making the decision or recommendation:

The traffic department does not participate at this stage. It can however keep compiling information and data in order to keep decision-makers informed on traffic flow on the roads identified and selected for the evacuation.

STEPS 7 AND 8 (Inclusive):

Organize the follow-up of available information and communicate any changes or developments as they happen.

STEP 9: Reviewing the decision or recommendation:

Develop the follow-up of information available and suggest alternatives if the initial strategy does not prove to be adequate.

F. Public and other Transportation Services

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Identify the components of public transit systems by planning sector:

  - public transit systems in place: bus routes, subway lines, commuter trains, paratranspo services (persons with disabilities, reduced mobility, school buses, etc.).
  - privately-owned transportation systems: cab companies, private bus companies following regional or national routes, school transportation companies; private railroad companies having regional or national routes, and airlines (in case of massive evacuation or evacuation in remote areas);

- Identify and characterize the components of each network: routes, number of available vehicles, number of seats per vehicle, the estimated and observed levels of service, passenger capacity of these vehicles, maximum capacity, estimated frequency of circulation on a route (length of the cycle), dispersal capacity, grouping capacity, assigned or available personnel, fuel stores available and their potential use during an evacuation, etc.;

- Identify and characterize the risks to which transit systems (both public and private) are exposed, pinpointing the portions of the networks or routes which might run into threats within the city.

STEP 2: Identifying and analyzing high-risk areas:

- Establish which parts or areas of the municipal or metro road systems are especially vulnerable in the case of a disaster (in accordance with the planning sectors);

- Assess the help and hindrance factors of the public transit routes in each section according to each identified risk:

Help factors:

- public transit resources available on site to act immediately in the stricken area;
- prior identification of certain bus lanes;
- proximity of possible alternatives allowing the flow of public transit vehicles.

Hindrance factors:

- emergency resources available in the stricken area (police, fire-fighters, ambulances, etc.);
- road conditions (holes, cracks, obstacles, other signs of damage); - infrastructures and public utilities which might help mitigate the threat: shelters, fire hydrants, water mains and sewers, etc.;
- weather conditions and their impact on road conditions;
- size of buildings (height, width, depth, configuration, layout, space occupied at ground level, etc.);
- presence of urban facilities along certain roads.

▪Study and assess means of mitigating the threats pertaining to the public transit (public or private) systems.

The questions to be asked are as follows:

- What can be done to maximize the effect of help factors when a threat is detected?
- What can be done to minimize the effect of hindrance factors when a threat is detected?
- Can risks be predicted? How can they be prevented?
- How soon can the risk impact be contained?

STEP 3: Simulating/analysing:

At this stage, the public transit service performs the following duties:

▪Establish where (which part of the system) the risk has been detected;

▪List and cross-reference the components of the public transit systems (public and private);

▪Establish the effects of the risk on the components of the public transit systems affected;

▪According to the impact and the evolution of the threat, develop scenarios to monitor the evolution of the situation and subsequent population displacement;

▪Simulate the evolution of the situation (dynamic scenario assessment);

▪Analyse the sector concerned and risk detected, establishing the most likely scenario.

STEP 4: Developing emergency response scenarios:

- Provide as accurate and complete a picture as possible of the public transit movement (city buses, buses, street-cars, subways, etc.) in the stricken area to decision-makers;

- Establish the best operating scenarios for public transit and determine the various conditions required for evacuation according to the extent of the area affected and the public transit resources available.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

- Although it is not really part of their mandate, public transit may be invited to participate in establishing the best scenario for safeguarding the population. During this step, this and other departments will implement, broadly speaking, the following procedures:

- Study possible evacuation response scenarios for possible public transportation of citizens during evacuation;

- Analyse the secondary effects detected and their evolution over time;

- Select the ideal response scenario;

- Study ways to mitigate the secondary effects of the disaster;

- Recommend mitigation measures appropriate to the selected scenario.

STEP 6: Making the decision or recommendation:

Public transit does not participate at this stage. It can, however, continue to collect information and data to keep decision-makers posted, as necessary.

STEP 7: Announcing/implementing the decision or recommendation:

- Organize the follow-up of available information;

- Report any changes or developments as they happen;

- Ensure liaison with all private transportation systems contracted for the response.

STEP 8: Monitoring/assessing the evacuation strategy selected:

- Organize the follow-up of available information;

- Report any changes or developments as they happen.

STEP 9: Reviewing the decision or recommendation:

- Organize the follow-up of available information;

- Report any changes or developments as they happen;

- Suggest new solutions if the initial strategy does not prove to be adequate.

G. Ambulance

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Identify the existing ambulance systems (private and public);

- Identify and characterize the components of ambulance services in each planning sector: number of vehicles, human resources assigned and available, service outlets, location of vehicles, performance levels by area or section, response speed in emergencies, maximum passenger capacity per vehicle, etc.;

- Identify and characterize the risks to ambulance services for each planning sector: identifying the parts of their network routes subject to threats in different sectors of the municipal or metro area.

STEP 2: Identifying and analyzing high-risk areas:

- In conjunction with the other departments, identify high-risk planning sectors of the city where they will require more response means or more elaborate planning;

- Assess the help and hindrance factors of the sectors according to each identified risk:

Help factors:

- human and material resources available to ambulance services;
- human and material resources available to other ambulance services in the vicinity.

Hindrance factors:

- anticipated problems in terms of conflicting use of road and traffic networks with other emergency services (police, fire-fighters, public transit, etc.);
- road conditions (holes, cracks, obstacles, other signs of damage);
- shortage or inadequacy of safety equipment preventing ambulance personnel from responding;
- human limitations in overly long response operations;

- Study and evaluate means of mitigating each risk:

The following questions have to be asked:

- What can be done to maximize the effect of help factors in a disaster?

- What can be done to minimize the effect of hindrance factors in a disaster?

- Can disaster risks be predicted (where, when, how, how long and how big)?

- How soon can the effects of the disaster be contained? How can they be eliminated altogether or at least significantly reduced?

STEP 3: Simulating/analysing:

At this stage, ambulance services perform the following duties:

- Establish where (in which part of the network) the risk has been detected;

- List and cross-reference the components of the ambulance services concerned;

- Establish the effects of the disaster on the components of the ambulance network;

- According to the effects and the evolution of the risk, develop scenarios to monitor the evolution of the situation and subsequent population displacement requiring ambulance transportation to leave the stricken area;

- Simulate the evolution of the situation (dynamic scenario assessment);

- Study the systems concerned and risk detected, establishing what will be the most likely scenario.

STEP 4: Developing emergency response scenarios:

- Brief decision-makers as accurately as possible on the status of ambulance movements in the stricken area;

- According to the nature of the risk detected, its features and effects, establish the best operational scenarios for transporting people by ambulance;

- Establish the various conditions required for evacuation according to the space and road features of the area.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

Ambulance services can be consulted during the phase of determining the ideal scenario for safeguarding the population. During this step, these and other departments will implement, broadly speaking, the following procedures:

- Examine possible evacuation response scenarios according to the resources available to the ambulance services;
- Analyse the secondary effects detected and their evolution over time;
- Select the ideal response scenario;
- Study ways to mitigate the secondary effects of the disaster;
- Recommend mitigation measures appropriate to the selected scenario.

STEP 6: Making the decision or recommendation:

Ambulance services do not participate directly at this stage of the process. They should, however, continue collecting information and data to inform decision-makers as necessary of any developments in terms of servicing the stricken area.

STEP 7: Announcing/implementing the decision or recommendation:

- Establish the follow-up of available information;
- Report changes and developments as they happen.

STEP 8: Monitoring/assessing the evacuation strategy selected:

- Establish the follow-up of available information;
- Report changes and developments as they happen.

STEP 9: Reviewing the decision or recommendation:

- Establish the follow-up of available information;
- Report changes and developments as they happen;
- Suggest new solutions if the initial ambulance strategy does not prove to be adequate.

H. Community Development/Recreation and Relief Planning

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Identify and characterize the responders in terms of relief services and their respective components:

i) Identify the required relief services: registration, information, shelter, food, clothing, general services;

ii) Identify response resources: voluntary organizations devoted to emergency response and humanitarian action, charity or community groups and movements, social clubs and private associations, specialized or very specific agencies;

iii) Characterize response resources: In this case, the following information is necessary for each participant: their specific or special skills, complementary skills, the human and material resources they have, the response procedures they usually perform, the suppliers or subcontractors with whom they usually deal.

- Characterize the risks threatening the action of response resources (relief).

STEP 2: Identifying and analysing high-risk areas:

- Identify the areas where the response of relief resources might be disrupted or would require a more organized approach;

- As far as hindrance factors are concerned, response resources should primarily advise the planner/coordinator of relief services on the human limitations in overly long response operations which might partly hinder the implementation of the strategy for safeguarding the population.

STEPS 3 TO 6 (Inclusive):

- There is no specific task to be performed during all these steps. However, the department coordinating the planning of relief services must make sure their resources can be prepared and mobilized when needed;

- The person in charge of coordinating relief services will be responsible for keeping decision-makers posted on any new developments.

STEP 7: Announcing/implementing the decision or recommendation:

- Post the decision among response resources so that they are ready to perform the expected relief services.

STEPS 8 AND 9 (Inclusive):

- Ensure follow-up on operations;

- Keep managers and decision-makers posted on any incidents or problems encountered during the implementation of relief services;

- When required, inform relief providers of any changes to the safeguarding strategy (decision made at step 6).

I. Social Services

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Identify the social services in the urban area: material and administrative resources and their location (central administrative office and district offices, community centres, social service centres, hospitals, etc.) and human and professional resources related to each of these centres (psychologists, psychiatrists, psycho-therapists, social workers, community helpers, etc.);

- Characterize the components of the social services available in each planning sector (as established by the municipality): for each component in each planning sector, it is necessary to specify the number of people available, classify them, and indicate how to allocate resources over the area during evacuation and relocation;

- Identify and characterize the risks within the social services: since these services are mainly called upon to participate in questions regarding the management of personnel, risk characterization will mostly concern staff and the limitations pertaining to their response.

STEP 2: Identifying and analysing high-risk areas:

Since the instructions for other responders do not apply here (because social services are much more active during the relocation stage than during population safeguarding), planning work between the municipality and social services at this stage should focus mainly on providing more specialized services and their extent.

STEPS 3 TO 6 (Inclusive):

Social services do not participate in planning the decision. They will however remain ready to act at the municipality's request.

STEPS 7 TO 9 (Inclusive):

Social service resources are used in accordance with the agreement they have with a municipality and the instructions of the departmental emergency plan.

J. Health Services

STEP 1: Characterizing the system at risk (city/metropolitan area):

▪Identify and locate the components of the health system: the provincial ministry responsible for health and the municipality must make a list of all hospitals, medical clinics, treatment centres, detoxification centres, psychiatric hospitals, and all other resources for the protection of public health, etc.;

▪Characterize the components of the health system: physical features of each building, distribution of patients by unit, number of beds available, average/minimum/maximum number of patients daily, elements pertaining to the personnel and its management, suppliers of pharmaceutical or medical products. Finally, any institutional emergency plan must be identified and indicated;

▪Identify and characterize the risks within a health system:

i) resources assigned to assess public health must attempt to obtain a comprehensive view of the risks threatening public health in each planning sector;
ii) the characterization of risk within health care institutions chiefly deals with the staff and the shortcomings inherent in their performance.

STEP 2: Identifying and analysing high-risk areas:

▪Planning activities between the municipality and the health services during this stage will focus on providing more specialized services, the type, and the extent they may be needed.

▪Public health resources could also be asked to:

- establish with the other responders which sectors are most vulnerable to disaster;
- determine the help and hindrance factors specific to these sectors and the appropriate mitigation measures. In this field, it would be wise to take into account all medical, psychological and social aspects which could be affected by detection of risk.

STEPS 3 AND 4 (Inclusive):

▪Health services have no responsibility for planning the decision. They do, however, have to be ready to respond.

- As for public health resources, they must report to the municipality as soon as a threat to public health is observed.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

Public health resources might be called upon to take part in the assessment of alternatives in order to choose the final response decision:

- Examine the possible evacuation response scenarios;

- Analyse the secondary effects detected and their evolution over time;

- Select the ideal response scenario;

- Study ways to mitigate the secondary effects of the disaster;

- Recommend mitigation measures appropriate to the selected scenario.

STEP 6: Making the decision or recommendation:

Public health authorities might be called upon to participate in the decision-making process or at least to make recommendations, as a result of the very nature of the information they will have assessed.

STEPS 7 TO 9 (Inclusive):

- Health response resources (hospitals, clinics, etc.) are mobilized in the sectors where they are needed;

- During step 9, the health authority (i.e. the department concerned or its agents) foresees and suggests health protection alternatives should the response strategy prove inadequate;

- Also to be deployed are the necessary public health information resources.

K. <u>The Ministry/Department of Environment</u>

STEP 1: Characterizing the system at risk (city/metropolitan area):

- Identify and characterize the planning sectors and their environmental components: air and drinking water quality, climate and atmospheric conditions (temperature, humidity, precipitation, etc.), wind direction, sunniness, different sorts of pollution, wildlife and flora in different sectors of each municipality in the metropolitan area;

▪Identify and characterize the environmental components of each city and district (or section);

▪Identify and characterize the threats in the identified planning sectors.

STEP 2: Identifying and analysing high-risk areas:

▪Identify the high-risk areas in light of the presence of environmental threats:
These high-risk sectors may be of two different types and have to be pinpointed and analysed in detail:

i) the sectors where a significant number of threats may occur;
ii) the sectors with an insignificant number of threats which could nonetheless have a very harmful impact on the health or safety of human beings or the environment, should they occur as a result of some other impending risk;

Evaluate the help and hindrance factors of the sectors with respect to each identified risk:

Help factors:

- weather conditions;
- physical and geographical features of the stricken area;
- man-made safeguards designed to ensure protection against such risks.

Hindrance factors:

- features of the bio-physical environment (some of which are particularly vulnerable);
- weather conditions at the time of disaster.

▪Study and assess mitigation means for risks pertaining to planning sectors:
The questions to be asked are as follows:

▪What can be done to maximize the effect of help factors when a risk is detected?

▪What can be done to minimize the effect of hindrance factors when a risk is detected?

▪Can risk be predicted? How can it be prevented?

▪How quickly can risk impacts be contained? How can they be eliminated altogether or significantly reduced?

STEP 3: Simulating/analysing:

At this stage, the Ministry/Department of the Environment must perform the following duties:

▪Establish where (in which sector or planning area) the disaster has taken place and what risk has been detected;

▪List and cross-reference the environmental components in the area or affected sector;

▪Establish the effects of the disaster and the risk detected on the components of the sector or area;

▪According to the impact and the evolution of the risk, develop scenarios to monitor the situation from the environmental quality viewpoint;

▪Simulate the evolution of the situation (dynamic scenario assessment);

▪Analyse the systems concerned and risk detected, establishing what is the most likely scenario.

STEP 4: Developing emergency response scenarios:

▪Provide as accurate and complete a picture as possible of the situation to the municipal decision-makers;

▪The ministry could suggest which operational safeguarding and evacuation scenarios decision-makers should tend towards.

STEP 5: Establishing the ideal response scenario (assessing the alternatives):

▪Although it is not really part of their mandate, the Ministry/Department of the Environment may be called upon to participate in establishing the best safeguard scenario, which includes the following duties:

- Study all possible evacuation response scenarios;
- Analyse the secondary effects detected and their evolution over time (in terms of environmental repercussions on the welfare of the public, this analysis is a key factor);
- Select the ideal response scenario;
- Study ways to mitigate the secondary effects of the disaster;
- Recommend mitigation measures appropriate to the selected scenario.

STEP 6: Making the decision or recommendation:

The Ministry/Department of the Environment does not participate directly in this stage but, just as with the public health services, it can be consulted as a result of the information it has assessed.

STEPS 7 and 8 (Inclusive):

- The ministry/department must organize the follow-up on available information;

- Report any changes or developments as they happen.

STEP 9: Reviewing the decision or recommendation:

- The ministry/department must organize the follow-up on available information;

- Suggest other alternatives if the initial strategy does not prove to be adequate.

L. <u>The Ministry/Department of Communications</u>

STEP 1: Characterizing the system at risk:

- Identify responsibilities and describe the duties of those responsible;

- Identify and characterize communication and information techniques which will be used during an evacuation operation:

- The work to be done is twofold:

i) develop internal communication facilities (organization of a hierarchical system of warning communication among responders, planning of relief communications, planning of a message control centre, planning of stationary or mobile communications stations, development and signing of service agreements with local ham radio clubs for their possible participation in an evacuation (this agreement will have to specify their roles and responsibilities));

ii) develop external communication techniques: radio or TV messages, press releases, press conferences, media kits, telegrams, circulars, etc.);

- Prepare presentation format for documents (both internal and external communication);

- Develop agreements in principle with the media.

STEPS 2 TO 6 (Inclusive):

Communication resources do not have any duties at this stage. They should, however, keep informed about any new developments in the analysis of the situation and decision-making process, and be ready to disseminate information at the request of the emergency measures coordinator.

STEP 7: Announcing/implementing the decision or recommendation:

Communications will enter the scene as soon as the decision is made. Their work is twofold:

i) at the request of the municipal emergency measures coordinator, coordinate the announcement of the decision internally, i.e. within the evacuation management structure:

- Communications must then send the applicable messages to the responders concerned in accordance with the instructions of the emergency plan;

ii) they must then disseminate the information externally:

- Communications must deploy a "plan of attack" with regard to the media in order to keep the victims and the public at large informed.

STEPS 8 AND 9 (Inclusive):

Communications will have to make adjustments as necessary depending on changes to the response strategy in the field.