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CORPORATE REPORT

NO: 205 COUNCIL DATE: **October 28, 2013**

REGULAR COUNCIL

TO: **Mayor & Council** DATE: **October 24, 2013**

FROM: **General Manager, Engineering** FILE: **7130-40**
7130-01

SUBJECT: **Regional Disaster Debris Management Plan**

RECOMMENDATION

The Engineering Department recommends that Council receive this report as information.

INTENT

The purpose of this report is to provide information regarding the development of a Regional Disaster Debris Management Plan and the development of Surrey Disaster Debris Response Plan that will interface with the Regional Disaster Debris Management Plan.

BACKGROUND

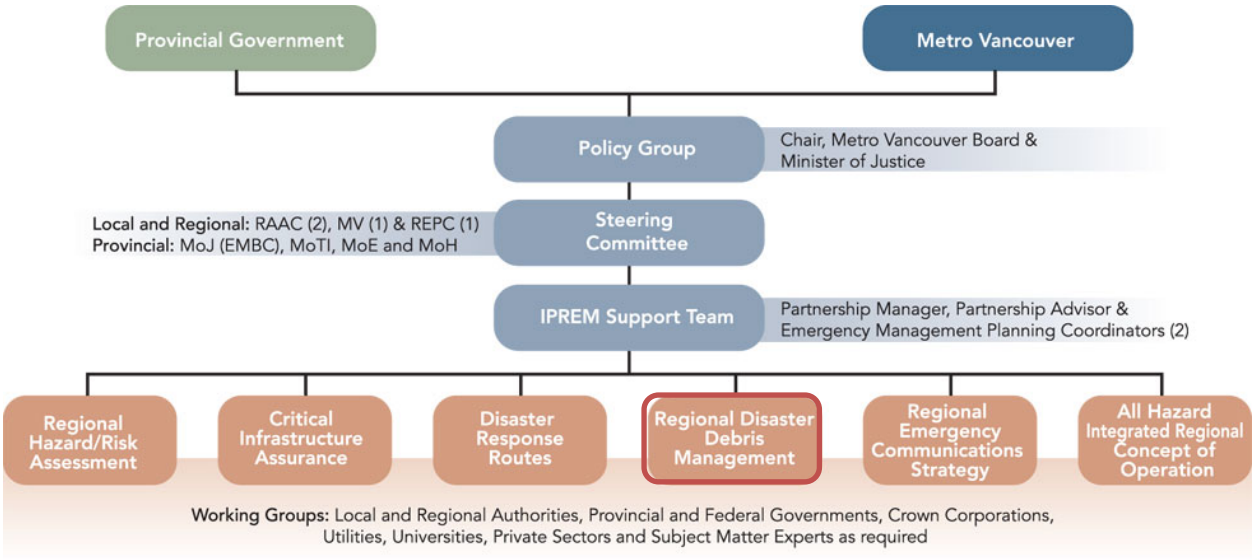
Multi-agency hazard plans for B.C. are prepared and updated regularly by Emergency Management BC (EMBC), also known as Provincial Emergency Program (PEP), to ensure an effective strategy is in place to address various types of emergencies and disasters. These plans have been developed with the involvement of multiple organizations focusing on public safety, infrastructure management and property protection, and are intended to guide the response to and recovery from emergencies/disasters.

In 2009, the Integrated Partnership for Regional Emergency Management (IPREM) evolved from the Joint Emergency Liaison Committee (JELC). IPREM is jointly funded by the Province of British Columbia and Metro Vancouver. The role of this multi-government entity is to facilitate cooperation between private and public organizations involved in emergency management. Specifically, IPREM's work is to assess regional emergency management capabilities and define regional priorities using established benchmarks and best practices.

In 2010, IPREM established the Regional Disaster Debris Management Working Group. The working group is comprised of municipal emergency planners, engineers, and solid waste management representatives from local governments across the Region and from Metro Vancouver.

DISCUSSION

The organizational structure of IPREM is illustrated below:



Source: www.iprem.ca

As is evident from the above organizational chart, the Regional Disaster Debris Management group is one of IPREM's six working groups as follows:

1. Regional hazard/risk assessment
2. Critical infrastructure assurance
3. Disaster response routes
4. Regional disaster debris management
5. Regional emergency communications strategy
6. All hazard integrated regional concept of operations

Regional Disaster Debris Management Plan

The goal of the Regional Disaster Debris Management Working Group initiative is to develop a Plan to address the debris impacts of disaster events. Key components of the regional disaster debris management plan (RDDM Plan) include:

- reviewing of possible disaster scenarios;
- estimating disaster debris quantities;
- an evaluation of available resources;
- understanding debris permitting considerations; and
- developing debris management and mitigation strategies.

A copy of the draft RDDM Plan is attached as Appendix I.

The RDDM Plan is one component of an overall Regional Recovery Plan. The RDDM Plan is intended to be a living document focusing on the recovery phase of a regional disaster (not an emergency response guide). The purpose of the Plan is to expedite recovery efforts through pre-event planning and preparedness. The RDDM Plan will be a framework for managing excessive quantities of debris that could result from a regional emergency event. The document will define

roles, relationships and authority under existing legislation, and will establish principles and objectives to guide recovery activities.

The RDDM Working Plan will be used by local and regional authorities, and the province to guide the storage, sorting, recycling and disposal of disaster debris.

The draft Plan was circulated to regional stakeholders for comments in October 2012. These stakeholders include the provincial government, Metro Vancouver, all MV local governments, solid waste industry representatives and private businesses involved in demolition, recycling, disposal, and environmental work, health authorities, School Districts and transportation and work safety entities.

The stakeholder engagement process focused on recommendations related to the plan's ownership, ongoing RDDM program funding, and the process for developing debris-specific projects following a major emergency event.

The Draft Plan was also presented to the Regional Engineers Advisory Committee (REAC) Solid Waste Subcommittee on November 30, 2012.

Currently, IPREM staff and the RDDM Working Group are working on incorporating the stakeholder feedback into the RDDM Plan. One of the key focus areas is on developing criteria for selecting debris management sites and reviewing the existing legislative framework to establish a governance structure for defining stakeholder roles and responsibilities, before, during and after disaster events.

Based on input, the plan is being expanded to include elements related to:

- The roles and responsibilities of all levels of government as well as health authorities and private owners; and
- All Hazard Integrated Regional Concept of Operations (i.e., how the RDDM plan interrelates to the overall Regional Emergency Management Plan); and
- Information on the provincial "Disaster Financial Assistance" program (i.e., what it does and does not cover).

A workshop for municipal solid waste managers is being held in the next few weeks to obtain feedback on the final draft of the RDDM Plan. After this workshop the RDDM will be refined and finalized by early 2014 for endorsement by the Regional and local governments in the Region.

Surrey Disaster Debris Response Plan

The RDDM Plan indicates that each local government in the region will develop and regularly update a local Disaster Debris Response Plan (DDRP) that will interface with the RDDM Plan. Based on a recent survey, it was determined that most Metro Vancouver municipalities, including Surrey, have not yet developed their own DDRP.

The Engineering Department is initiating the development of a DDRP for Surrey this fall. This plan will be developed in collaboration with Surrey Fire Services and will become an element of the City of Surrey Emergency Response Plan.

It is expected that a draft of the Disaster Debris Response Plan will be forwarded to Council for consideration in 2014.

SUSTAINABILITY CONSIDERATIONS

The Regional Disaster Debris Management Working Plan will support the objectives of the City's Sustainability Charter by acting to mitigate the effects of a disaster on the City from an economic and environmental perspective.

CONCLUSION

As part of the Region's planning in relation to managing potential emergencies and disasters, a Regional Disaster Debris Management Working Plan is being developed. A copy of the draft Plan is attached to this report as Appendix I. It is expected that the Plan will be finalized in early 2014. In support of the regional Plan, Engineering staff is commencing the development of a local Disaster Debris Response Plan for the City, which will be completed in 2014.

Vincent Lalonde, P.Eng.
General Manager, Engineering

VL/RAC/ras/brb

Appendix I: DRAFT – Regional Disaster Debris Management Working Plan

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Draft - for distribution

Regional Disaster Debris Management Working Plan

Updated: October 16th, 2012

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List of Acronyms

BCERMS	British Columbia Emergency Response Management System
CBRNE	Chemical, Biological, Radiological, Nuclear and Explosive
DFA	Disaster Financial Assistance
DFO	Fisheries and Oceans Canada (aka Department of Fisheries and Oceans)
EMBC	Emergency Management British Columbia
EOC	Emergency Operations Centre
FEMA	Federal Emergency Management Agency (USA)
HAZUS	Hazards U.S. Multi-Hazard Software
ICS	Incident Command System
IEPC	Inter-Agency Emergency Preparedness Council
IPREM	Integrated Partnership for Regional Emergency Management
JELC	Joint Emergency Liaison Committee
MAAs	Mutual Aid Agreements
MoUs	Memorandums of Understanding
NRCan	Natural Resources Canada
OCP	Official Community Plan
PREOC	Provincial Regional Emergency Operations Centre
PSSG	Public Safety and Solicitor General
RAAC	Regional Administrative Advisory Committee
RDDM	Regional Disaster Debris Management
REAC	Regional Engineers' Advisory Committee
REPC	Regional Emergency Planning Committee
RROC	Regional Recovery Operations Centre

Preface

Disasters can generate massive quantities of debris. Global experience tells us the level of preparedness in areas such as governance structure, debris management plans, concept of operations, pre-defined procurement processes and building standards are significant factors affecting the speed of recovery of affected communities. This document, Regional Disaster Debris Management Working Plan, is an evolution of past efforts of representatives from government and the private sector volunteering their time, knowledge and skills to create a regional disaster debris management action plan.

HISTORY

To establish a foundation for dealing with regional emergencies, local governments within Metro Vancouver and the Province formed the Joint Emergency Liaison Committee (JELC). In 2004, one of JELC's working groups completed a template for creating municipal disaster debris response plans. Following stakeholder input, in November 2007 the Regional Administrative Advisory Committee (RAAC) endorsed in principle the continuing support for the Regional Disaster Debris Management initiative. This resolve became part of a larger review to identify the actions as well as the current and recommended roles and responsibilities of the various public and private sector organizations involved in managing disaster debris.

To move forward on this recommendation and address other regional uncertainties, a more formalized entity was created in April of 2009, the Integrated Partnership for Regional Emergency Management (IPREM). IPREM is a partnership between the Province represented by Public Safety and Solicitor General, and local governments, represented by Metro Vancouver (Organizational structure is provided in Appendix I). IPREM has set the following vision and mission:

Vision: *Metro Vancouver: A Disaster Resilient Region where all levels of government and key stakeholders work together seamlessly*.

Mission: *Develop and deliver a coordinated seamless regional emergency management strategy supported by an integrated concept of emergency operations, strategic priorities and supporting plans.*

To address Regional Disaster Debris Management (RDDM), a working group was established, holding its first meeting in June 2010.

Today, if an event should occur, this document could provide the framework for an actionable project that could be developed to manage disaster debris. It includes recommendations for an on-going program, and a process to receive input on resources, temporary debris storage sites and disposal, which needs to be considered by all stakeholders in the public and private sectors.

This Working Plan has been written in the absence of both a regional concept of operations and a regional recovery plan. A separate IPREM Working Group is engaged in developing the Regional Concept of Operations, which is to include a regional decision making model. Any RDDM Plan should be validated, and consistent with the Regional Concept of Operations, when established. Given the above, this Working Plan is based on existing legislative structure. The proposed RDDM Interim Advice and Decision Framework is presented on the understanding that it will be reviewed and updated as required with the completion of the Regional Concept of Operations and the subsequent Regional Recovery Plan.

It has been identified that a special provision is required by the Minister of the BC Ministry of Environment to allow acceptance of unsorted disaster debris at storage and disposal facilities across the

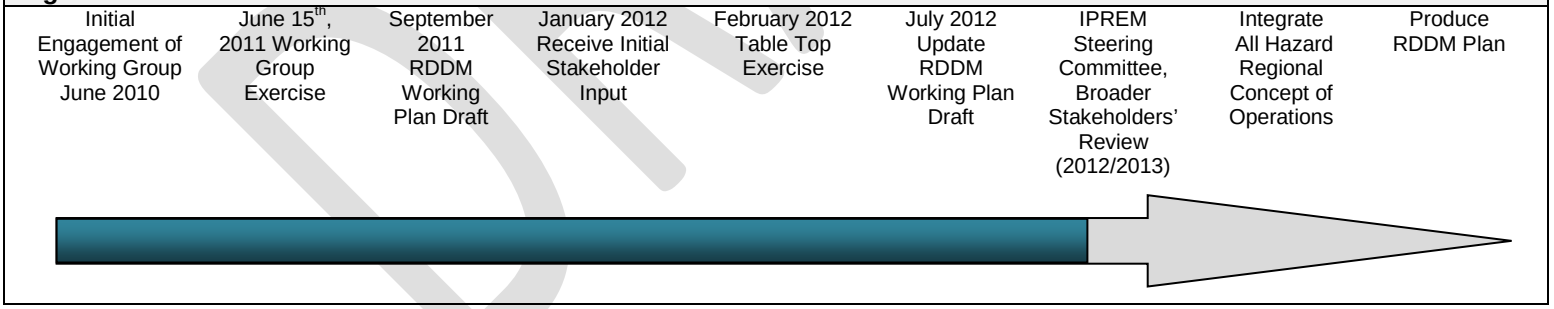
province. Metro Vancouver has requested that the Ministry of Environment layout the process for requesting such a provision following a disaster. Public Safety Canada has also indicated they will work with Fisheries and Oceans Canada, the Canadian Coast Guard and Transport Canada with respect to approval processes and restrictions associated with disaster debris disposal.

ASSUMPTIONS MADE WITHIN THIS PLAN

- All of the local authorities in the region have completed and will update their Disaster Debris Response Plans to interface with the RDDM Plan. Included in this document is the Disaster Debris Response Template (Appendix III).
- Disaster Debris is not, by definition, or practically the same as municipal solid waste. Under Metro Vancouver's approved Integrated Solid Waste and Resource Management Plan, municipal solid waste covers a broad range of materials, but requires a level of separation to enable the appropriate management of recyclables and garbage. Each separated stream must meet minimum criteria for the established process. Disaster debris assumes no source separation and could include mixtures of hazardous or special wastes, earthen materials, putrescible wastes, building debris and other garbage. Disaster debris is unlikely to meet the required quality criteria for disposal unless it undergoes sorting and pre-processing.
- The existing solid waste disposal facilities are not equipped or permitted to accept unsorted disaster debris. Further, with limited excess capacity, the solid waste system in its current form cannot deal with instantaneously large quantities of disaster debris materials, even if sorted.
- Risk assessments on anticipated types and quantity of disaster debris waste has been completed by local and authorities. This information will then be compiled as part of the regional disaster debris management plan.
- Financial implications for the management of regional disaster debris will be dealt with under a separate report.

Figure 1 depicts milestones since the establishment of the RDDM Working Group in June 2010, the Working Group's tabletop exercise of the Working Plan a year later, the drafting of this document, and recommended remaining activities to develop the final RDDM Plan.

Figure 1: RDDM -- Milestones



Executive Summary

> *Disaster debris is debris produced by catastrophic events that generate excessive amounts of mixed materials overwhelming the normal day-to-day recycling and waste management systems within the region. It can be the result of catastrophic incidents such as large fires, flooding, earthquake, landslides, volcanic ash fallout, plane crash, building collapse, human induced, or other unpredictable events.*[1]

The Integrated Partnership for Regional Emergency Management (IPREM) Steering Committee established the Regional Disaster Debris Management (RDDM) Working Group following input from Regional Administrative Advisory Committee (RAAC), Regional Engineers Advisory Committee (REAC), Regional Emergency Planning Committee (REPC), Inter-Agency Emergency Preparedness Council (IEPC) and other stakeholders based on recommendations from the 2006 Disaster Debris Management Workshop and the 2004 Municipal Disaster Debris Response template.

The Working Group was represented by local authorities, Metro Vancouver, regional health authorities, Emergency Management BC, federal government, post secondary institutions and private sector solid waste management companies.

From June 2010 to July 2012, the RDDM Working Group developed a Working Plan to facilitate a coordinated regional methodology to deal with disaster debris. It is anticipated that the Working Plan will evolve into the RDDM Plan.

A single or group of local authorities or the province can activate the Regional Disaster Debris Management Plan when either recognizes that:

- the volume of disaster debris will overwhelm their day-to-day operations; or,
- daily solid waste operations will be wholly or partially suspended for a significant period of time.

Any RDDM Plan could provide a framework to be used by local and regional authorities and the province to guide the management of excessive quantities of debris, and, if necessary, develop situation-specific regionally coordinated projects that are consistent with BCERMS goals and the following guiding principles:

1. Ensure the Health and Safety of responders and the public
2. Have regard for both local and global consequences and long-term impacts.
3. Recognize and reflect the interconnectedness and interdependence of systems and be collaborative.
4. Protect the natural environment and enhance it at every opportunity.
5. Provide for ongoing prosperity (conserve and develop economic capital).
6. Build community capacity and social cohesion (conserve and develop social capital).

This RDDM Working Plan is one component of an overall Regional Recovery Plan which will provide regional priorities to disaster debris management. A Regional Concept of Operations is under

[1] Veterinary residues are covered under mass carcass disposal plans.

development and work on a Regional Recovery Plan is recommended[2]. The RDDM Working Plan will require further modification as those tasks are completed. In the interim, the principles and framework within this RDDM Working Plan can serve as a basis for moving forward, should a regional disaster occur.

The RDDM Plan (once completed) is intended to be a living document that will need to be updated on a regular basis e.g. after training and exercises; and as local authority disaster debris response and recovery plans are developed. The RDDM Plan will focus on the recovery phase of a regional disaster. It is not an emergency response guide, but part of an overall regional plan to hasten the 'return to new normal' for the region.

The RDDM Working Plan defines roles, relationships and authority under existing legislation and is accompanied by initial recommendations for the future.

The RDDM Working Plan establishes guiding principles and debris management objectives to help ensure that the areas with the greatest need receive priority access to equipment and personnel or assistance from neighbouring local authorities, regions, the province or federal government. Depending on the scale of the disaster, if existing collection disposal systems are overwhelmed, temporary systems will be set up to manage debris sorting and storage areas will be set up to receive debris.

Immediately following a disaster, the bulk of the resources will be directed to response activities. However, while response activities continue, recovery activities are being planned and are usually initiated. To expedite recovery, creating a "new normal", ongoing pre-event planning and preparedness is needed to adapt, rather than develop, event specific disaster debris recovery projects. This requires the integration between local disaster debris response plans and the RDDM plan.

On this basis, the Working Group recommends the RDDM Working Plan consist of 1) an ongoing program to ensure regional preparedness; and 2) event specific project(s) ("project(s)") to deal with the actual regional disaster debris after an event. The proposed program and project component are described below.

PROGRAM

The *Program* involves ongoing tasks that include further RDDM Working Plan development, integration with other emergency management plans, as well as the testing and exercising of the RDDM Working Plan. Also included under the Program would be: estimating the quantity and type of debris expected based on different regional disaster scenarios; identifying recyclers, processors and disposal end-points for disaster debris within and outside the region; and an up-to-date analysis of the current solid waste management system including existing capacity and assessment of the vulnerability to failure or reduced capacity post-disaster.

Following a disaster, the priority of the *Program* would be to estimate the quantity and types of debris and determine if regional management options are required. The basis for these estimates is the

[2] Given that the scope of decisions to be made by the governing bodies will likely be broader than disaster debris alone, the RDDM Working Group provides the following working plan for further consideration by the Regional Concept of Operations Working Group and the IPREM Steering Committee. The subsequent determinations with respect to governance can then be included in the approved RDDM Plan. In the interim stakeholders are asked for their recommendations regarding the above and to focus on the other recommendations listed in the Working Plan.

information provided by the local authorities to the South West Provincial Regional Emergency Operations Center (PREOC). [3]

The capacity and expertise to undertake the *Program* tasks does not currently exist. There are options available to provide this resource, e.g. staff, secondment, contractor etc.; however, for the purpose of this RDDM Working Plan the individual charged with this responsibility shall be called: RDDM Program Coordinator.

PROJECT COMPONENT

The project component covers activities to deal specifically with actual clean-up and disposal of debris after an event.

After a significant disaster, local recyclers and processors in affected areas could be inaccessible, overwhelmed and/or held non-operational for a period of time, necessitating the storage of excess debris or sourcing of processors outside the region. Local Authorities may be expected to secure resources, manage debris transportation and set up and operate temporary debris staging, sorting, and storage facilities within their boundaries. The RDDM project could then focus on efficient transportation, recycling and disposal of disaster debris from these temporary storage sites. Upon completion of RDDM projects, there will need to be reporting out process.

The Working Group recommends the establishment of a Regional Disaster Debris Management *Project Manager*, be it staff, secondment, contractor, etc. The RDDM Project Manager will facilitate the region's recovery more quickly and efficiently than if local authorities were to act independently. The RDDM Project Manager will work within the existing British Columbia Emergency Response Management System (BCERMS) to support both public and private work crews, focusing on the priorities identified by local, regional and provincial authorities in response to the specific event(s) which have occurred.

Recommendations

The Regional Disaster Debris Management Working Plan can be used by local and regional authorities, and the province to guide the storage, sorting, recycling and disposal of disaster debris when it overwhelms existing systems in the region.

The RDDM Working Group recommends that:

OVERALL

1. This RDDM Working Plan should be further developed following advice and recommendations from stakeholders. After the Regional Concept of Operations is approved, then the RDDM Plan can be finalized.
2. In its current form, the RDDM Working Plan can provide the framework to manage regional disaster debris and should be referred to EMBC and Local Authorities for consideration of its immediate use including the proposed Interim Advice and Decision Framework. (Appendix X)

[3] Some municipalities may have activated their own plans to setup debris storage, sorting, and staging areas within their communities while others may not. Regional plans need to consider this reality together with the disparity of capability and processes within different agencies, authorities and governments to fully support local authorities. This could include regional recovery projects facilitating the movement of processed debris, e.g. from municipal storage areas to the designated reuse, recycling, and/or disposal site(s).

GOVERNANCE AND FRAMEWORK

The following governance structure and framework be established to define roles and responsibilities over activities before, during, and after disaster events.

3. IPREM continues to be responsible for planning activities, including further development and refinement of the RDDM Working Plan until the RDDM Plan is adopted.
4. IPREM Steering Committee identifies a Plan Owner following input from stakeholders.

   This could include:

   - A local authority
   - Metro Vancouver Regional District
   - Emergency Management British Columbia (EMBC) or another provincial authority.

5. As BCERMS is the accepted system under which all provincial government agencies will work and the one recommended for local authorities, the proposed Disaster Debris Management Objectives shown in Table 1 be adopted by Local and Regional Authorities.
6. The following guiding principles be adopted as part of the RDDM framework:

   - Ensure the Health and Safety of responders and public.
   - Have regard for both local and global consequences, and long-term impacts.
   - Recognize and reflect the interconnectedness and interdependence of systems and be collaborative.
   - Protect the natural environment and enhance it at every opportunity.
   - Provide for ongoing prosperity (conserve and develop economic capital).
   - Build community capacity and social cohesion (conserve and develop social capital).

7. Activation of the RDDM Plan may be by a:

   - single local authority;
   - group of local authorities; and/or
   - provincial authority.

8. The RDDM Program be established that involves:

   a) Scenario analysis, identification of resources, integration with other plans, and updating the RDDM Plan.
   b) During an event, working with the Advanced Planning Unit at the Southwest PREOC to develop event-specific RDDM project(s).
   c) Appointing a RDDM Program Coordinator to carry out a) and b) above. (Options to provide this resource need to be further explored, e.g. staff, secondment, contractor.)
   d) A process for the approval of an event-specific RDDM project plan and the subsequent appointment of a RDDM Project Manager. (It is envisioned that the RDDM Project Manager will be resourced via secondment, contractor, etc.)

9. A tabletop exercise(s) be conducted in 2013 to evaluate whether the existing legislation and authorities are sufficient to carry out the RDDM Plan and the broader Regional Concept of Operations. Following the exercise(s), IPREM will work with local authorities and the province to recommend specific legislative/policy changes (if needed) to enable the above and remedy identified gaps in the short and longer term up to and including consideration of the delegation of authority and/or the desired governance structure that may be required. (The forgoing would also include ongoing and event specific funding.)

RDDM PLAN

The final RDDM Plan should set out RDDM objectives, roles of the RDDM Program Coordinator and RDDM Project Manager, responsibilities of both government and stakeholders, and will outline the regional disaster debris portion within the context of a proposed regional recovery plan, which itself is part of the broader Regional Concept of Operations (currently under development). The recommendation is for the RDDM Plan to include pre-event and post-event activities as determined below.

That as part of Pre-Event: Preparedness

10. Develop support tools and complete disaster scenario spatial analysis of risks and vulnerabilities based on probable scenarios from a variety of disasters (e.g. earthquake, mass flooding, wildfires:
    a) Estimate debris types and quantities;
    b) Assess region's *physical* readiness to handle and dispose of large amounts of debris.

11. Support the development of multi jurisdictional guidelines for debris management including:
    a) Temporary storage sites;
    b) Sorting – priorities and circumstances;
    c) Permanent disposal.

12. Assess, with stakeholders, the region's organizational readiness to manage disaster debris to better define roles and responsibilities:
    a) Affirm who does what when, including the transition between response and recovery involving multiple jurisdictions in multiple phases;
    b) Identify gaps in responsibilities and recommend mitigation measures;
    c) Identify opportunities to reduce debris quantity;
    d) Identify alternatives and requirements for temporary and permanent disposal operations;
    e) Refine RDDM Plan for more efficient and effective operations;
    f) Refine RDDM Plan for reduction in the time to achieve "new normal";
    g) Assess integration with other local, regional, provincial, utility and stakeholders' emergency plans;
    h) Examine existing and proposed education, training and exercise programs

13. Develop inventories of required vs. available resources (e.g. land, equipment, skilled workforce) to process disaster debris:
    a) Local/regional;
    b) Private sector and non-government within/outside the region;
    c) Provincial;
    d) Federal.

14. Identify funding programs

15. Address gaps in resources and programs, conduct education, training and exercises as required.

16. Coordinate the development and integration of RDDM with local disaster debris response and recovery plans.

17. Within the broader Regional Concept of Operations, including regional recovery, local authorities and the province develop agreements on priorities, authorities and mechanisms for use and reallocation of resources. The following sequence could be used before consideration of reallocation of resources from one jurisdiction to another is required:
    a) within the local authority;
    b) mutual aid agreements between local authorities and others;
    c) use of private sector;
    d) provincial agreements.

That as part of Post-Event: Analysis and Execution

18. The RDDM Plan outlines activities and responsibilities post-event. Some of the key efforts include:
    a) Activation of recovery operations under the RDDM Plan by local, regional and provincial authorities;

    Once PREOC is activated for an event within Metro Vancouver that has (or the potential to have) disaster debris, the RDDM Program Coordinator will work at PREOC to:

    b) Conduct information gathering and impact assessment, estimation of disaster debris quantity and suitable temporary or permanent sorting, disposal, and recycling facilities;
    c) Participate in the setting up of a regional operational center for RDDM and other recovery functions and tasks.
    d) Collaborate through the PREOC during the early post-event phase;
    e) Develop post-event regional disaster debris recovery project(s), considering priority needs, scale of debris, available resources, impact on other disaster plans;
    f) Seek approval[4] of the post-event project(s) and recommend appointment of the RDDM Project Manager;

    Once appointed, the RDDM Project Manager will work to:

    g) Execute the approved recovery project(s);
    h) Provide situation updates to the PREOC (then on deactivation to EMBC), Appointing Authority and Plan Owner
    i) Recommend deactivation of the recovery operations of the RDDM Plan
    j) Provide a final report, including financial revenues and expenditures

    The RDDM Program Coordinator will:

    k) Using best practices, ensure a post-event review of the RDDM activation and recommend refinements to the RDDM Plan.

OTHER RECOMMENDATIONS

19. The RDDM Program Coordinator will develop a comprehensive communications plan within the broader context of a Regional Concept of Operations.

[4] Approving body yet to be determined.

20. The Draft RDDM Working Plan be received, considered by the IPREM Steering Committee and then referred to stakeholder agencies for their review and comment.

1 Background

1.1 RESILIENCY

The concept of resiliency is central to the IPREM vision and it has a number of dimensions including: technical, social, organizational, and economic. To provide context for disaster debris management, resiliency is defined as: the time required after a disaster event to resume core services and return to a *new normal*. A shorter recovery time after a given event indicates a greater degree of resiliency, allowing the community to get back to its routines fairly quickly. The idea of a new normal is inevitable after a situation-altering disaster as "business as usual" will not be the same before and after the event.

1.2 PRINCIPLES

The time required for recovery will be a function of not only the magnitude of the disaster, but also the degree of preparation and mitigation to reduce loss of life and property. The RDDM Working Group explored several aspects related to developing an RDDM Plan that involved: determining a means to quantify disaster debris, identifying the need to review existing and needed resources, examining case studies from around the world; drafting roles and responsibilities; and, considering authority, governance and integration of the RDDM Plan with existing plans and organizational structures.

As one of its first tasks, the RDDM Working Group established Guiding Principles for the RDDM Plan. The Guiding Principles are:

1. Ensure the Health and Safety of responders and public.
2. Have regard for both local and global consequences, and long-term impacts.
3. Recognize and reflect the interconnectedness and interdependence of systems and be collaborative.
4. Protect the natural environment and enhance it at every opportunity.
5. Provide for ongoing prosperity (conserve and develop economic capital).
6. Build community capacity and social cohesion (conserve and develop social capital).

1.3 METHODOLOGY

The Working Plan is the product of supporting research, meeting discussions a RDDM focused Table Top Exercise carried out on June 15, 2011 and an overall Regional Tabletop Exercise held on February 16, 2012. Working Group members and their stakeholder groups have had regular opportunities to provide input to the Working Plan as it has unfolded

The work was broken down into the following:

- **Understanding of Hazards and Nature of Disaster Debris**. The initial meetings of the Working Group in 2010 focused on developing an understanding of potential disasters and resulting debris in the Metro Vancouver area. An all-hazards approach was used to scope-out the nature of incidents which can include earthquakes, floods, landslides, wildfires, volcanic eruptions, and terrorism.
    - For example the initial modelling scenario (initial damage) of a magnitude 7.3 Georgia Straight Earthquake provides a ballpark estimate that one quarter of buildings across the region would be moderately or severely damaged.
    - Natural Resources Canada (Geoscience Centre Pacific) provided the Working Group information on the risks of three types of earthquakes: i) mega thrust, ii) deep, iii) crustal.

As well, Natural Resources Canada's disaster modelling initiative (named HAZUS) holds the promise of predicting the quantity and nature of debris[5] that could be generated by various disaster scenarios.

- **Case Studies.** There was no shortage of world disasters to use as case studies and the Working Group examined several: Hurricane Katrina, World Trade Centre attack of 9/11 in Manhattan, tsunami in the Maldives, Samoa, flooding in Yemen, earthquakes in Peru, Haiti, Chile, New Zealand, Italy, Japan, California, Washington, Alaska, and within BC. In some instances, the Working Group received first-hand account from those who visited or assisted with response and/or recovery operations. In addition, literature research on post-disaster clean up and recovery for these events was conducted, but turned in only a limited number of disaster debris plans. Conference calls to representatives in Oregon Metro[6] and New Zealand supplemented the Working Group's understanding of how other jurisdictions had dealt, are dealing and/or /proposed to deal with disaster debris.
- **Development of RDDM Working Plan including Roles and Responsibilities**. The Working Group comprised representatives from a number of sectors including: municipal engineers, municipal/regional emergency planners, non-government association, post secondary emergency planners, regional government, provincial government, federal government, and public health authority. Working Group members provided their perspectives in developing the Working Plan, including their ideas on roles and responsibilities for managing disaster debris which was included in tabulated matrix. The Roles and Responsibility matrix was developed by Working Group members with input from their respective stakeholder agency. A working draft of the matrix is included in Appendix VI: Representative Outline for a Roles and Responsibilities Matrix.
- **Preliminary RDDM Working Plan Exercise**. After having developed a RDDM framework, the Working Group held a tabletop exercise on June 15, 2011 using a mega thrust subduction zone earthquake as the test scenario. The purpose of the exercise was to identify key aspects of the various roles that needed adjustment, deletion or was omitted in the original working plan, as well as to bring greater clarity on immediate response priorities vs. longer term decisions. This led to readjustment of timelines for the initiation of some RDDM activities after an event, in addition to expectations of various authorities.

[5] Natural Resources Canada is continuing to develop estimates on debris quantities for various scenarios. The list of types of debris due to disasters is provided in Appendix V: Debris Types.

[6] Oregon Metro is the regional government that serves more than 1.5 million residents in Clackamas, Multnomah and Washington counties, and the 25 cities in the Portland, Oregon metropolitan area. Oregon Metro Council comprises a president and six councillors who are directly elected by the membership constituency.

2 Current Situation: Existing Structure, Issues and Gaps

2.1 LEGISLATIVE AUTHORITY

The Emergency Program Act RSBC 1996 assigns the Minister responsible a number of powers and duties including the ability to declare a Provincial State of Emergency in any area of the province. Through the emergency powers of the Act, the Minister may employ the assistance of any qualified personnel, use private property, and initiate evacuations in any jurisdiction. Also, the Minister could empower any employee of Emergency Management BC (EMBC) to have access to the powers enabled during a Provincial State of Emergency to coordinate resources province-wide and fix prices e.g. rates charged by contractors. The same Act also empowers local authorities to declare a State of Local Emergency, which provides the local authority access to the same emergency powers available to the Minister responsible during the declaration of emergency. More specific powers and duties of local governments during emergency declarations may be further defined by each authority's respective bylaws.

Established under the Act is the Emergency Program Management Regulation 477/94 that outlines the provincial ministry mandates and the obligations to have emergency plans and procedures developed and in-place. The Regulation details the responsibilities and duties of provincial ministers and crown corporations, and defines the terms of the Inter-agency Emergency Preparedness Council (IEPC). While the IEPC does not have an operational role, it must recommend emergency preparedness, response and recovery measures to representative provincial ministers, ensuring emergency plans and procedures are coordinated with those of other ministries.

The BC Environmental Management Act SBC 2003 is applicable to disasters and resulting debris as it relates to oil spills, industrial accidents, or environmental emergencies. This Act identifies requirements for disposal of oil and hazardous materials, spill prevention and reporting, as well as pollution abatement. The powers of the Minister of the Environment and the Regional Environmental Protection Manager are also defined in this Act. For example, the Minister of Environment has the authority to declare an environmental emergency that extends the Minister's power.

There are also authorities (e.g. under the Public Health Act) that focus on the management of hazards to human health which will be researched further as the RDDM Plan is developed.

BC's Emergency Program Act and Environmental Management Act delegate authority to respective provincial ministries as well as local and regional authorities. A single overall authority on emergency management or disaster debris management specifically over the collective Metro Vancouver region does not exist within one entity. In the absence of a specific regional authority on emergencies, the default authority falls to the Provincial Government.

Examination of recent global disasters revealed that the government agency most centrally affected by the event is generally responsible for dealing with disaster debris. In the case of a mega thrust earthquake in the region, it is likely to affect numerous local authorities without an apparent centrally affected agency. This highlights the need for collaboration and pooling of resources within the region.

On this basis, the RDDM Working Group recommends the development of a Regional Concept of Operations and putting in place the necessary legislation, structures and funding to support it and the Regional Disaster Debris Management Plan.

2.2 Focus on Preparedness and Recovery

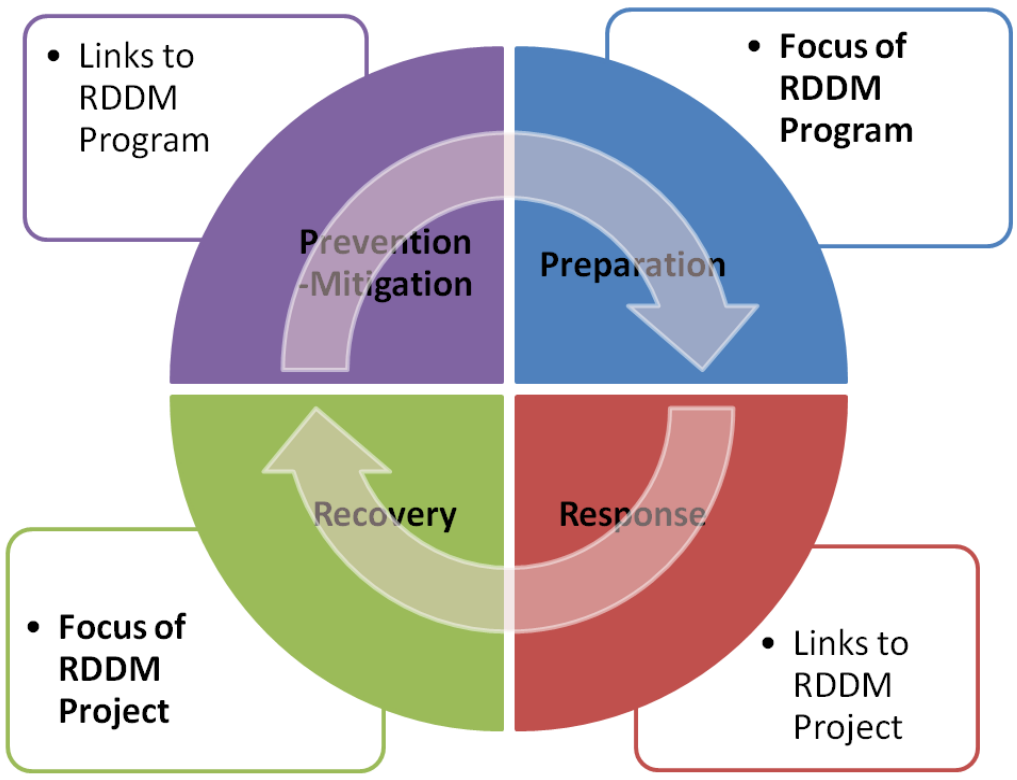
Emergency Management BC (EMBC) under the Ministry of Justice identifies the four major areas or pillars of emergency management (see Figure 2) as:

i) Prevention and mitigation
ii) Preparation
iii) Response
iv) Recovery.

A good part of the focus for EMBC is response actions that are guided by priorities set through objectives of the British Columbia Emergency Response Management System (BCERMS). Recovery actions that are generally post response have received much less attention in BCERMS and a world scan of emergency plans indicates there is much less attention paid to recovery actions such as those related to addressing disaster debris. This situation is changing as events such as Hurricane Katrina, 9/11, and earthquakes in Haiti, New Zealand and Japan have heightened awareness of the longer-term nature of recovery and community restoration after a catastrophic event. The realization is that response activities must be executed and expedited within hours or days, but recovery activities are often measured in years. In the longer timeframe afforded in the recovery phase, communities have the time to consider new land use opportunities and build back better.

International events have also highlighted that the more prepared a region is for recovery from a disaster, the faster authorities can activate their plans to help reduce public suffering, inconvenience, speed up business resumption, identify and return to the new normal and be more fiscally responsible in the process.

Figure 2: The "Four Pillars" of Emergency Management

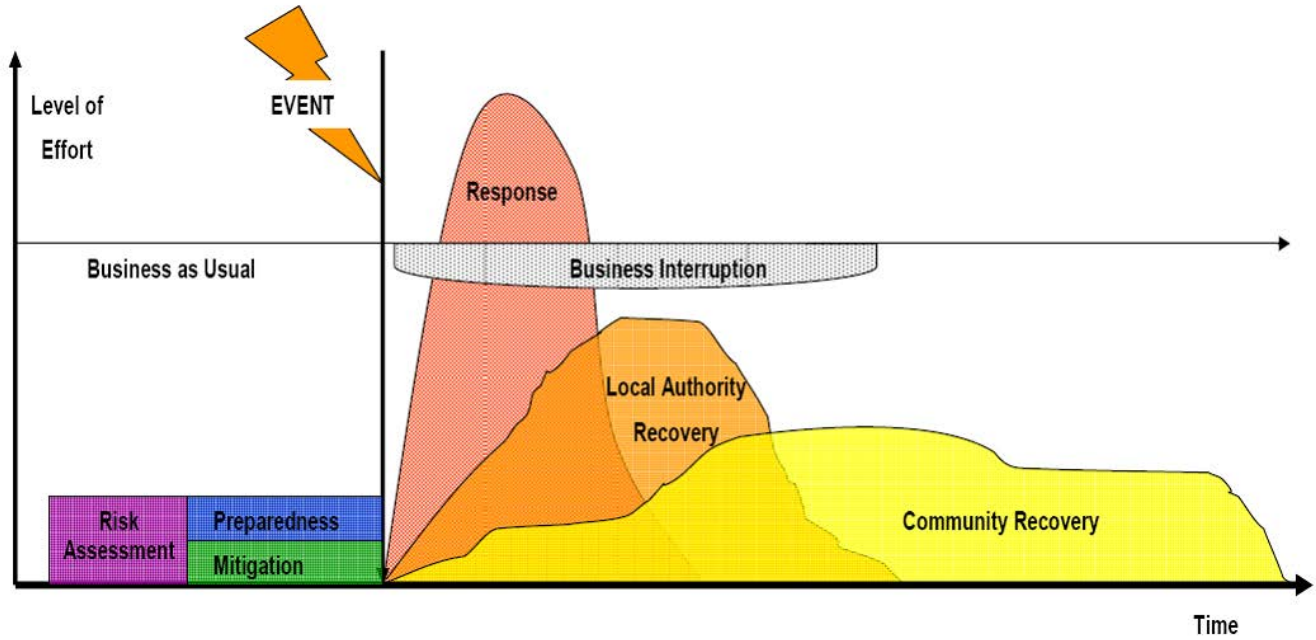


It was with the understanding of the need to focus on preparation and recovery, that the RDDM Working Plan was formulated to include a Program component to address in particular the preparedness pillar, and a Project component to address specifically the recovery pillar of emergency management. The RDDM Working Group also recognized that both preparedness and recovery phases are normally of a longer duration than the response phase. This led to the following approach in achieving the new normal:

1. Ensure the health and safety of the public and all parties involved.
2. Respect and align RDDM principles, objectives and strategies with those established within the BC Emergency Response System (BCERMS).
3. Use of a centralised incident command system (ICS) position or function to facilitate coordination, cooperation and collaboration on debris management throughout the region.
4. Follow the 5R hierarchy of solid waste management: Reduce, Reuse, Recycle, Recover, [manage] Residuals with resumption of normal municipal solid waste collection occurring as quickly as practical while following principals of sustainability as much as possible.
5. Use local and regional resources for collection, recycling, and disposal before seeking outside assistance.
6. Be fiscally responsible: minimize the overall economic impact of debris processing and ensure an accurate and organized debris and expense tracking system.
7. Align all goals and strategies with other relevant emergency plans including business continuity plan.

Figure 3 further illustrates the temporal aspects of prevention/mitigation, preparedness, response and recovery phases. Response activities occur immediately following an event, the recovery phase(s) begin soon thereafter but will normally continue for a much longer period. Its duration (weeks, months or years) will be dependent on the event magnitude and extent of the damage experienced.

Figure 3: Chronology of a Disaster



3 RDDM Plan Development Process and Context

3.1 RDDM Plan Owner and Program Coordinator

A Plan Owner needs to be identified to provide care of the Plan and run the RDDM Program, including appointing a Program Coordinator responsible for updating and maintaining the Plan, organizing exercises on a regular basis, and providing initial reconnaissance and project development after an event.

The following organizations are Plan ownership candidates for consideration by the IPREM Steering Committee:

- A local authority
- Metro Vancouver Regional District
- Emergency Management British Columbia (EMBC) or another provincial authority.

3.2 Approval Process

A key aspect of any action plan is the need to have a clear decision-making process defined. Within the context of RDDM this would include an overall Regional Concept of Operations. Without this guidance for both a governance and reporting structure, the Working Group identified the following requirements and options for decisions pertaining to regional disaster debris management should be considered:

1. **Approval of RDDM Plan** – Joint approval at least by, local, regional and provincial authorities, and may expand during the consultation process.
2. **Identification of the RDDM Plan Owner and Approval of the RDDM Program and Funding** - stakeholder identified options included: i) Metro Vancouver Board, ii) Minister of Justice, or iii) jointly between Metro Vancouver and Ministry of Justice.
3. **Appointment of the RDDM Program Coordinator** - person responsible to be appointed by Plan Owner.
4. **Approval of Regional Disaster Debris Management Project(s)** - large-scale disasters could affect the entire Metro Vancouver membership and surrounding regional districts, while small disasters could involve just a few.[7] The approving authority will need to determine the overall scope including the extent of debris removal, disposal and clean up, apportionment of recovery costs and revenues, and voting structure required to administer the project. Approval options identified include: i) the Province, ii) only the affected local governments (sub-region) and Province, iii) Metro Vancouver and Province. In the short term (at least) given current legislation and the resulting responsibilities for local authorities approval from the affected local governments (sub-region) and the Province is the likely option.
5. **Appointment of the RDDM Project Manager** - the Project Manager will be responsible for executing regional clean-up and debris management tasks/project(s) under the RDDM Plan. In the short term, without the benefit of legal advice and a further Table Top Exercise (focussed on legislation and authorities) the Working Group concluded this would need to be a Provincial

[7] Under the Emergency Program Act and the Compensation and Disaster Financial Assistance Regulation, local authorities can receive financial assistance for some post-disaster recovery costs associated with the repair or restoration of essential public works and facilities. The Province may contribute up to 80% of eligible costs. Eligibility for this will need to be pre-determined e.g. is the Project seen merely as an extension of the Local Authorities activities, in which case this may already be covered under existing Act/Regulations.

Appointment for funding and liability purposes – with the individual acting on behalf of the local authorities. In the longer term the decision on appointment and supervision is envisaged to be an outcome of the Regional Concept of Operations discussions. Their options include, but are not limited to Emergency Management BC (EMBC) southwest Senior Regional Manager, Regional Administrative Advisory Committee (RAAC), Regional Engineers Advisory Committee (REAC), Metro Vancouver Board, the Sub-Region members identified in 4 above, or Metro Vancouver CAO, RDDM Program Coordinator etc.

3.3 A PLAN AMONG PLANS

Throughout the planning process, the Working Group has been conscious of how the RDDM Plan fits in and within existing emergency management and other plans that will be active post-disaster. The Plan will interact within/alongside the existing provincial emergency management structure.

Other plans that will be in effect post-disaster include:

- Individual local authority emergency, recovery and/or business continuity plans
- Emergency, recovery and/or business continuity plans of various provincial ministries
- Stakeholder emergency, recovery and/or business continuity plans.

There may be additional emergency or recovery plans from numerous agency categories that have not yet been addressed that should be considered.

Emergency Management BC under the Ministry of Justice defines emergency action priorities through the BCERMS Goals. BCERMS focus is on response phase activities. Both the local and regional Disaster Debris Management Objectives must be consistent and complementary to BCERMS. The following table contains the proposed Disaster Debris Management Objectives alongside the BCERMS Response Goals:

Table 1: BCERMS Response Goals and Proposed Disaster Debris Management Objectives

BCERMS Response Goals	Proposed Disaster Debris Management Objectives
1. Provide for Safety & Health of all Responders	• Clarify roles and responsibilities of agencies and individuals through development of plans, education and conducting training and exercises • Clearing and Stabilization of debris for safe access and egress into, out of and through impacted areas
2. Save Lives	
3. Reduce Suffering	• Where infrastructure is damaged, and removal of same when necessary to support, those trying to: - provide temporary potable water supply, sanitation, basic utilities to those areas impacted by service disruption - establish initial temporary supply chains for food, rations, other basic needs
4. Protect Public Health	• Contain/remove hazards from high traffic and public areas • Provide information about exposure and precautions.
5. Protect Government Infrastructure	• Mitigate against further infrastructure damage • Undertake infrastructure assessments • Implement steps to enable re-establishment of critical infrastructure service
6. Protect Property	• Stabilization or removal of debris
7. Protect the Environment	• Contain/remove/mitigate acute environmental risks • Find local solutions to solid waste management processes • Determine reuse and recycling options over disposal when

BCERMS Response Goals	Proposed Disaster Debris Management Objectives
	possible • Respect permitting and regulatory requirements at all levels of government
8. Reduce Economic & Social Losses	*Basic services* • Support those restoring permanent potable water supply, sanitation, and basic utilities • Support those re-establishing long term supply chains for food, rations, other basic needs *Clean up* • Removal of fallen debris • Calculation of potential commodity value of debris • Demolition or deconstruction of unsafe or condemned infrastructure • Processing/disposal of materials • Respect permitting and regulatory requirements at all levels of government *Restoration and Rebuilding* • Revisions to land use plans and OCPs [8] from lessons learned • Restore and rebuild back to "new normal" • Review and modify building codes

3.4 Powers During Declared States of Emergency

The *Emergency Program Act* of British Columbia enables the Province, Local Authorities (municipal governments and regional districts, on behalf of their electoral areas) to enact special powers and actions when in a declared state of emergency. However, under current legislation, the Working Group could not identify a clear authority by which a RDDM Project Manager could enforce decisions or resolve conflicts between local authorities. Only the province has the ability to override local authorities when a provincial state of emergency has been declared. Further, states of emergency are time-limited and not sustained over the duration of recovery activities which can take months or years, depending upon the extent of impact.

Cross-jurisdictional decisions on allocation of resources during and after declared states of emergency will be required. The Working Group is aware that the Regional Concept of Operations initiative will be addressing this issue and looks forward to providing input to them on a practical solution that will support the regional priorities that have been put forward by local authorities within Metro Vancouver and this Plan. The speed and effectiveness of recovery will rely on the RDDM Project Manager having sufficient authority (directly or indirectly) to implement approved RDDM projects to benefit regional recovery.

3.5 Roles and Responsibilities

Local authorities will continue to develop their own Local Area Disaster Debris Response Plans. The RDDM Program Coordinator will work with the Local Authority representative to integrate individual plans to the regional plan. Where possible common terminology, processes and guidelines will be consistent e.g. the Safety and Security guidelines as outlined in Appendix VII: Guidelines for Debris Storage and

[8] Official Community Plans

Sorting Areas, thus facilitating the long term objective of creating a standard system of debris management that will facilitate region-wide clean up operations.

Not all jurisdictions will be equally impacted by the event, have equivalent types or volumes of disaster debris, nor have equal response and recovery resource capacity. Through Mutual Aid Agreements (MAAs) or Memorandums of Understanding (MoUs), recovery efforts and continuity of business can proceed much more swiftly than if provincial or federal aid is solely relied upon. Therefore the use of MAAs and MoUs will be a focus for the RDDM Project Coordinator in the discussions with Local Authorities.

Local authorities will continue to control and manage solid waste for their jurisdictions, including additional disaster debris, to the extent they are able during the response and recovery phases.

Consistent with Emergency Management best practices, EMBC, Aboriginal Affairs, Local Authorities and First Nations, are encouraged to coordinate and share their local emergency plans, including local DDM with neighbouring jurisdictions.

3.6 FUNDING

For cost purposes, the RDDM Plan can be divided into three stages:

i) further development of the Draft Working Plan into a full RDDM Plan,
ii) the ongoing RDDM program and
iii) post event project costs.

Depending on the Regional Concept of Operations deliberations and outcomes it is estimated that the finalization of the Working Plan into a RDDM Plan including: completing additional analysis of scenarios, populating the appendices with known information on available resources; and education/training/workshops will be required. With the continuation of IPREM involvement and Stakeholders' participation and in kind contributions, providing the RDDM scenarios can be incorporated into other table top exercises it is estimated there will be an additional cost of $10,000 which could be covered under the IPREM budget for 2012 and 2013.

The RDDM program portion of the Plan involves ongoing planning, preparation, and mitigation relating to regional disaster debris management. There will also be the need to develop broad technical specifications e.g. identifying site selection criteria for temporary/permanent storage of disaster debris. This should be part of the first and second year work plan and budget.

An annual program budget should be developed, after stakeholder input on this Draft Plan is received, to cover the costs of:

a) Pre-event activities, coordinated primarily by the RDDM Owner and Program Coordinator, which include training and exercising of the plan, plan maintenance, event preparation and mitigation,
b) Resources for the program manager to develop the RDDM projects, post-event, prior to a project coordinator being brought on.

Costs associated with post-event project(s) are dependent on the specific disaster, its nature and scope and therefore are not estimated[9]. There will be collective policy decisions required (e.g. determining the desired level of, and timing to achieve the "new normal") when approval of event specific Regional

[9] The working group believes that a coordinated approach, which the Draft Plan envisages, will not cost more than local authorities dealing individually with disaster debris impacting other jurisdictions.

Disaster Debris Management Project is considered. It is also envisaged that as part of the RDDM Plan Owner responsibilities there will be pre-event discussions leading to an agreement with EMBC as to the availability of senior government funding and the revenue/expenditure sharing with local authorities.

4. Prepare (Pre-Event)

The process of preparing for a significant disaster involves a number of local, regional, provincial and federal pre-event activities to integrate and refine plans that should be coordinated to maximize resiliency of the collective. The activities can be divided into the following categories:

- Development and review of disaster scenarios
- Estimating disaster debris quantities
- Contact list for existing and Procurable Resources
- Pre-event improvements
- Permits, approvals, and licenses
- Validation through training and exercises.

4.1 Development and Review of Disaster Scenarios

A key starting point to managing emergencies is to consider all hazards that can have consequences on a community. Analysis of disaster scenarios will help estimate the extent of damage expected as well as the corresponding quantity of debris to be managed. Key activities for the Plan Owner include:

- Identify disaster scenarios, examining all hazards and scale.

  A separate IPREM Working Group is currently completing a Regional Hazard Risk Analysis, the outcome of which would provide a focus to identifying disaster scenarios. In the absence of their work, the below list are some possible scenarios to explore:
  - Two main earthquake scenarios: a Magnitude 9.0 megathrust subduction zone earthquake off the coast, 150 km from Vancouver and a Magnitude 7.0 crustal zone earthquake under a central urban location.
  - A 200-year Fraser River Freshet.
  - A wildfire on the North Shore Mountains.

4.2 Estimating Disaster Debris Quantities – Use of HAZUS Methodology

The estimation of disaster debris quantities involves establishing a database of types and condition of buildings and infrastructure within the area of study, collecting spatial information on the impact of various disaster scenarios, then estimating failures to arrive at estimates on the nature and quantity of debris expected. To help expedite the estimation process, the US Federal Emergency Management Agency (FEMA) has been developing a GIS-based natural disaster loss estimation software program called Hazards U.S. (HAZUS). Its continuing support by FEMA has helped HAZUS become a standard means of estimating losses from natural disasters in the United States and is now being adapted for use in Canada by Natural Resources Canada (NRCan). It can be used in inter-jurisdictional planning for response and recovery from natural disasters such as floods and earthquakes.

The HAZUS methodology provides users the capacity to assess physical vulnerabilities associated with the impacts of a defined disaster scenario. It visually maps a specified region, the predicted locations and estimated amounts of damage and loss, including critical infrastructure failures, loss of life and debris quantities. This is useful for disaster preparation to develop and analyze disaster scenarios, and for evaluating disaster impacts in order to develop more detailed response and recovery plans. Within minutes following a disaster event, HAZUS offers the ability to provide initial damage and loss estimates.

HAZUS can likewise play a significant role in coordinating multiple aspects of disaster response and recovery plans through its capabilities to estimate social and economic losses, and to provide an inter-jurisdictional planning tool. In addition to debris estimates, HAZUS can identify shelter needs, estimate

injuries and fatalities, approximate the time to return to full functionality, visually map the state and distribution of damage, and provide preliminary assessments of economic losses (including building and infrastructure replacement costs). Furthermore, the system is standardized in the US and when established for the Metro Vancouver area, HAZUS could facilitate integrated modeling to better understand the capabilities and assistance that may be available from across the border.

For the Metro Vancouver area, HAZUS uses British Columbia Assessment data which has been aggregated to larger census tracts, then to individual municipalities (although capability exists for adding detailed inventory on buildings, essential facilities, utilities, transportation and critical facilities such as water and sewage treatment facilities).

NRCan funding for HAZUS is limited to its establishment in Canada and does not extend to its ongoing updating and maintenance. NRCan will be looking to pass-on the HAZUS work to a provincial or regional entity upon completion of their project.

4.3 Inventory of Existing and Procurable Resources

The available and procurable resources to deal with any given disaster scenario will need to be sized and shortfalls determined. Resources include items such as plant and equipment, skilled labour, time, and funding. Plan Owner activities include:

1. Examine solid waste and recycling system capacity and vulnerability to all hazards.
2. Maintain contact list of equipment and resources from local public and private sector operations. This could include:
    a) Equipment suppliers (e.g., backhoes, excavators, portable cranes, etc.);
    b) Material haulers (via road, water, rail, air);
    c) Skilled labour;
    d) Recycling processors;
    e) Regional and private transfer stations; and,
    f) Disposal methods and sites for all types of waste.
3. Develop template(s) for contracting services, supplies and equipment, retainers.
4. Develop process(es) for right of entry permit to private property.
5. Establish mechanisms to quickly expand post-event capacity for demolition, sorting, processing recyclables and non-recyclables including a list of temporary sorting and storage sites for disaster debris based on input from each local authority and the private sector.
6. Establish mechanism to prioritize disposal requirements and secure supporting core resources.
7. Identify final disposal options which could include:
    a) Recycling
    b) Landfills: local, distant, export to U.S.
    c) Waste to energy
    d) Other (e.g. disposal at sea)

4.4 Pre-Event Improvements

Pre-event, physical, improvements would increase infrastructure's resiliency and reduce the quantity of debris generated and its consequences. The RDDM Plan will not address debris mitigation, however, where possible, linkages to programs that operate to lessen the impact of events will be established. The following activities are examples of what should be considered by potentially impacted agencies/authorities:

1. Establish or enhance on-going building / infrastructure inspection program(s) in all jurisdictions to address all hazards (e.g. seismic, flooding, wildfires, terrorism).
2. Establish or enhance coordinated dike improvement program(s).
3. Reduce vulnerability of key utilities: power, transportation, communications, water, gas, sewage collection, including interdependencies and non-utility owned assets which could cause secondary damage.
4. Increase security / awareness of impacts from (mis-)use of hazardous materials or substances, be they caused by technological, accidental or intentional means e.g. chemical, biological, radiological, nuclear and explosive (CBRNE) materials at storage, transportation or operational facilities such as gas stations, hospitals, or industrial plants.

4.5 PERMITS, APPROVALS, LICENSES

Under a provincial or local declaration of state of emergency, permits, approvals, and licenses normally required to establish solid waste facilities or undertake certain activities may be waived. . Because the duration of declarations are likely to be short-lived to deal primarily with rescue and life-safety activities, the requirement for permits and approvals to undertake RDDM recovery activities will be reinstated once the declaration is cancelled or expired. The potential for relaxation of permit procedures and other issues will need to be addressed by the Plan Owner and considered by the agency having authority to arrive at workable solutions. Activities include:

1. Investigate the types of permits or approval processes for material handling, storage and disposal during RDDM recovery. Connect with relevant authorities and layout processes or shortcuts for approvals.
2. Review land use designations that may affect where debris can be temporarily stored. Establish the method to relax permits to enable alternate use.

Other jurisdictions may have responsibilities and authorities that need to be taken into account and could take precedence e.g. Medical Health Officers in the management of hazards to health under the Public Health Act.

4.6 VALIDATION THROUGH TRAINING AND EXERCISES

The Program will be charged with validating the RDDM Plan through exercises and establishing appropriate training and education for representative agencies and stakeholders. Activities include:

1. Regular meetings of the RDDM Program Coordinator, the Plan Owner and representatives from Local Authorities and other key stakeholders.
2. Undertake exercises to test and validate processes, mitigating gaps in responsibility coverage.
    - Develop and establish a training and exercise program
    - Conduct ongoing training and hold regular exercises
3. Involvement by all stakeholders and the general public as needed.

5 Recovery: Phase 1 – Analysis (Post-Event)

5.1 Impact Assessment

First response agencies provide incident size-ups, preliminary damage assessments and status updates to the local Emergency Operations Centres (EOCs), which, in turn, will provide updates to the Provincial Regional Emergency Operations Centre (PREOC).

The RDDM Program Coordinator will gather intelligence regarding debris locations, nature, scale, risks and the capacity and capability of the local authorities. The RDDM Program Coordinator will use the intelligence provided by the EOCs and other sources to develop a strategy for coordinating disaster debris cleanup based on current conditions.

Information that will be collected to create a disaster debris management strategy may include:

- Estimated overall volume and/or tonnage of debris and where it is located
- Percentage of region or population affected
- Mapping of most impacted areas
- Functionality of regular local and regional solid waste operations
- Functionality of waste processing and recycling facilities
- Mapping of major roadways, bridges and other infrastructure challenges affecting the mobility of trucks, crews and equipment for RDDM activities and estimates of repair initiation and completion.

5.2 RDDM Plan Activation

The RDDM Program Coordinator will engage with local authorities and the province to determine the (potential) impact(s) and whether the RDDM Plan will be activated. If so, as an add-on to existing cleanup activities or a separate, longer-term project. If required, specific regional tasks will be identified, approved including appointing a RDDM Project Manager. The Project Manager may initially work out of the PREOC then at other agencies as required after the PREOC stands down.

5.3 Collaboration

5.3.1 Interface with Other Relevant Plans

Local authorities will activate their EOCs when necessary. Some local authorities have Disaster Debris Response Plans. The Province will activate the PREOC either of its own accord or when a local EOC is activated.

Other agencies, such as the Coroner's Office and the Health Authorities, will activate their plans and protocols.

Depending on the nature of the disaster, the RDDM Program Coordinator will be in contact with various agencies to ensure that RDDM priorities are harmonious with other plans' priorities and activities.

5.3.2 Integration of Priorities and Resources Regionally

The RDDM Program Coordinator will work with various authorities to ensure that clean up priorities utilize the Objectives (see Table 1) as a guideline. Support to utilities that are vital to reducing suffering and protecting public health, such as health services, restoring power, water and sanitation, will take priority over the clearing and disposing of disaster debris.

5.4 Develop Recovery Project(s)

The RDDM Program Coordinator will develop options for and recommend regional disaster debris management recovery project(s) and provide initial guidance until such time as a RDDM Project Manager is appointed. Where practical local authorities will focus on staging and sorting debris within their jurisdictions. Each local authority will have a representative inform the RDDM Program Coordinator (through existing reporting processes to the PREOC where practical) on types, volumes and locations of debris to be collected in their community.

Based on available information with regards to types and quantities of debris, the RDDM Program Coordinator will examine re-use and disposal options which could include:

- Identify any capital works projects where large volumes of debris can be utilized (i.e. land reclamation, dike improvement).
- Determine where and how debris can be processed for alternate uses, into new material e.g. concrete can be repurposed as fill or into new building material and/or other economic opportunities.
- Develop recommendations for sorted debris recycling and re-use options.
- Develop recommendations for debris that can be handled immediately and debris that will require temporary storage before it can be assessed and/or disposed.
- Assess potential economic and social impacts of debris storage sites and develop regional priorities based on getting the community back in business and able to access public facilities.
- Apply for disposal at sea permits, as required, for authorized material types that can be safely deposited in designated ocean locations as outlined in the program.
- Estimate costs and financial accountabilities. Discuss with Disaster Financial Assistance (DFA) specialists to ensure eligible costs can/will be covered.

5.5 Seek Project Approval

The proposed RDDM recovery project(s) will require approval by the affected and funding authorities. Large-scale projects will likely involve the entire Metro Vancouver region, while other projects may affect only a select number of municipalities.

Following the approval of the RDDM project(s), an RDDM Project Manager will be appointed to direct the procurement of resources, execution of activities and ultimately their completion.

5.6 Interim Advice and Decision Framework

The Working Group concluded the completion of the RDDM Plan should allow for stakeholder input to the Draft Report, including feedback on the recommendations and approval of the Regional Concept of Operations. Only then should the RDDM Plan be finalized. Recognizing this time frame, that there is currently not a regional disaster debris management plan or methodology in place, and the reality that a regional disaster could occur at anytime, the Working Group is proposing an Interim Advice and Decision Framework. The Framework for analysis and execution within the Post-Event Recovery Phases is shown in Appendix X. While it forms part of the Draft Report and should also be commented on by stakeholders, it could be used by EMBC and Local Authorities to assist in their decision making should the need arise.

6 Recovery: Phase 2 – Execution (Post-Event)

6.1 Implement Disaster Debris Recovery Project

Disaster debris will be one of numerous priorities for authorities, public works and engineering departments during the Response and Recovery phases of emergency operations.

The RDDM Project Manager will liaise with other authorities to ensure that both public and private work crews are initially focused on activities critical to the reduction of suffering and the protection of public health, which may include debris hazards (e.g. overhead hazards, unstable structures), power, water supply and sanitation services, and the recovery of remains. Disaster debris clearing activities might occur simultaneously if resources permit.

Priorities will need to be established to ensure that the parts of the region hardest hit by the disaster get preferred access to private contractors' equipment and personnel or assistance from neighboring local authorities, the region or the province.

The RDDM Project Manager may request a suspension and/or an adjustment to regular services such as solid waste and recycling collection and disposal, port activity, road, rail or air traffic, to deal with priority debris removal. This decision would be made in consultation with the various stakeholders.

These are further examples of the need for a Regional Concept of Operations that will include a regional decision making process, supported by clear lines of authority and resource sharing models.

6.2 RECOVERY OPERATIONS CENTRE

The RDDM Project Manager, in cooperation with the local authorities affected, may need to establish a regional recovery operations centre. The recovery operations centre may work in parallel out of the PREOC or an agreed upon local authority EOC for a period during the response and recovery phases. (It is not clear whether the PREOC in a major regional disaster would stand down after completion of the response phase – the RDDM Program Coordinator will need to clarifying this with EMBC.) The recovery operations centre will continue to operate until recovery operations are deemed to be complete.

6.3 DEBRIS PROCESSING

The RDDM Project Manager will direct the set-up of debris handling facilities and the processing of debris from a regional perspective. The Project Manager will continuously monitor outcomes against the approved business plan and how actual resource allocations are impacting local authorities individual response/recovery activities vis-à-vis the overall regional priorities that were established collectively by the local authorities. Adjustments for priority access to and use of private and public resources may be required.

After a significant disaster, local recyclers and processors in affected areas could be inaccessible, overwhelmed and/or held non-operational for a period of time, which could necessitate the storage of excess debris or sourcing of processors outside the region The Project Manager could assist local and other authorities in establishing local debris storage sites and an integrated schedule for hauling crews to transport the debris to larger regional sites for longer term temporary storage, sorting, processing or permanent disposal. This activity could allow municipalities to focus on their rebuilding and returning to post event service levels sooner than what could otherwise be expected.

6.4 DEACTIVATION

The RDDM Project Manager will work with the Plan Coordinator, Local Authorities, Province, and other stakeholders to determine the appropriate time frame to deactivate disaster debris operations under the RDDM Plan. This will be assessed on an ongoing basis, potentially week-by-week. Specific criteria for deactivation will need to be defined; but, at a minimum, it is expected that local authorities will have resumed regular household solid waste collection.

The RDDM Program Coordinator will produce a report assessing the effectiveness of the Plan and the specific Project(s) with recommendations on improvements and lessons learned for consideration of the

Plan Owner. A forum for input will be provided for stakeholders. The Plan Owner will update the Plan as required.

6.5 INTERIM ADVICE AND DECISION FRAMEWORK

The Working Group concluded the completion of the RDDM Plan should allow for stakeholder input to the Draft Report, including feedback on the recommendations and approval of the Regional Concept of Operations. Only then should the RDDM Plan be finalized. Recognizing this time frame, that there is currently not a regional disaster debris management plan or methodology in place, and the reality that a regional disaster could occur at anytime, the Working Group is proposing an Interim Advice and Decision Framework. The Framework for analysis and execution within the Post-Event Recovery Phases is shown in Appendix X. While it forms part of the Draft Report and should also be commented on by stakeholders, it could be used by EMBC and Local Authorities to assist in their decision making should the need arise.

Appendices

APPENDIX I: IPREM ORGANIZATIONAL CHART

APPENDIX II: RDDM WORKING GROUP TERMS OF REFERENCE

APPENDIX III: DISASTER DEBRIS RESPONSE TEMPLATE

APPENDIX IV: BCERMS OBJECTIVES

APPENDIX V: DEBRIS TYPES

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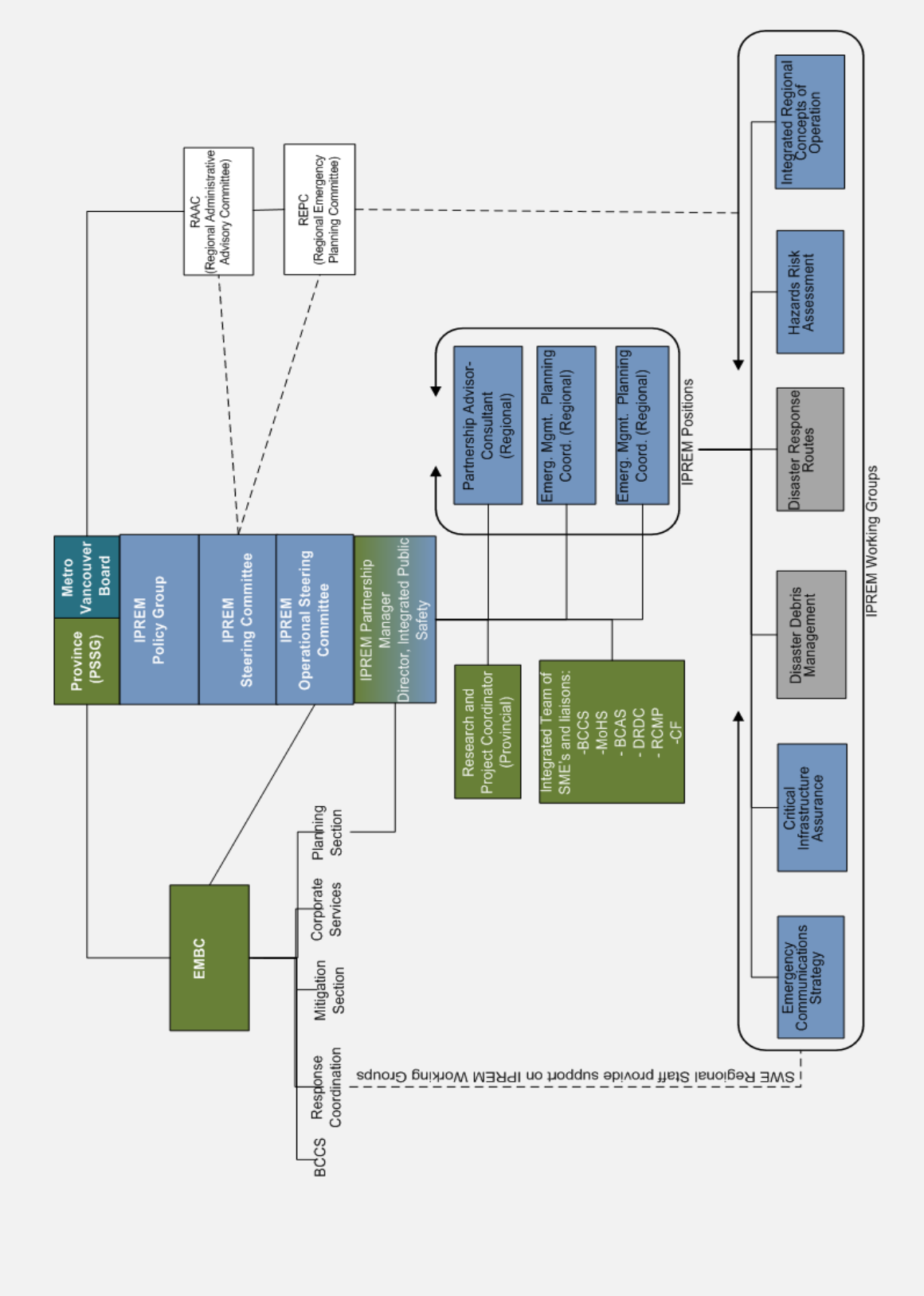
Appendix I: IPREM ORGANIZATIONAL CHART


Metro Vancouver Board
Province (PSSG)
IPREM Policy Group
IPREM Steering Committee
IPREM Operational Steering Committee
IPREM Partnership Manager Director, Integrated Public Safety
RAAC (Regional Administrative Advisory Committee)
REPC (Regional Emergency Planning Committee)
Partnership Advisor-Consultant (Regional)
Emerg. Mgmt. Planning Coord. (Regional)
Emerg. Mgmt. Planning Coord. (Regional)
IPREM Positions
Research and Project Coordinator (Provincial)
Integrated Team of SME's and liaisons:
-BCCS
-MoHS
- BCAS
- DRDC
- RCMP
-CF
EMBC
Planning Section
Corprate Services
Mitigation Section
Response Coordination
BCCS
SWE Regional Staff provide support on IPREM Working Groups
Integrated Regional Concepts of Operation
Hazards Risk Assessment
Disaster Response Routes
Disaster Debris Management
Critical Infrastructure Assurance
Emergency Communications Strategy
IPREM Working Groups

Appendix II: RDDM WORKING GROUP TERMS OF REFERENCE

[Approved by IPREM Steering Committee May 14, 2010; amended December 2010].

Purpose

- To bring forward recommendations on scope and responsibilities of partners for managing disaster debris from a regional perspective in Metro Vancouver. Draft by September, 2010
- To develop a Regional Disaster Debris Management Working Plan
  - 1st draft by March 2011
  - finalized by July 2011.

Establishment and Authority

The Integrated Partnership for Regional Emergency Management (IPREM) Steering Committee established this Working Group following input from Regional Administrative Advisory Committee (RAAC), Regional Engineers Advisory Committee (REAC), Regional Emergency Planning Committee (REPC) and Inter-Agency Emergency Preparedness Council (IEPC) and other stakeholders based on recommendations from the 2006 Disaster Debris Management Workshop[10] following development of a Disaster Debris Response Plan.

This Regional Disaster Debris Management Working Group (RDDMWG or Working Group) will be appointed by and shall make its recommendations to the IPREM Steering Committee.

Geographic Scope

The geographic area focuses on Metro Vancouver. The Working Group acknowledges that the outcome could have implications beyond these regional boundaries.

Composition of Working and Stakeholder Groups

Managing disaster debris encompasses a number of dimensions, each with issues, options, solutions, affected participants, and various lines of jurisdiction and responsibilities. To balance the need for productivity and inclusivity, the development of a regional disaster debris management plan will be done through the formation of two groupings. A Working Group comprising of eight appointees would be responsible for evolving ideas into concepts, then putting them into context so that meaningful discussion can be facilitated with a broader Stakeholder Group (Table 2). The Working Group will also have the responsibility for keeping the Stakeholder Group informed of key findings. When broad representation is required, gathering(s) of the Stakeholder Group and others will be considered.

[10] Disaster Debris Management Workshop/Exercise – Outcomes and Recommendations, Nov. 21, 2006.

Table 2: Working and Stakeholder Groups

Working Group		Stakeholder Group
Sector (seats)	Organization	Additional Organizations
Municipal Engineers (1)	Regional Engineers Advisory Committee	REAC members or designates
Municipal / Regional Emergency Planners (1)	Regional Emergency Planning Committee	Municipal and regional emergency planners or designates
Non-Government, Private Sector (1)	BC Pacific Chapter of SWANA	Select DLC contractors, barge & dredging companies
Post Secondary (1)	BC Post Secondary Emergency Planners	All members of BC Post Secondary Emergency Planners or designates at universities, colleges, technical institutes
Regional Government (1)	Metro Vancouver	Other regional districts and authorities
Provincial Government (1)	Ministry of Environment or Emergency Management BC	Emergency Management BC, Ministries of Transportation & Infrastructure and Education
Federal Government (1)	Environment Canada or Public Safety Canada	Department of Fisheries and Oceans, Department of National Defense, Aboriginal Affairs and Northern Development Canada, Transport Canada, Canadian Food Inspection Agency, Environment Canada, Public Health Agency of Canada, Health Canada, Agriculture and Agrifood Canada
Public Health (1)	Regional Health Authority (MHO or Environmental Assessment)	Coroner's Office, Vancouver Coastal Health, Fraser Health, BC Centre for Disease Control, Canadian Food Inspection Agency, Work Safe BC

The composition of the Working Group is founded on anticipated priority responsibilities in the sectors of: municipal engineers, emergency planners, private sector operators, post secondary institutions, regional, provincial, federal, governments, as well as public health. The designated organization for each sector will provide the name of one representative as well as one alternate representative to hold a seat on the Regional Disaster Debris Management Working Group.

Organization and Structure

The Working Group shall have a:

- Chair
- Vice Chair

The Chair and Vice Chair will be supported by:

- IPREM Partnership Manager

- IPREM Steering Committee Liaison Member
- Secretary, Metro Vancouver.

The term of the above appointments is intended to be until completion of the Working Group's purpose as determined by the IPREM Steering Committee.

The Chair may appoint sub-groups to perform specific tasks any of which shall include at least one member from the Working Group.

The Working Group will meet at the call of the Chair (or for the purposes of this section the Vice Chair or a member designated by them) which is expected to be quarterly until completion of the Regional Disaster Debris Management Plan for Metro Vancouver. The Secretary will issue meeting agendas to Working Group members for regularly scheduled meetings one week in advance of the meeting date. The Chair will call the meeting to order and advance discussion on the agenda items. The Secretary will record key actions and decisions made at meetings. These Action Notes will be distributed in draft to the Working Group within 1 week of the meeting and approved at the next meeting, after which they will be forwarded to the IPREM Steering Committee.

Tasks and Objectives

The overall approach to developing from a regional perspective, a recommended Regional Disaster Debris Management Plan for Metro Vancouver is to: quantify the disaster debris potential, review existing system capacity, undertake case studies, set criteria for management options, identify gaps and resources required, determine roles, authorities, responsibilities, timeframe for implementation, and draft a communications plan. Key tasks include:

1. Examine the scope of potential disasters based on an all hazards approach (e.g. earthquake, flooding, wildfire, volcanic eruption, terrorism) and estimate potential debris quantities.
2. Review inventory of previously identified infrastructure for the storage, processing, recycling and disposal of disaster debris. Examine the capacity of the system located largely within the Metro Vancouver area. Also review the infrastructure system's vulnerability to damage from the disaster itself.
3. Undertake case studies and explore innovative disaster debris management methods. This may include examination of best practices, best handling of materials, new equipment and execution of operations. Define the criteria for selecting management options to deal with excess debris and where possible, pre-select primary, secondary, and temporary debris management sites and methods of disposal.
4. Identify through consultation, applicable roles and responsibilities amongst local, regional, provincial, federal agencies, as well as private sector organizations. Achieve agreement in principle to jointly develop a disaster debris management plan for the Metro Vancouver region, identifying authorities, roles, relationships, responsibilities and accountability.
5. Develop a Regional Disaster Debris Management Plan for Metro Vancouver, supported by a disaster debris communications plan for both the stakeholders and the general public.
6. Submit the Regional Disaster Debris Management Plan, accompanying communications plan, as well as any recommendations, including changes in authority for review by the IPREM Steering Committee.

Budget

The Regional Disaster Debris Management Working Group is expected to operate largely through in-kind resources provided by its members. Funding for consulting / contracting work will require approvals through the IPREM Steering Committee.

Contributors to the Working Plan

Sector	Organization
Municipal Engineers	Jozsef Dioszeghy, (formerly with) District of North Vancouver – 1st Chair Gary Vlieg, City of Langley – 2nd Chair
Municipal / Regional Emergency Planners	Charmaigne Pflugrath, City of Burnaby Michel Latendresse, City of Delta
Non-Government, Private Sector	Thomas Land, Ecowaste Industries Allen Lynch, Northshore Recycling Society
Post Secondary	Glen Magel, BCIT Apollonia Cifarelli, SFU
Regional Government	Greg Smith, Metro Vancouver Ken Carrusca, (formerly with) Metro Vancouver
Provincial Government	Ian Cunnings, EMBC Jonn Braman, Ministry of Environment
Federal Government	Cindy Jeromin, Public Safety Canada Sean Standing, Environment Canada
Public Health	Brian Johnstone, Vancouver Coastal Health Jody Sydor Jones, Vancouver Coastal Health Kirsten Jasper, Vancouver Coastal Health
Additional Support	Doug Allan, IPREM Andrew Morrison, IPREM Paul Kadota, Metro Vancouver Laura Princic, Metro Vancouver Rob Nicholls, Metro Vancouver Rob Tulett, Metro Vancouver Nela Graham, Metro Vancouver John Lavery, Steering Committee Liaison

Appendix III: DISASTER DEBRIS RESPONSE TEMPLATE

[see separate pdf file]

Appendix IV: BCERMS RESPONSE GOALS

1) Provide for Safety & Health of all Responders
2) Save Lives
3) Reduce Suffering
4) Protect Public Health
5) Protect Government Infrastructure
6) Protect Property
7) Protect the Environment
8) Reduce Economic & Social Losses

Source: http://pep.bc.ca/bcerms/bcerms.html

Appendix V: DEBRIS TYPES

The following list outlines the types of debris that are expected to be found following a disaster in an urban setting:

- Municipal solid waste: general household trash (non-recyclables).
- Municipal solid waste: general household recyclables.
- Perishable municipal solid waste: organic waste from fridges and freezers due to power outages.
- Construction and demolition debris, both buildings and infrastructure: building materials (which may include asbestos-containing materials), concrete, rebar, glass, drywall, lumber, roofing, carpet, and plumbing fixtures.
- Other large household and commercial debris: furniture, mattresses, couches, tables, and desks.
- Vegetative debris: trees, branches, shrubs, and logs.
- Non-vegetative debris: mud, rocks, boulders, and standing water.
- Household hazardous waste: oil, pesticides, paints, and cleaning agents.
- White goods: refrigerators, freezers, washers, dryers, stoves, water heaters, dishwashers, and air conditioners.
- Electronic waste: computers, televisions, printers, stereo equipment, and telephones.
- Sanitary waste: human and animal feces, animal remains.
    - Animal remains are covered under mass carcass disposal plans.
- Other large debris: vehicles, boats, machinery, etc.
- Sensitive waste: weapons, ammunition, explosive materials and devices, etc.

Appendix VI: REPRESENTATIVE OUTLINE FOR A ROLES AND RESPONSIBILITIES MATRIX

		Location / Transit of Debris						
		Private Property	**Public Property**	**Collection and Transportation**	**Temporary Sorting Site**	**Transfer Station**	**Disposal Site (Licensed)**	**Disposal Site (Approved)**
Entity	Property Owner	Property owner is primarily responsible for securing debris site when access is available. Property owner is to liaise with its insurer and local authority.	Disaster debris originating from private property is to be removed at the expense of the property owner. Coordination with Local Authority is imperative. Disaster debris originating from public property is to be removed by the property owner (Local/Provincial/Federal Authority or Agent) at its cost.	Property Owner is responsible for collecting and transporting DD from debris site to Temporary Sorting Site or Transfer Station.				
	Local Authority	If no health issue, removal order - nuisance, building safety order to demolish; may be uninsured and/or unable to locate owner	If damage caused by non-local authority owned property, seek compensation from causing party. Otherwise local authority to cover disaster debris removal costs from local public infrastructure.	Local Authority to advise (free) and/or assist (for cost recovery fee) Private Property Owner to collect and transport DD from disaster site to Temporary Sorting Site or Transfer station.	Local authority to provide and manage temporary sorting site location(s) for private, municipal and regional disaster debris material when deemed necessary. Transfer to: by property owner (or by Local Authority at cost to property owner) Transfer from: by Local Authority to Transfer Station or by Regional Authority direct to Disposal Site			
	Regional Authority (TransLink to be added as a further example)	Health & Safety: hazardous materials protection (i.e. City of Vancouver has own)	If damage caused by non-regional authority owned property, seek compensation from causing party. Otherwise regional authority to cover disaster debris removal costs from regional public infrastructure.	Regional authority to provide support to local authority.	Transfer disaster debris from regional property to temporary sorting site managed by local authority.	Managed by: Regional Authority Transfer to: by property owner if direct from disaster location; by Local Authority from Temporary Sorting Site if needed Transfer from: by Regional Authority to disposal Site	Managed by: Regional Authority Transfer to: by Regional Authority from Temporary Sorting Site or from Transfer Station	Managed by: Regional Authority Transfer to: by Regional Authority from Temporary Sorting Site or from Transfer Station
	Health Authority	a) Responsible for collection, storage and/or removal of debris from own sites, b) assess, advise and/or issue orders as to collection, storage and/or removal of debris as regulatory agency or as per act/regulations	a) Responsible for collection, storage and/or removal of debris from own sites, b) assess, advise and/or issue orders as to collection, storage and/or removal of debris as regulatory agency or as per act/regulations					
	Provincial	Worksafe BC for workers; ESS (focus on people safety, but have no links to physical debris) managed by local authorities until overwhelmed; if declaration and call to demo building, using Emergency Act; assume responsibility for debris from demolition	If damage caused by non-provincial authority owned property, seek compensation from causing party. Otherwise provincial authority to cover disaster debris from provincial public infrastructure.	Provincial government responsible for collection and transportation of provincial debris. Coordinate with local and regional authority and provide support.	Provincial authority to provide temporary sorting site for provincial disaster debris material.			

		Location / Transit of Debris						
		Private Property	**Public Property**	**Collection and Transportation**	**Temporary Sorting Site**	**Transfer Station**	**Disposal Site (Licensed)**	**Disposal Site (Approved)**
	Federal	**Aboriginal Affairs and Northern Development Canada** (AANDC) follows Provincial DFA and Federal DFAA guidelines in accordance with the Emergency Program Act 2007 and Emergency Management Act. Through a Letter of Understanding between Emergency Management British Columbia (EMBC) and AANDC, EMBC provides coordination for response and recovery for all First Nations Reserve lands in British Columbia. **Transport Canada** –Receiver of Wreck (oversight for abandoned vessels). **Agriculture and Agrifood Canada** in collaboration with **Canadian Food Inspection Agency** have oversight of the disposal of Specified Risk Material (associated with BSE) and well as Humane Treatment and Animal Health concerns.	If damage caused by non-federal authority owned property, seek compensation from causing party. Otherwise federal authority to cover disaster debris from federal public infrastructure. **Transport Canada** – Restoration of marine channels, Navigable Waters Protection Program.	Federal government responsible for collection and transportation of federal debris. Coordinate with local and regional authority and provide support. **Canada Coast Guard** has authority under the Canada Shipping Act (CSA) marine pollution as defined by the International Maritime Organization. Debris is not listed, however if such pollutants contaminate the debris as oil, the CCG is the lead agency. If radioactive, they would be working with other agencies such as the National Energy Board.	Federal authority to provide temporary sorting site for federal disaster debris material.			**Environment Canada** - Disposal at Sea Program Federally controlled permitting program. Permits granted on a case-by-case basis after a detailed application and assessment process. http://www.ec.gc.ca/iem-das/default.asp?lang=En&n=3C819E48-1
	Private Sector	Insurance company will reduce risk exposure. Contractors to follow WorkSafe BC.		Private waste management, construction, demolition and transportation contractors to be available for collection and transportation of disaster debris.				

Appendix VII: GUIDELINES FOR DEBRIS STORAGE AND SORTING AREAS

Site Selection

The following qualities can help to identify good debris storage areas:

- stable ground, out of hazard areas (e.g. flood plain)
- large enough to accommodate several piles or containers of different debris types
- paved to facilitate vehicle drop-off and minimize mess
- central enough to be convenient to clean up operations
- not likely to interfere with local business or institutional activities once they resume
- well-lit
- have covered and secure areas or containers for hazardous materials and electronics
- fenced to discourage scavengers after hours
- staffed during business hours to ensure the proper sorting of materials, keep the site tidy, ensure site safety and coordinate the pickup of materials by haulers.

As the RDDM Plan continually improves, input from local authorities on suitable temporary debris storage areas will be requested.

Site Safety and Security

Local authority and contractor plans applicable to collection sites and associated infrastructure receiving disaster debris should include a risk assessment prior to commencing operations to ensure all appropriate OH&S, regulatory and security considerations are accounted for. Irrespective of whether a state of emergency is in effect, WorkSafeBC has procedures to be followed for any work and should be consulted early in the risk assessment process.

Specific topics to be considered as part of this process should include as a minimum:

1. Physical security of facilities;
    a. prevention of unauthorized dumping
    b. prevention of unauthorized removal of debris (scavenging)
2. Personal security of workers;
    a. minimizing threat to workers (agitated customers, scavengers, etc.)
    b. working alone procedures (if needed)
3. Safe work procedures;
    a. Worker training & education
    b. Personal Protective Equipment
    c. Handling of potentially hazardous materials (identification, separation, etc.)
4. Visitor safety;
    a. safe areas to unload
    b. adequate lighting
    c. traffic control (vehicle & pedestrian)
5. Environmental risk to soil, groundwater and nearby waterways from leaching materials.

Appendix VIII: LINKS TO OTHER RELEVANT RESOURCES

BC Emergency Program Act [RSBC 1996] CHAPTER 111)
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96111_01

Compensation and Disaster Financial Assistance Regulation
http://www.bclaws.ca/EPLibraries/bclaws_new/document/LOC/freeside/--%20E%20--/Emergency%20Program%20Act%20RSBC%201996%20c.%20111/05_Regulations/10_124_95.xml

Emergency Management BC
http://www.pep.bc.ca/Emerg_Mgmt_BC/Emerg_Mgmt_BC.html

Public Safety Canada
http://www.publicsafety.gc.ca/prg/em/index-eng.aspx

Integrated Partnership for Regional Emergency Management
http://www.iprem.ca

Regional Disaster Debris Management (secure site)
https://extranet.metrovancouver.org/sites/rddm/Pages/default.aspx

U.S. Federal Emergency Management Agency
http://www.fema.gov/

Appendix IX: DEFINITIONS

“Concept of Operations” provides the concept of the process to be followed to implement the overall disaster recovery effort (not just for disaster debris). It clearly identifies goals and objectives, role of stakeholders, the decision-making process, as well as tactics to achieve stated milestones. It provides the high-level concepts and is not intended to be an implementation plan in itself.

“critical infrastructure” the processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of the government;

"declaration of a state of emergency" means a declaration of the minister or the Lieutenant Governor in Council;

"declaration of a state of local emergency" means a declaration of a local authority or the head of a local authority;

"director" means the person appointed as the director of the Provincial Emergency Program;

"disaster" means a calamity that

(a) is caused by accident, fire, explosion or technical failure or by the forces of nature, and

(b) has resulted in serious harm to the health, safety or welfare of people, or in widespread damage to property;

"electoral area" means an electoral area as defined in the *Local Government Act*;

"emergency" means a present or imminent event or circumstance that

(a) is caused by accident, fire, explosion, technical failure or the forces of nature, and

(b) requires prompt coordination of action or special regulation of persons or property to protect the health, safety or welfare of a person or to limit damage to property;

"head of a local authority" means

(a) for a municipality, the mayor or a person designated by the municipal council to act in the capacity of mayor in the mayor's absence, and

(b) for an electoral area in a regional district, the chair of the board of the regional district, or, in the chair's absence, a vice chair;

“interdependency” mutual, shared or reciprocal dependencies. Services which two or more units of critical infrastructure must provide to each other in order for each to function as designed;

"jurisdictional area" means any of the following for which there is a local authority:

(a) a municipality;

(b) an electoral area;

(c) a national park;

"local authority" means

(a) for a municipality, the municipal council,

(b) for an electoral area in a regional district, the board of the regional district, or

(c) for a national park, the park superintendent or the park superintendent's delegate if an agreement has been entered into with the government of Canada in which it is agreed that the park superintendent is a local authority for the purposes of this Act;

"local emergency plan" means an emergency plan prepared by a local authority;

“program” describes the ongoing RDDM planning and preparedness that will ensure that the Plan is regularly updated, maintained and practiced;

“project” incudes a description of the event-specific strategy that will be developed to manage disaster debris post-event through one or more projects;

"Provincial Emergency Program" means the Provincial Emergency Program or Emergency Management BC;

“RDDM Project Manager” is the individual hired or appointed to develop and manage the post-event project(s);

“RDDM Program Coordinator” is the individual responsible for ensuring the ongoing updating and exercising on the RDDM Plan;

“RDDM Plan” the final RDDM Plan evolved from the Working Plan after sufficient information has been provided;

“RDDM Plan Owner” is the organization that houses and provides resources to maintain the RDDM Plan;

“RDDM Working Plan” the interim RDDM plan, yet to include key information, procedures and required approvals;

“Resiliency” the ability to resist or withstand impacts so that inevitable damage from an extreme event does not reach disastrous proportions;

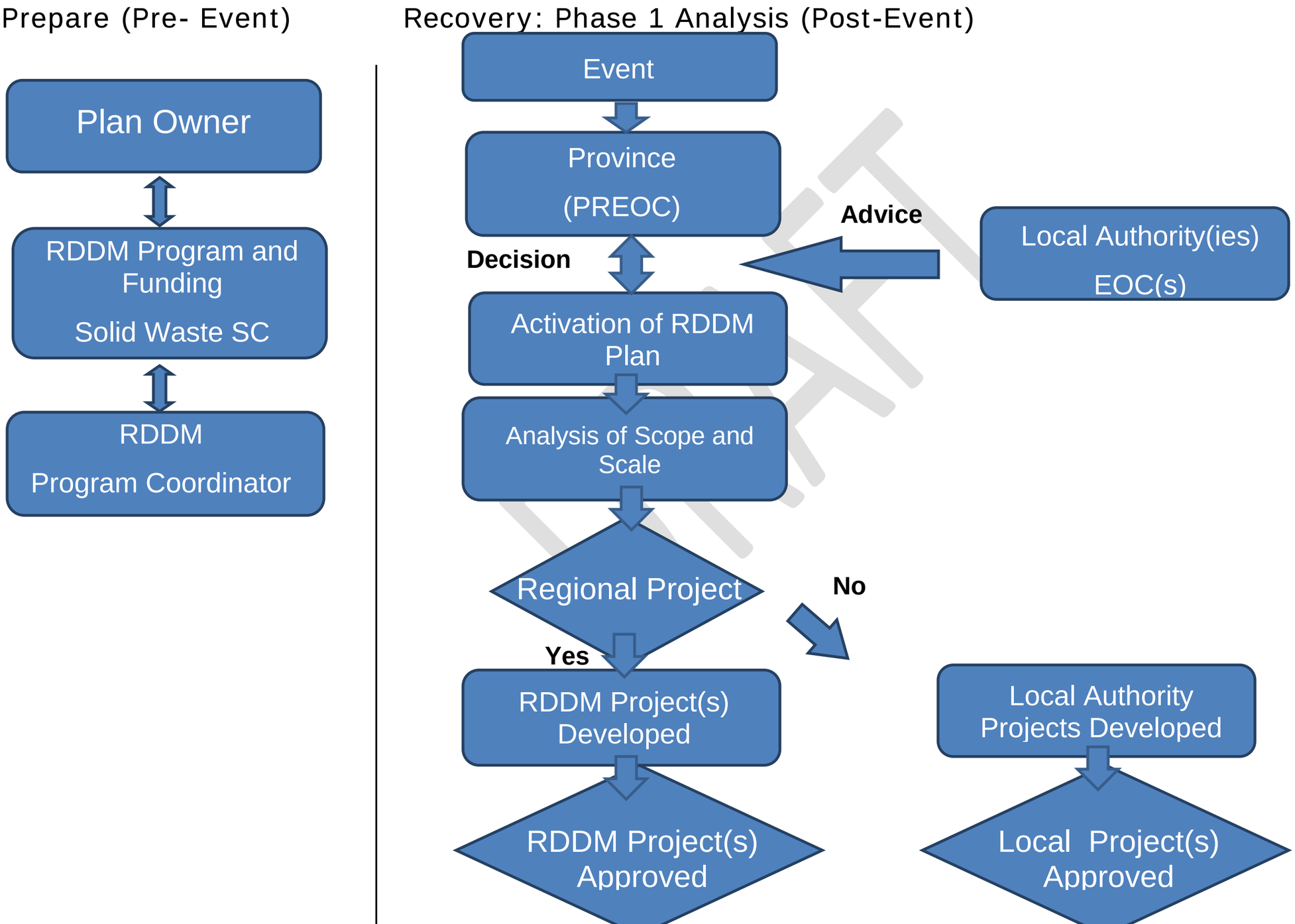
“Risk” potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences;

"Risk Assessment" product or process which collects information and assigns values to risks for the purpose of identifying priorities, developing or comparing courses of action, and informing decision making;

"Scenario" (in the context of risk) a hypothetical situation comprised of a hazard, an entity impacted by that hazard, and associated conditions including consequences when appropriate;

"Vulnerability" physical feature or operational attribute that renders an entity, asset, system, network, or geographic area open to exploitation or susceptible to a given hazard. Characteristic of design, location, security posture, operation, or any combination thereof, that renders an entity, asset, system, network, or geographic area susceptible to disruption, destruction, or exploitation.

APPENDIX X: PROPOSED RDDM INTERIM ADVICE AND DECISION FRAMEWORK (SUBJECT TO ADOPTION OF THE REGIONAL CONCEPT OF OPERATIONS)



APPENDIX X: PROPOSED RDDM INTERIM ADVICE AND DECISION FRAMEWORK (SUBJECT TO ADOPTION OF THE REGIONAL CONCEPT OF OPERATIONS)

Recovery: Phase 2 - Execution (Post-Event)