

# CHAPTER 2

## PRE-DISASTER ASSESSMENT

**Background:** Performing an assessment or inventory of your resources is the first step in determining your jurisdiction's preparedness to effectively handle debris generated after a disaster.

The purpose of this assessment is to identify the kind of debris management strategy needed and diversion programs to consider. It will also show the areas that need to be developed in order to prepare an effective disaster debris response.

More detailed information on specific diversion programs is contained in Chapter 3, Debris Management Programs.

**Contents:** This chapter contains 12 sections and is divided into steps one might follow to develop a debris management strategy.

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## **STEP 1: DEVELOP LOCAL CHECKLISTS**

**Checklists:** Developing checklists in advance of a disaster can save valuable time in establishing debris management programs as well as in directing the overall recovery operations.

These checklists will be specific to a jurisdiction's situation and will reflect the resources available and those that will be needed.

**Primary checklists:** The primary checklists that need to be developed are listed below. Some of these, however, are more applicable to the city or county emergency services staff. In this case, check with your city/county OES to see what has been developed.

The other checklists or resource inventories will probably be developed by the staff responsible for establishing the diversion program, i.e. the city/county Solid Waste or Recycling Coordinator. Much of this information can be developed as each step in the following assessment is completed .

### **EMERGENCY SERVICES AND RESPONSE**

- ◆ Emergency Organization Alert List;
- ◆ Available resources: staffing, equipment;
- ◆ Local, state, federal agencies involved in disaster debris management (see chapter 1 on Government Coordination for examples);
- ◆ Non-profit organizations (e.g., American Red Cross, Salvation Army);
- ◆ Mutual Aid agreements;
- ◆ Equipment and supply summary, both public and private sectors;
- ◆ Directories of field and regional locations;
- ◆ Maps, charts, diagrams of transportation corridors; and
- ◆ List of TV, radio, wire services.

### **FACILITIES**

- ◆ Recycling, reuse, and disposal facilities;
- ◆ Maps of transportation corridors to facilities and alternate routes.

#### **MARKETS**

- ◆ End-uses for generated materials;
- ◆ Markets for generated materials;
- ◆ Haulers/brokers/processors and materials, amounts they can handle;
- ◆ Construction and demolition (C&D) brokers/processors;
- ◆ RMDZ businesses/local and state government contacts;
- ◆ Waste exchanges (CALMAX and national exchange list) and/or local exchanges;
- ◆ C&D recyclers (use CIWMB's list and/or local lists);
- ◆ salvage yards; and
- ◆ non-profit organizations.

#### **TEMPORARY STORAGE SITES**

#### **MUTUAL AID AGREEMENTS**

#### **CONTRACTS AND FRANCHISE AGREEMENTS**

#### **ORDINANCES**

**STEP 2: CONDUCT A DISASTER EVENT ANALYSIS AND WASTE CHARACTERIZATION ANALYSIS**

**Purpose:** Identify the types of disaster(s) your city/county is likely to encounter. Different disasters will generate different types and amounts of debris, which in turn will affect the selection of a diversion strategy.

For each disaster event, evaluate its potential severity and your community's vulnerability to such a disaster.

**Actions to take:**

- ◆ Identify disasters likely to occur.
- ◆ Analyze nature of disasters and jurisdiction's vulnerability to each.
- ◆ Estimate amount and types of wastes that could be generated.
- ◆ Estimate amount and types of waste that could be generated as a result of recovery phase.
- ◆ Estimate construction and demolition (C&D) disposal tonnage.
- ◆ Develop list of materials that could be included in a diversion program.

**Disaster event table:**

The table below gives a general idea of the types of materials typically generated after a particular disaster.

**DISASTER EVENT ANALYSIS**

<b>Disaster Event</b>	<b>Damage</b>	<b>Materials Generated</b>	<b>Secondary Impacts</b>
Urban Fires	Foundations; Chimneys; Burned Cars	Metals; Bricks; Concrete; Foundations; Charred lumber and wood; Sand bags; Plastic.	Houses on hills, erosion & large amounts of earth move downhill.  Can be caused by firefighting efforts, heavy rains after fire, earthquake.  Earth, trees, and boulders fall on other homes, creating more structure debris.
Wildfires	Firestorm through trees and brush without wind, leaves nothing.  With wind may leave dead but standing trees.  Foundations, chimneys, burned cars.	Metals; Bricks; Foundations; Concrete; Dirt; Downed trees; Charred lumber; and wood; Sandbags; Plastic.	Erosion problems (same as urban fires)
Floods Tsunami Dam failure	Damage to homes: lumber, wallboard, carpets, furniture. (Mud) sediments deposited on public and private property and discarded belongings.  Landslide debris - soil, gravel, rock, construction materials. Household hazardous waste	Downed trees; Wallboard; Carpets; Brown goods (e.g., furniture); White goods; Household hazardous waste; Greenwaste; Sandbags; Plastic; Food.	Landslides

<b>Disaster Event</b>	<b>Damage</b>	<b>Materials Generated</b>	<b>Secondary Impacts</b>
Earthquake	Infrastructure damage - concrete and asphalt highways, overpasses, bridges. Concrete, cement block, stone retaining walls, smashed vehicles. Asphalt from damaged parking lots. Building material, personal property, sediments caused by landslides.	Concrete; Bricks; Foundations; Asphalt; Wallboard; Glass; Rebar; Carpets; Asbestos; Greenwaste; Plastic; Food.	Secondary damage such as fires and explosions may result from disruption of utility systems. Waste generated from new construction and renovation.
Hurricane	Remains of damaged buildings, sediments, trees, personal property.	Wallboard; Carpets; Brown goods; White goods; Household hazardous waste; Wood; Lumber; Greenwaste; Sandbags; Plastic; Food.	
Tornado	Damaged and destroyed structures, trees, personal property.	Wallboard; Carpets; Brown goods; White goods; Household hazardous waste; Wood; Lumber; Greenwaste; Sand Bags; Plastic; Food.	
Civil Unrest	Damaged and destroyed structures, personal property.	Wallboard; Carpets; Brown goods; White goods; Household hazardous waste; Wood; Lumber;	

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<b>Disaster Event</b>	<b>Damage</b>	<b>Materials Generated</b>	<b>Secondary Impacts</b>
		Food.	
Volcanic Eruption	Ash, downed trees, molten rock.	Ash	
Terrorist Acts	Damaged and destroyed structures.		



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## Waste characterization of disaster debris

### Project types and amounts of debris:

Project the amounts and types of waste likely to be generated after a disaster. This will be one indicator of the types and scope of diversion programs that should be planned.

This will be your "best guess" based on the variables below:

- ◆ the type and severity of disaster;
- ◆ location and extent of the damage;
- ◆ building types and their age (residential, commercial, etc.);
- ◆ number of buildings affected; and
- ◆ population affected.

### Purpose:

Although this waste characterization will only provide a general idea of the materials to be handled, some assumptions can be made about the facilities, processing, staffing, equipment, and markets that will be needed.

### List of materials:

The list below shows those materials typically generated after a disaster. Generally, the post-disaster waste stream is composed of construction and demolition materials and personal belongings.

- ◆ concrete;
- ◆ asphalt;
- ◆ metals;
- ◆ greenwaste;
- ◆ plastic;
- ◆ sand bags;
- ◆ dirt;
- ◆ wallboard;
- ◆ wood; and
- ◆ glass.

**Materials (cont'd):**

- ◆ white goods - refrigerators, washers, dryers, stoves;
- ◆ brown goods - furniture (sofas, chairs) and other bulky goods;
- ◆ bricks; and
- ◆ household hazardous waste.

**Other debris:**

Keep in mind that other debris will be generated during the course of recovery . Examples include plastic water bottles and plastic sheeting associated with mass care (i.e. tent shelters); sand bags and dirt remaining after a flood or wildfire or used for erosion control.

Another factor can be the additional waste generated in the long-term from construction and renovation activities as well as ongoing demolition projects.

### **STEP 3: IDENTIFY TEMPORARY STORAGE SITES**

#### **Purpose:**

This assessment will indicate whether adequate temporary storage space for the projected types and amounts of disaster debris is available, the options for diversion programs given the ability or inability to store the materials, and example tasks to complete in order to secure storage areas.

Refer to Chapter 4 for more detailed information on temporary storage sites.

#### **Actions to take:**

- ◆ determine need for temporary storage areas;
- ◆ develop criteria for siting temporary storage or pre-staging areas'
- ◆ make a list of all possible sites: public and private;
- ◆ consider pre-approving sites and receiving permit in advance, to be activated upon declaration of disaster/emergency;
- ◆ consult with solid waste facility operators and Local Enforcement Agency on need to request emergency waiver of standards for waiver of certain minimum standards at landfill or to request establishment of a temporary storage or processing area;
- ◆ identify permit and environmental compliance requirements and time needed to process;
- ◆ decide the type and level of environmental assessment and monitoring needed to be performed at site;
- ◆ negotiate in advance the use or lease of public or private land;
- ◆ develop Site Operation Plan; and
- ◆ develop Site Restoration Plan.

#### **When to use:**

The better strategy is to transport the disaster debris directly to the landfill or recycling/processing facility rather than using a temporary storage site.

In this way, labor and transportation costs are paid once, whereas hauling to the temporary storage site

and then hauling again to the recycling facility and increase costs significantly.

And, FEMA may not pay for these additional costs. Prior to establishing a temporary storage site, contact FEMA to obtain prior authorization and to ensure reimbursement for these program costs. Refer to Chapter 6, Reimbursement, for more information.

**Emergency waiver of standards regulations:**

The Board has adopted the emergency waiver of standards regulations, which are found in California Code of Regulations, Title 14, Division 7, Chapter 3, Article 3, sections 17210 through 17210.9.

The regulations allow Local Enforcement Agencies to issue emergency waivers to solid waste facility operators, upon request, in the event of a state of emergency or local emergency. The waiver grants an operator temporary relief from specific state minimum solid waste standards or terms or conditions of the operator's solid waste facilities permit.

The waiver applies to the following:

- ◆ origin of waste;
- ◆ the rate of inflow for storage, transfer, or disposal of waste;
- ◆ the type and moisture content of solid waste;
- ◆ the hours of facility operation; and
- ◆ the storage time before transfer or disposal of wastes, at a solid waste facility.

A waiver can also be granted to an operator for the establishment of a locally-approved temporary transfer or processing site, if authorized by the LEA.

**Criteria:**

Examples of evaluation criteria for establishing temporary storage (pre-staging) areas are included in Chapter 4, Temporary Storage Area.

**List sites:**

Prepare a list of potential temporary storage sites based upon the types and amounts of materials projected to be collected, processed, and transported.

Check on available public and private sites for use as temporary storage, recycling, or disposal sites. Explore the possibilities of using city/county-owned land, state lands, and private property. Private property will probably be the last resort given the liability associated with this.

**Examples:** Examples of sites to consider include the following:

- ◆ landfill;
- ◆ recycling facility;
- ◆ right-of-way;
- ◆ vacant lot;
- ◆ corporation yard;
- ◆ parks;
- ◆ parking lot; and
- ◆ private property.

**Do beforehand:**

Securing storage sites is best done before a disaster strikes so that arrangements, such as leases and permits for the land, can be accomplished quickly.

Realistically, if sites are not designated in advance, it is unlikely that a jurisdiction will have enough time to do so when trying to manage the disaster recovery at the same time.

**STEP 4: DETERMINE END-USES AND MARKETS FOR MATERIALS COLLECTED**

**Purpose:**

This assessment will provide an overview of the markets needed, the processing requirements for the identified end-uses, and the type of facilities needed to handle the wastestream.

For purposes of this report, markets are considered outlets for raw or processed materials. End-uses are the products themselves that are made from the disaster debris e.g., crushed concrete, soil amendment.

**Actions to take:**

- ◆ Determine end-uses and market specifications for disaster debris.
  - ◆ List the local brokers and processors, materials they handle, and end-uses.
  - ◆ Identify market specifications for the selected end-uses.
  - ◆ Identify processing requirements for selected end-uses.
- ◆ Identify potential markets.
  - ◆ List the existing markets your jurisdiction is currently using, the materials accepted, and end-uses.
  - ◆ If located in or near a Recycling Market Development Zone, list the recycling businesses within the Zone and the secondary materials they accept and process and the end-products.
  - ◆ List local, state, and national waste exchanges available.
  - ◆ Identify potential projects within your city/county programs for materials collected (e.g., parks, public works).
- ◆ Identify markets still needed after evaluating existing, available markets for materials and quantities projected.
- ◆ Identify market barriers.

**Determine end-uses**

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**End-uses:** Determine end-uses for materials before processing them. If materials are processed before the end-uses are determined, this may preclude their use for certain applications, thereby limiting their marketability.

For example, if concrete is ground too finely or is mixed with wood or brick, it cannot be used for certain road applications.

**Market spec's:** Ensure that processed materials will meet market specifications. For example, most crushed asphalt and concrete is used as road base on Department of Transportation (CalTrans) or local public works road projects. Most local governments, particularly in northern California, rely on CalTrans specifications for road materials. Many local governments in southern California rely on specifications in the *Greenbook*. (For a more detailed discussion of road base specifications, see the fact sheet *Recycled Aggregate* in Attachment A).

If specifications are not met, the material will be rejected. However, more relaxed standards may apply when using the processed material for less structural applications such as temporary roads at landfills or parks.

Also refer to Attachment B for a more detailed discussion of processing techniques and equipment.

## Identify markets

**Markets:** Determine if established markets exist for the materials that will be collected. Identify the recyclers, processors, and brokers who can divert the designated materials and the amounts they can handle. This is best done beforehand so that arrangements can be made quickly and the materials moved off site immediately.

**Potential markets:**

Consider the following as possible markets for the disaster debris:

- ◆ City/county use for future projects such as temporary roads at landfills (concrete, brick, asphalt), daily cover (dirt), erosion control, parkways (mulch), and riprap;
- ◆ City/county use for aggregate base and subbase in public works road projects.
  1. See CalTrans Standard Special Provisions, which allow reclaimed asphalt and concrete in aggregate base and subbase, as described in fact sheet *Recycled Aggregate* (Attachment A).
  2. See *Greenbook*, which allows recycled material in crushed Miscellaneous Base and processed Miscellaneous Base. Both are described in fact sheet *Recycled Aggregate*.
- ◆ State agencies (Dept. of Parks & Recreation - mulch);
- ◆ CalMAX, the materials exchange program run by the California Integrated Waste Management Board. (See Attachment C for more information on how to use CalMAX);
- ◆ Recycling Market Development Zone businesses. Contact your RMDZ administrator if there is a zone in your county, or call the CIWMB, Market Development and Zone Assistance, at (916) 255-2708 for a listing of zones and participating businesses.
- ◆ National waste exchanges (see Attachment D for a listing);
- ◆ CalTrans use for aggregate base and subbase in road projects. See CalTrans Standard Special Provisions, which allow reclaimed asphalt and concrete in aggregate base and subbase, as described in fact sheet *Recycled Aggregate* (Attachment A).



- ◆ To market to CalTrans projects, review "going contracts" as described in the fact sheet *CalTrans and Recycled Construction Products*, (Attachment\_E). |
- ◆ Salvage operations and local materials exchanges;
- ◆ Non-profit organizations;
- ◆ Out-of-state markets and brokers shipping to the Pacific Rim and Mexico.

**Markets used:**

The following table provides examples of the markets used by a number of jurisdictions for disaster debris:

<b>JURISDICTION</b>	<b>MATERIALS</b>	<b>MARKETS</b>
Humboldt County 1992 earthquake	<ul style="list-style-type: none"> <li>◆ Redwood and fir lumber</li> <li>◆ Insulation</li> <li>◆ Fixtures, appliances, carpets, roof shingles</li> </ul>	<p>Reuse by non-profit organizations; cogeneration</p> <p>Reuse by non-profit organizations</p>
City of Oakland 1989 Firestorm	<ul style="list-style-type: none"> <li>◆ Partly burnt or obstructing trees and branches</li> <li>◆ Metals - Ferrous: cars, appliances</li> <li>◆ Metals - non-ferrous: copper plumbing, aluminum siding</li> <li>◆ Concrete/brick from destroyed foundations, walls, chimneys, driveways, fireplaces</li> </ul>	<p>Biomass fuel Composting/mulch. Soil amendment/fertilizer. Landfill cover (mixed with sewage). Firewood/logs. Used as firewood or as logs for construction.</p> <p>Sold to mills and smelters in U.S. or Pacific Rim for varied end uses ) new cars, appliances</p> <p>Road construction material (Class II aggregate base. Meets CalTrans specifications)</p>
City of Santa Clarita 1994 Northridge earthquake	<ul style="list-style-type: none"> <li>◆ Gravel</li> <li>◆ Drywall</li> <li>◆ Metals</li> </ul>	<p>Cemetery base; gravel on ranch sites; backfill in sidewalks</p> <p>Recycled</p> <p>Recycled</p>
City of Los Angeles 1994 Northridge earthquake	<ul style="list-style-type: none"> <li>◆ Concrete; combination of concrete, red clay brick, and other inerts</li> <li>◆ Rubble</li> <li>◆ Gypsum wallboard</li> </ul>	<p>Landfill winter deck Landfill roads</p> <p>Landfill cover Winter deck Decorative gravel Aggregate road base</p> <p>Included in fines for daily cover</p>

JURISDICTION	MATERIALS	MARKETS
	<ul style="list-style-type: none"> <li>◆ Red clay brick</li> <li>◆ Wood and green materials that could not be traditionally processed</li> <li>◆ Well-screened dirt</li> </ul>	<p>Roofing amendment, decorative gravel</p> <p>Alternative daily cover at landfills</p> <p>Soil amendment</p>

### Identify market barriers

**Barriers:** Identify the market barriers to recycling the collected materials. They can include:

- ◆ expense to collect, transport, and process the materials;
- ◆ low market price for materials;
- ◆ cheap virgin sources;
- ◆ limited end-uses and markets for materials; and
- ◆ few or no temporary storage sites.

**Limit materials collected:** Based on the analysis of market barriers, a jurisdiction may decide to limit the materials to be collected in its diversion program, thereby increasing the likelihood of recycling those that are collected.

**Example:** The City of Santa Clarita experienced a 97% diversion rate of their disaster debris after the 1994 Northridge earthquake. In large part, their success can be attributed to two factors:

1. a collection program limited to the following materials: concrete, asphalt, block wall, rubble, masonry, cinder block, clay brick, metals, and wood waste; and
2. the City's requirement for curbside separation of the waste.

**STEP 5: IDENTIFY FACILITIES AND PROCESSING OPERATIONS**

**Purpose:**

This assessment will help identify the recycling, reuse, and disposal facilities available or needed to process and/or store the disaster debris. Processing operations include wood chipping, concrete and asphalt crushing, and drywall recycling.

Given the projected amounts and types of debris anticipated, assess whether these facilities can handle the debris quickly, particularly if there are limited temporary storage sites.

**Actions to take:**

- ◆ Prepare a list of existing facilities and their ability to store, handle, and process waste: facilities include source separated, mixed recycling, and disposal
- ◆ Prepare list of facilities in neighboring jurisdictions that could be used.
- ◆ Map transportation routes to facilities and develop alternate routes.
- ◆ Review list of disaster debris likely to be generated and collected.
- ◆ Complete facility assessment form for each facility.
- ◆ Review list of potential end-uses and markets for collected materials.
- ◆ Based on the above, develop a list of facilities needed.
- ◆ Negotiate with franchise haulers, facility operators/owners, processors, and neighboring jurisdictions to use facility to collect, process, and/or divert disaster debris.

**Facility types:** The following facility descriptions are used throughout this document.

FACILITY TYPE	DESCRIPTION <sup>1</sup>
Source separated facilities	accept materials such as concrete and asphalt exclusively for recycling
Mixed recycling facilities	accept both source-separated and all mixed debris, from which recyclable materials are processed for recovery and residuals are disposed of
Disposal facilities	accept materials for landfilling only

**Assessment factors:** To assist in the facility capacity assessment, determine the following for each facility. This should give an indication of whether to modify existing facilities or establish new facilities.

- ◆ expected waste types and origin of waste;
- ◆ materials accepted;
- ◆ remaining disposal capacity;
- ◆ processing capacity;
- ◆ processing barriers;
- ◆ description of on-site recycling facilities;
- ◆ expected storage capacity for disaster debris;
- ◆ on-site processing capability;
- ◆ proximity to disaster area; and
- ◆ disaster debris disposal/diversion reporting formats.

**Site capacity:** From the information gathered during the preliminary damage assessment, a jurisdiction should be able to determine whether the existing recycling facilities have the capability to process the expected volumes and types of debris and whether landfills have sufficient capacity for the expected volumes of debris. If not, consider the following:

- ◆ expanding an existing recycling facility;
- ◆ adding a temporary storage area at a landfill for recycling operations;
- ◆ establishing a new recycling facility; or
- ◆ expanding existing landfills for additional disposal.

**Mix of facilities:**

Identify any mixed or segregated construction and demolition recycling facilities in the area. If one is not available, consider establishing one, particularly if the materials collected will not be source separated.

To keep the average recycling tip fees at the lowest possible level, maintain a mix of source separation recycling facilities and mixed debris recycling facilities .

**Negotiate in advance:**

Negotiate with franchises, haulers, and facility operators/owners in advance to ensure that the facility will:

- ◆ be available when needed,
- ◆ be able to handle the amount and type of materials expected to be generated, and
- ◆ establish a diversion program for the materials collected, if one does not already exist.

**Contingency plan:**

In the event that major roadways are closed or landfills and recycling facilities are closed or damaged, develop a contingency plan to deal with the disaster debris until the roads and facilities are open.

- ◆ Develop a plan for temporary storage of the collected materials.
- ◆ Develop a policy to deal with putrescibles and with waste from the public until a diversion program is implemented.
- ◆ If the landfills you use are closed, make arrangements with neighboring jurisdictions or, if applicable, private landfill owners to use their facilities. Do this before a disaster strikes since it may take valuable time to negotiate the agreement and receive approvals, particularly from the local government governing body.
- ◆ Develop alternate transportation routes to facilities.



**STEP 6: IDENTIFY PROCESSING TECHNIQUES AND BARRIERS**

<b>Introduction:</b>	This section presents an overview of the barriers to recovering or reusing the construction and demolition (C&D) material and of the equipment and processing techniques involved in structured demolition and materials recovery.
<b>Purpose:</b>	This information can help jurisdictions plan and contract for the removal of structures. It will also help in the selection of equipment and processing techniques based on the materials to be processed and their end-uses. Refer to Attachment B for a more detailed discussion on processing techniques and equipment.
<b>Actions to take:</b>	<ul style="list-style-type: none"> <li>◆ Develop a processing strategy based on composition of C&amp;D materials and their end-uses.</li> <li>◆ Select a processing strategy.</li> <li>◆ Review processing techniques for wood and concrete for projected end-uses.</li> <li>◆ Identify processing barriers and develop programs accordingly.</li> </ul>
<b>Processing strategy<sup>2</sup></b>	
<b>Two points:</b>	<p>The processing strategy to recover or reuse C&amp;D materials depends on two things:</p> <ol style="list-style-type: none"> <li>1. the composition of the C&amp;D materials, and</li> <li>2. the end-uses for the recovered materials.</li> </ol> <p>Composition refers to the types of materials and the form in which it is received by the processors, either clean or mixed.</p>
<b>Presort:</b>	Presort all C&D materials as much as possible by unloading similar materials on specific areas, picking with front-end loaders, etc. Bulky items such as furniture, white goods, and major pieces of rubble or wood are often presorted.
<b>Equipment:</b>	For clean, sorted debris, the reduction equipment, such as impactors, jaw crushers, hammermills, and stump grinders, can provide quality end products.
<b>Evaluate costs:</b>	With mixed loads, it is important to evaluate the cost of separation versus land disposal. Certain loads may be so

contaminated or mixed that separation may not be economical.

### **Select a processing strategy<sup>3</sup>**

#### **Basic strategies:**

There are two basic C&D processing strategies. The processing strategy to use depends on the nature of the mixed material.

1. Sort and separate, then crush and reduce.

For mixed material containing significant amounts of plastics, paper, rags, or other contaminants, it makes sense to sort and separate and then crush and reduce.

2. Crush and reduce, then sort and separate.

For fairly clean materials with a large portion consisting of rubble and wood, crushing and reducing the material first may be acceptable before sorting and separation.

Separate the rubble and wood first. Even small amounts of wood will disqualify aggregate from use as road base.



Processing strategy	Description
<b>Salvaging</b>	The traditional means of C&D recovery include salvaging of C&D materials on-site by contractors. These materials are then sold and provide additional revenues to contractors.
<b>Dump and pick</b>	This is also an old practice for the recovery of a limited amount of material. This practice reduces the bulkiness of C&D material by simply dumping the material on the ground and spreading it out using heavy equipment. Items that can be recycled are then hand picked during the process.
<b>Separate soil and rock</b>	After bulky material is removed by presorting, an effective first step for mixed material processing is to separate the soil and rocks beforehand picking out the cleaned and uncrushed recyclables. Soil and rocks are recyclable.

### Identify processing barriers

**Identify requirements:** Identify processing requirements or barriers for collected materials. Determine the processing barriers that might limit the processing capability and hence the marketability of the collected materials.

**Contamination:** Contamination of materials is one of the biggest barriers that results in the landfilling of materials. Depending on the processing equipment being used, certain contaminants (nails in wood, rebar in concrete, wood mixed with the concrete) can preclude the materials from being recycled at all.

In addition, the debris may contain paint or asbestos that could be fragmented if crushed and would contaminate large amounts of C&D materials.

To minimize contamination, source separate the materials upon collection, and ensure that they remain separated during transport and processing.

**For more info:** For more information on handling asbestos, refer to Attachment F.



## STEP 7: IDENTIFY PROCESSING EQUIPMENT NEEDS

**Purpose:** This step will help you identify the types of equipment you may need to implement the selected diversion programs and provide some options to consider when planning these programs.

**Actions to take:**

- ◆ After selecting the diversion or recycling programs to implement, compile a listing of equipment needed to support those programs.
- ◆ Survey the following to estimate the equipment you can have available in the event of a disaster:
  - ◆ your agency/department,
  - ◆ franchise hauler,
  - ◆ private sector, and
  - ◆ neighboring jurisdictions.
- ◆ Make a list of equipment needed in addition to what you will have available.

**Survey hauler:**

Survey your local haulers or franchises to determine the staffing and equipment they can provide in a disaster. If they do not have equipment available, they may be able to acquire the equipment when needed. This may necessitate the jurisdiction writing contracts for debris removal and diversion outside the scope of the franchise agreement, as the City of Oakland did after the firestorm of 1991.

**Survey needs:**

It is best to survey your labor and equipment needs before a disaster. Contact local dealers who can provide the equipment as needed, and make the appropriate arrangements before a disaster strikes. This includes pre-qualifying contractors or developing model contracts for debris recycling or removal.

Identify the equipment and labor the jurisdiction has available during a disaster. Determine the equipment and labor you can borrow from neighboring jurisdictions, keeping in mind they may also be affected by the disaster.

**Lease:**

If facilities are not readily available, consider leasing equipment.

**Rural areas:**

In rural areas there may be fewer facilities or facilities that are farther away from the disaster site. In this instance, leasing equipment may be the cheapest and fastest way to deal with the debris.

Take into account the size of the equipment and the travel distance to bring the equipment on-site. Consider smaller, mobile equipment in these cases.

Contact local processors or equipment suppliers and manufacturers to estimate the size of equipment needed. In some cases, the quantity of materials to be processed may be too small to justify processing them.

**More information:**

For more information, refer to Chapter 3, Debris Management Programs.

**STEP 8: REVIEW FUNDING OPTIONS**

**Purpose:** Review local funding sources to determine where funds can be obtained in a disaster to cover diversion and recovery programs until state and federal reimbursement are received.

**Actions to take:**

- ◆ Identify local or private funds that can be used to start program until FEMA reimbursement is received.
  - ◆ determine ability to use General Fund;
  - ◆ evaluate possibility of acquiring a loan; and
  - ◆ explore use of private funds.
- ◆ Prepare documentation regarding local policy for diversion/recycling.

**NOTE: FEMA may/will not reimburse for donated monies or services.**

**Reimbursement:** To initiate its recovery efforts, a jurisdiction must be knowledgeable about the state and federal reimbursement programs and the process for requesting funding.

Anticipate that the Federal Emergency Management Agency (FEMA) typically reimburses program costs, not advances them, and that the jurisdiction will need to identify funds to start-up programs until federal funding becomes available.

**Small projects:** FEMA will advance funding for "small projects," as contained in individual Damage Survey Reports. For "large projects," funding occurs as a reimbursement. Check with OES regarding the dollar amount associated with each "project" category as this amount is tied to the Consumer Price Index.

**Documentation:** Research documentation needed for FEMA, including all existing local policies, ordinances, debris management plans, etc. for recycling or diversion.

**FEMA policy:** FEMA's policy to date has been to reimburse for the "least cost" programs, and reimburse for diversion programs if they are in keeping with an existing policy of the jurisdiction.

However, the jurisdiction must document such policies, provide adequate documentation to FEMA, and receive their approval prior to implementing the diversion program in order to receive reimbursement.

**Do in advance:** Compiling this information in advance can save valuable time in receiving approval to proceed with the diversion programs and begin the recovery process.

**Ownership of recyclables:**

One of the City of Santa Clarita's goals in its Northridge earthquake cleanup program was to maintain ownership of the recyclables. This was to ensure that the disaster debris was diverted. However, the City later changed its position and assigned ownership of the materials to the contractor, who was responsible for collecting and marketing the materials.

The City took this action in an effort to avoid conflict with FEMA over reimbursement for its diversion programs. Had the City retained ownership of the collected materials and received revenues from their sale, FEMA could have reduced the City's reimbursement for the diversion program since there was no compelling local program or plan.

**More information:**

Refer to Chapter 6, Reimbursement, for more information.

**STEP 9: DETERMINE CONTRACT NEEDS**

**Purpose:** This assessment is critical to ensuring that planned diversion programs are successful. It will give an indication of the types of contracts needed and outline the contracting options available to a jurisdiction.

**Actions to take:**

- ◆ review existing contracts and franchise agreements;
- ◆ determine contract needs;
- ◆ select contract type;
- ◆ develop model contracts;
- ◆ develop list of contractors in the area who are qualified and have equipment to handle the work and update annually;
- ◆ develop list of contractors who can respond in emergency and update annually; and
- ◆ pre-qualify contractors.

**Review existing contracts:** Review all existing contracts and franchise agreements dealing with municipal solid waste, recycling, reuse, etc. Contracts and franchise agreements are pivotal to ensuring a successful debris management program. Unless diversion is specified, it is likely the collected debris will be disposed.

After deciding upon a debris management program(s) and having identified funding, the next step is program implementation. This can be accomplished through contracts for the debris removal, recycling, etc., ensuring that diversion language is included as a contract provision.

**Determine contract needs:** Determine the type of contract best suited to the city/county's situation.

FEMA recommends three types of contracts typically used in disaster cleanup. They are:

- ◆ Time and Material Contract
- ◆ Lump Sum Contract
- ◆ Unit Price Contract

**Alternate bid:** A fourth contract type is the Alternate Bid contract, which allows the contractor to select an alternate method to

perform the work stated in the contract, within specified parameters. An example of this is the CSU Northridge cleanup contract for the parking structure that was destroyed in the earthquake.

**When to use:**

The following table will help in the selection of a particular contract type, based on whether the work is for short- or long-term services.

<b>CONTRACT</b>	<b>CONTRACT TYPE</b>	<b>USE WHEN<sup>4</sup></b>
Time and Material	Short-term Services for first 100 hours.	Used immediately after a disaster for emergency life saving activities and debris clearance.
Lump Sum	Long-term Beyond initial 100 hours of recovery.	Use when scope of work is clearly defined and areas of work specifically quantified. Establishes total contract price by a one-bid item. (e.g., demolish and recycle 1 structure for \$10,000).
Unit Price	Long-term Beyond initial 100 hours of recovery.	Use when scope of work is defined and can be quantified by actual field measure (e.g., recycle 10 tons concrete, 7 trees, etc.)

**Follow procedures:**

Check to see if contracting and procurement provisions are suspended or modified in the event of an emergency or disaster. Be sure to follow the proper procedures since to circumvent them could jeopardize a jurisdiction's ability to receive state and federal funding for disaster operations.

**Diversion options:**

Refer to Chapter 5, Contracts, for more contract options to ensure that disaster debris is diverted from landfills.

## **STEP 10: REVIEW MUTUAL AID AGREEMENTS**

**Purpose:** This assessment will identify the type of assistance you can request from the neighboring cities and counties through mutual aid agreements, and those agreements that your jurisdiction should consider developing. (Refer to the table on page 36 for a list of existing mutual aid agreements or those under development).

**Actions to take:**

- ◆ Review existing mutual aid agreements
- ◆ Explore possibility of entering into discipline-specific mutual aid agreements, such as those for public works, Emergency Managers Mutual Aid, or public information.
- ◆ Develop a list of mutual aid agreements the jurisdiction is a signatory to and the resources available through each.

**Mutual aid:** Because California's disaster planning is based on a statewide system of mutual aid, this will be one of the first options a jurisdiction will use to get additional staffing and/or equipment.

Each local jurisdiction relies first on its own resources, then calls for assistance:

- ◆ city to city,
- ◆ city to county,
- ◆ county to county, and
- ◆ county to the regional office of the OES,
- ◆ which relays the request to the state.

For more detailed information on mutual aid, refer to Chapter 7.

**Review agreements:** Review the mutual aid agreements your city or county is a signatory to and list the types of assistance available through those agreements. Based on this review, your jurisdiction may identify mutual aid agreements that it needs to develop, or, for an existing agreement, become a signatory to.



- Model agreement:** A Model Mutual Aid Agreement is contained in Attachment G; a city or county may consider developing such an agreement with neighboring jurisdictions specifically for debris management.
- Public works:** A Public Works Mutual Aid Agreement, which may provide more specific assistance related to debris management, is under development by the OES Southern Region; jurisdictions may consider adopting a similar agreement . For more information, contact the Emergency Operations and Training Officer at the OES Southern Region, (310) 795-2900.
- Public information:** In addition, a Public Information Mutual Aid Plan has been adopted by San Luis Obispo, Santa Barbara, and Ventura Counties; local governments may find this useful in developing a similar Plan to obtain resources to coordinate public outreach and media activities. Contact the nearest OES Regional Office for more information.
- EMMA program:** Also consider the Emergency Managers Mutual Aid (EMMA) program, which is composed of emergency managers from cities and counties. The State Office of Emergency Services (OES) maintains mutual aid inventories and facilitates mutual aid among Operational Areas (counties) and among OES Regions. These emergency managers may be able to provide technical assistance and advice on debris management programs. Contact the nearest OES Regional Office for more information (see Attachment H for listing of OES regional offices).

<b>CALIFORNIA MUTUAL AID PROGRAM<sup>5</sup></b>			
<b>Mutual Aid Systems and Channels of Statewide Mutual Aid Coordination</b>			
<b>COORDINATED BY STATE OES</b>			<b>COORDINATED BY EMSA**</b>
<b>Fire and Rescue</b>	<b>Law Enforcement</b>	<b>Emergency Services</b>	<b>Disaster Medical</b>
Fire Mutual Aid System	Coroners Mutual Aid System	All other emergency services mutual aid not included in other systems.	Disaster Medical Mutual Aid System.
Urban Search and Rescue System	Law Enforcement Mutual Aid System	Volunteer Engineers Mutual Aid System*	
	Search and Rescue Mutual Aid System (non urban)	Public Works Mutual Aid System*	
		Emergency Managers Mutual Aid System*	
		Hazardous Materials Mutual Aid System*	
		Water Agency Response Network (WARN)*	

\*Systems currently under development

\*\*Emergency Medical Services Authority

**STEP 11: IDENTIFY LABOR NEEDS**

**Purpose:** This step will give you an estimate of the types of staffing you may need and provide some options to consider when planning diversion programs.

**Actions to take:**

- ◆ Estimate staffing requirements for diversion programs as part of staffing needed for overall recovery programs.
- ◆ List all possible sources for obtaining additional staffing, within the department as well as from other jurisdictions, volunteer groups, and state agencies.
- ◆ Enter into mutual aid agreements before disaster for staffing assistance.

**More information:** For more information, refer to Chapter 3, Debris Management Programs.

**STEP 12: REVIEW LOCAL ORDINANCES**

**Purpose:** This assessment will give an indication of any ordinances that might affect planned diversion programs, and also alert city/county staff as to any administrative barriers to securing emergency contracts.

**Actions to take:**

- ◆ Review all local ordinances to determine the effect of existing ordinances on the following:
  - ◆ establishment of diversion programs;
  - ◆ establishment of temporary storage areas;
  - ◆ who has been delegated the authority to act on behalf of the governing body in the event of an emergency/disaster.
- ◆ Outline jurisdiction's local authority with respect to debris management.

**Who's in charge:** Become familiar with the local ordinances affecting a city or county's ability and authority to establish a diversion program or to enter into contracts on behalf of the city/county to manage the disaster debris.

Determine whether the City Council or Board of Supervisors has delegated contracting or other authority to city managers/staff in the event of an emergency or disaster and the extent of that authority. Also, evaluate the role of any existing Joint Powers Agreement/Authority regarding waste management.

**Empower staff:** It is important that the city/county staff responsible for the recovery be empowered by their local governing body to act independently in order to respond quickly. Having the flexibility to make independent decisions quickly can expedite the disaster response and the recovery operations.

## Temporary Storage Sites

**Local authority:** A city or county can use its authority to pass local ordinances in order to establish temporary storage sites. This is one option available in the absence of a requirement to obtain a solid waste facilities permit for the site.

After reviewing its existing land use ordinances, a jurisdiction can consider taking the following action(s):

- ◆ relax storage requirements at the temporary storage site;
- ◆ exempt certain discretionary actions from the California Environmental Quality Act; or
- ◆ waive storage standards at a particular temporary storage site for emergency storage; for example, if it is less than X cubic yards, depending on the local conditions.
- ◆ Or, the jurisdiction, through its zoning and land use authority, can establish temporary storage areas by passing a new ordinance in response to the emergency.

## Examples

**Abatement programs:** Following are two examples of ordinances passed to enact earthquake abatement programs:

**City of Santa Clarita:** The City of Santa Clarita passed Ordinance No. 94-01E (Emergency), An Emergency Ordinance of the City of Santa Clarita Establishing the Santa Clarita Abatement Program for the Mitigation of Structural Hazards and Debris Removal (see Attachment I).

**Town of Los Gatos:** The Town of Los Gatos passed Ordinance No. 1800, Urgency Ordinance of the Town of Los Gatos Establishing the Los Gatos Restoration Program for the Repair, Restoration and Reconstruction of Structures Damaged as a Result of the October 17, 1989 Earthquake (Attachment J).

Identify ordinances dealing with storage/stockpiling. (See discussion under Temporary Storage Sites in Chapter 4.

**Effect of existing** Review all ordinances to determine if they will impact

**ordinance:** the disaster recovery programs. After the 1994 Northridge earthquake, the City of Los Angeles instituted a fencing program as part of the earthquake recovery. In the interest of public health and safety, and in keeping with the City ordinance requiring that all swimming pools be fenced, the City contracted for the damaged or destroyed fences to be repaired or constructed. The City paid for the work even if the fencing was on private property.

**Sample requirements:** When adopting a local ordinance related to diverting disaster debris, consider the example requirements described in Attachment K.

## ATTACHMENTS

- A. Fact sheet, *Recycled Aggregate*.
- B. Processing techniques and equipment.
- C. CalMAX , materials exchange program.
- D. List of national waste exchanges.
- E. Fact Sheet, *CalTrans and Recycled Construction Products*.
- F. Fact Sheet, Asbestos.
- G. Model Mutual Aid Agreement
- H. List of OES Regional Offices
- I. City of Santa Clarita Ordinance No. 94-01E.
- J. Town of Los Gatos Ordinance No. 1800
- K. List of ordinances.

## REFERENCES

- ◆ *Resource Recovery*, p. 34, August, 1993.
- ◆ Tchobanoglous, George, et al., *Integrated Solid Waste Management*, 1993.
- ◆ City of Los Angeles Northridge Earthquake Response Effort, Final Report, Issue No. 7 (9/15/95) .
- ◆ Debris Removal Guidelines for State and Local Officials, FEMA, DAP-15 (Draft) Dec. 1991, Modified.
- ◆ SEMS, Emergency Operations Center Course, Module C3, page 6, Governor's Office of Emergency Services.

## ENDNOTES

1. City of Los Angeles Northridge Earthquake Response Effort, Final Report, Issue No. 7 (9/15/95).
2. *Resource Recycling*, p. 34, August, 1993.
3. George Tchobanoglous, et al., *Integrated Solid Waste Management*, 1993.
4. Debris Removal Guidelines for State and Local Officials, FEMA, DAP-15 (Draft) Dec. 1997 Modified.
5. SEMS, Emergency Operations Center Course, Module C3, page 6, Office of Emergency Services.

# CHECKLIST

## CHAPTER 2 PRE-DISASTER ASSESSMENT

**STEP 1: Develop local checklists**

- ◆ emergency organization alert list,
- ◆ available resources: staffing and equipment,
- ◆ mutual aid agreements,
- ◆ maps, charts, transportation corridors,
- ◆ list of TV, radio, wire services,
- ◆ non-profit organizations,
- ◆ facilities,
- ◆ markets and end-uses,
- ◆ haulers, brokers, processors,
- ◆ Recycling Market Development Zone (RMDZ) businesses,
- ◆ waste exchanges,
- ◆ temporary storage sites,
- ◆ contracts and franchise agreements, and
- ◆ ordinances.

**STEP 2: Conduct a disaster event analysis and waste characterization analysis**

- ◆ Identify potential disasters.
- ◆ Analyze nature of risks posed with each disaster.
- ◆ Project amount of wastes generated.
- ◆ Estimate construction and demolition (C&D) disposal tonnage.
- ◆ Estimate waste components & quantities.
- ◆ Develop list of materials that could be included in diversion programs.



**STEP 3: Identify temporary storage sites**

- ◆ Determine need for temporary storage or processing sites.
- ◆ Develop criteria for siting temporary storage or pre-staging areas.
- ◆ Make a list of all possible sites: public and private
- ◆ Identify agencies involved in permitting temporary storage sites and processing activities or on-site processing activities.
- ◆ Consider pre-approving sites and receiving permit in advance, to be activated upon declaration of disaster/emergency.
- ◆ Enact ordinance regarding temporary storage sites (waiver)
- ◆ relax storage requirements
- ◆ exempt certain discretionary actions from CEQA
- ◆ re-zone sites if needed through City Council
- ◆ Identify permit and environmental compliance requirements and time needed to process.
- ◆ Decide the type and level of environmental assessment and monitoring needed to be performed at site.
- ◆ Set up guidelines for use of the temporary site (materials that will be accepted, condition of materials, hours, etc.)
- ◆ Develop hazardous waste screening program
- ◆ Negotiate in advance the use or lease of public or private land.
- ◆ Develop Site Operation Plan.
- ◆ Develop Site Restoration Plan.

**STEP 4: Identify end-uses and markets**

- ◆ Determine salvageable and/or recyclable materials.
- ◆ Determine end-uses and market specifications for disaster debris.
- ◆ Develop directory of businesses/processors, materials and volumes they can handle.
- ◆ Identify processing requirements for selected end uses.
- ◆ Identify potential markets.
- ◆ List the existing markets your jurisdiction is currently using, the materials they accept, and their end-uses.

- ◆ If located in or near a Recycling Market Development Zone:
  - ◆ list the businesses within the Zone, and
  - ◆ the secondary materials they accept and process,
  - ◆ the end-products.
- ◆ List local, state, and national waste exchanges available.
- ◆ Identify potential projects within your city/county programs for materials collected (e.g., parks, public works).
- ◆ Identify markets needed after evaluating existing, available markets for materials and quantities projected.
- ◆ Identify market barriers.

**STEP 5: Identify Facilities and Processing Operations**

- ◆ Prepare list of existing facilities:
  - ◆ source separated,
  - ◆ mixed recycling, and
  - ◆ disposal.
- ◆ Prepare list of facilities in neighboring jurisdictions that could be used.
- ◆ Review list of disaster debris likely to be generated and collected (from Step 2).
- ◆ Complete facility assessment form for each facility.
  - ◆ materials handled
  - ◆ processing capacity
  - ◆ processing barriers
  - ◆ remaining disposal capacity of facility
  - ◆ description of on-site recycling facilities
  - ◆ expected waste types and origin of waste
  - ◆ expected storage capacity for disaster debris
  - ◆ disaster debris disposal/diversion reporting formats
- ◆ Review list of potential end-uses and markets for collected materials (from Step 5).
- ◆ Based on the above, develop a list of facilities needed.
- ◆ Negotiate with franchise haulers, facility operators/owners, processors, and neighboring jurisdictions to use facility to collect, process, and/or divert disaster debris.
- ◆ Identify air and/or water quality permits that must be obtained.

- ◆ Identify transportation corridors and alternate routes and develop contingency plan.

**STEP 6: Identify processing techniques and barriers**

- ◆ Develop a processing strategy based on composition of C&D materials and their end-uses.
- ◆ Select a processing strategy.
- ◆ Review processing techniques for wood and concrete for projected end-uses.
- ◆ Identify processing barriers and develop programs accordingly.

**STEP 7: Identify processing equipment needs**

- ◆ Compile a list of processing equipment needed to support selected diversion programs.
- ◆ Survey the following to identify the equipment available in the event of a disaster:
  - ◆ agency/department,
  - ◆ franchise hauler,
  - ◆ private sector, and
  - ◆ neighboring jurisdictions.
- ◆ List equipment needed in addition to what will be available.

**STEP 8: Review funding options**

- ◆ Anticipate FEMA reimburses program costs, not advances them.
  - ◆ identify local General Fund or private funds that can be used to start program until FEMA reimbursement is received;
  - ◆ evaluate possibility of acquiring a loan; and
  - ◆ explore use of private funds.
- ◆ Prepare documentation re local policy for diversion/recycling.

**STEP 9: Determine contract needs**

- ◆ Review existing contracts and franchise agreements.
- ◆ Determine contract needs.
- ◆ Select contract type best suited to local situation
- ◆ Develop model contracts.
- ◆ Include diversion/recycling language in contract.

- ◆ Set up tracking system (load verification requirements).
- ◆ Develop list of qualified contractors in the area who have equipment to handle the work.
- ◆ Develop list of contractors who can respond in emergency.
- ◆ Pre-qualify contractors.

**STEP 10: Review Mutual Aid Agreements**

- ◆ Review existing mutual aid agreements.
- ◆ Explore possibility of entering into discipline-specific mutual aid agreements, such as:
  - ◆ public works,
  - ◆ Emergency Managers Mutual Aid, or
  - ◆ public information.
- ◆ Develop a list of mutual aid agreements the jurisdiction is a signatory to and the resources available through each.

**STEP 11: Identify labor needs**

- ◆ Estimate staffing requirements for diversion programs as part of staffing needed for overall recovery programs.
- ◆ List all possible sources for obtaining additional staffing
  - ◆ city/county staff from other agencies,
  - ◆ human services agencies and non-profit organizations, or
  - ◆ volunteers.
- ◆ Enter into mutual aid agreements before disaster for staffing assistance.

**STEP 12: Review local ordinances**

- ◆ Identify all local ordinances affecting a jurisdiction's ability and authority to establish a diversion program or to enter into contracts to manage the disaster debris.
- ◆ Determine who in the jurisdiction has been delegated the authority to act on behalf of the governing body in the event of an emergency/disaster.
- ◆ Outline jurisdiction's local authority with respect to debris management.
- ◆ Identify or establish local ordinances relating to temporary storage sites:
  - ◆ relax storage requirements, or

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- ◆ exempt certain discretionary actions from California Environmental Quality Act (CEQA).