

# UNIFIED FACILITIES CRITERIA (UFC)

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## SELECTION OF METHODS FOR THE REDUCTION, REUSE, AND RECYCLING OF DEMOLITION WASTE



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**UNIFIED FACILITIES CRITERIA (UFC)**

**SELECTION OF METHODS FOR THE REDUCTION, REUSE, AND RECYCLING OF  
DEMOLITION WASTE**

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U.S. ARMY CORPS OF ENGINEERS (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

Record of Changes (changes are indicated by \1\ ... /1/)

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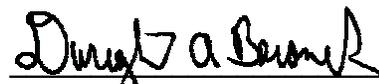
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## CHAPTER 1

### INTRODUCTION

1-1 **PURPOSE.** The purpose of this UFC is to provide guidance for recovery and recycling of building demolition waste. It will assist DoD facilities in determining the most feasible methods to reduce the amount of construction and demolition (C&D) waste material being disposed of in landfills.

1-2 **APPLICABILITY.** This UFC applies to installations or facilities involving facility disposal and construction.

1-3 **REFERENCES.** Appendix A contains a list of references used in this UFC.

1-4 **DISCUSSION.** Outlined in this UFC are demolition, recovery, recycling, and deconstruction techniques for more efficient landfilling practices along with project objectives and conditions for which each of these methods is economically and practically viable. An interactive matrix contains information to assist personnel at installations and facilities in determining the appropriate strategy to divert C&D waste from landfills. The management of demolition projects is largely at the discretion of the individual installation or facility. It is important to investigate prior to any demolition activity to determine which method is most desirable. Building demolition poses unique challenges in the area of waste management. Since each project is different, generating its own unique combination of wastes, a project manager must be flexible and creative in finding ways to reduce, reuse, or recycle the various types of waste.

1-4.1 **Benefits.** C&D debris accounts for an estimated 35 to 40 percent of the municipal solid waste stream. Disposing of debris in landfills is both economically and environmentally costly. Landfilling debris unnecessarily wastes both natural resources and valuable landfill space. Alternatives to conventional demolition and landfilling wastes have proven to reduce solid waste volume, avoid costs for landfill tipping fees, and even provide a source of revenue from the sale or reuse of building materials.

1-4.2 **Policy.** AR 420-49, Chapter 3, contains policy for Solid Waste Management. AR 420-49, paragraph 3-6, sub-paragraph d., states that construction and demolition debris should be recycled when possible. There is a need for effective procedures for evaluating and selecting methods to assist installations and facilities in the reduction, recovery, and recycling of C&D waste. Air Force Instruction (AFI) 32-7042, *Waste Management*, states that installations should pursue cost-effective management approaches that decrease the landfill space required for C&D debris, decrease the amount of HW contaminating C&D debris, and help the Air Force uphold its commitment to pollution prevention. OPNAVINST 5090.1B, Chapter 14 contains the Navy's Solid Waste Management And Resources Recovery Ashore instructions and policy and Chapter 3, Pollution Prevention contains waste minimization and prevention policy. Qualified Recycling Program (QRP) Guide, UG-0039-ENV, July 2000 provides Navy and Marine Corps guidance in operating an installations QRP. The Marines have a

similar instruction, Marine Corps Order MCO P5090.2A of 10 July 1998. See Chapters 15, Pollution Prevention and Chapter 17 Solid Waste Management and Resource Recovery. UFGS 01572, Construction and Demolition Waste Management requires contractors to devise a construction waste management plan that will address recycling, reuse, and other waste diversion methods.

**1-4.3 Army's Future Demolition.** Under Defense Reform Initiative Directive 36, the Army's goal for FY 1998-2003 is to reduce excess space by 53 million SF. Installations continue to maintain excess and/or obsolete structures. The demolition of these structures will cut costs and improve safety but will produce significant amounts of solid waste.

**1-4.4 Requirements.** Requirements for reducing the generation of solid waste are contained in Executive Order 13101. For recycling and waste prevention, each agency is required to establish a goal for diversion of solid waste from landfilling or incineration. The current DoD goal is in the Measure of Merit (MoM) "Non-Hazardous Solid Waste Diversion Rate" issued 13 May 1998. By the end of FY 2005, the goal is to ensure that the diversion rate for nonhazardous solid waste is greater than 40 percent, while ensuring that integrated nonhazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone.

**1-4.5 Planning and Execution Guidance.** This UFC contains information that will help with planning and execution of projects involving the recovery and recycling of building demolition waste to reduce landfill volume. Tables 2-1 and 2-2 list parameters (Objectives and Conditions) associated with the methods for disposing of demolition waste (Demolish, Recycle, Recover, and Deconstruct). In electronic form, each element of the matrices is hyperlinked to its associated text paragraph for easy document browsing.

**1-4.6 Definition of Terms.** Appendix B contains definitions of terms. Appendix C lists State-by-State resources for C&D waste recovery, recycling, and reuse. The first page of the Appendix contains a map, which, in electronic form, contains hyperlinks between the mapped State and that State's listed resources.

**1-4.7 EPA Information.** Please check out EPA's new website on the issue of construction and demolition (C&D) debris at <http://www.epa.gov/epaoswer/non-hw/debris>. C&D debris, the waste from the construction, renovation and demolition of buildings (and other structures), constitutes an enormous volume of materials. This website includes information and links to many diverse resources and organizations covering the characterization, reduction, reuse, recycling and management of C&D debris.

## CHAPTER 2

### SELECTION OF DEMOLITION WASTE REDUCTION, REUSE AND RECYCLING METHODS SELECTION OF DEMOLITION WASTE REDUCTION, REUSE AND RECYCLING METHODS

2-1 **GENERAL.** There is a significant amount of C&D waste developed due to construction activities and structure demolition. For example, at Army installations actively involved in a Facility Reduction Program, C&D waste accounts for up to 80 percent of the solid waste stream. At both active and inactive Army installations, there are about 26,000 WWII structures Army-wide that, if demolished, will produce approximately 6 billion lb, or roughly 10.6 million cu yd of debris. Demolishing and landfilling the building waste incurs significant life-cycle expense to the government as landfill space is diminishing. Landfilling debris unnecessarily wastes both natural resources and valuable landfill space.

2-2 **DEMOLITION.** Traditionally, buildings are removed by means of conventional mechanical demolition techniques. "Demolition" refers to the razing of a building with heavy equipment in such a way that the building components are rendered into rubble and are fit for nothing more than landfill. Demolition provides no opportunity for cost offsets or to generate income. Many alternatives are being practiced in the commercial market and have proven to be successful at reducing the amount of demolition debris that ends up in the landfill.

2-3 **ALTERNATIVES TO DEMOLITION.** Alternatives to demolition include recycling, recovery, and deconstruction. Recycling includes diverting materials that are not reusable from the solid waste stream and using these extracted materials as feedstock for reprocessing into other useful products. Recovery includes the removal of materials or components from the solid waste stream in a manner that retains its original form and identity, for the purpose of reuse in the same or similar form as it was produced. Deconstruction means systematic dismantling of a building, preserving the integrity of the materials, with the goal of maximizing the recovery of salvageable materials for potential reuse and recycling. While these all sound very logical and simple, there is no "one size fits all" solution. Some options that will work for certain situations will not be feasible in others.

2-4 **DECISION MATRIX.** Personnel involved in demolition activities need some method to quickly evaluate alternatives to traditional demolition relevant to specific project objectives and conditions. The attached decision matrix includes various project objectives and project conditions that are matched with the alternative methods of building removal. Conventional demolition is considered a benchmark for comparison. Comparing the performance of each of the alternative approaches will enable personnel to assess their feasibility under the specific project limitations. The requirements and constraints surrounding demolition are defined and included in this matrix as project objectives and project constraints. Certain parameters generally govern the successful completion of a demolition requirement. These objectives include: cost constraints; time

constraints; quality or expected results; safety; risk tolerance; and ease of implementation and opportunity. Other factors that affect the feasibility include such project conditions as: scope or magnitude of the demolition requirement; type of construction and materials involved; condition of materials that can potentially be salvaged; presence of hazardous materials; wage structures; time constraints; landfill burden; environmental conditions; and availability of market outlets.

**2-4.1 How to Use Tables.** Tables 2-1 and 2-2 list these project objectives and project conditions along with the alternative methods of building removal. Each intersection in the table indicates which paragraph number to reference for the corresponding information. In an electronic version of this matrix, each intersection contains a hyperlink that references information for the corresponding cell. For example, to use this matrix, select the cell at the intersection of **DEMOLITION** and **COST**. A hyperlink takes you to paragraph 2-1.1. The costs relative to a standard demolition contract are presented here along with any cost advantages or disadvantages to the owner. This information may then be used for comparison with each alternative method by selecting the hyperlinks in the table or by referencing the paragraph number. For example, selecting the intersection of **DECONSTRUCTION** and **COST** hyperlinks to paragraph 2-1.4, which states that the method of deconstruction, as compared to traditional demolition, has high initial costs with the potential to offset costs and even generate income. Each installation or facility will need to determine, based on individual circumstances, which of these alternatives, or combination thereof, may be acceptable. This matrix is a tool that can be used for this evaluation. The problem of what to do with the waste generated through demolition activities will not simply “go away.” Building waste as a result of demolition activities will increasingly tax the capacity of the nation’s overflowing landfills. This matrix will provide direction and assistance in the recovery and recycling of building demolition waste to reduce landfill volume and conserve resources.

**Table 2-1. Project Objectives.**

	<b>DEMOLISH</b>	<b>RECYCLE</b>	<b>RECOVER</b>	<b>DECONSTRUCT</b>
<b>COST</b>	[3-1.1]	[3-1.2]	[3-1.3]	[3-1.4]
<b>TIME</b>	[3-2.1]	[3-2.2]	[3-2.3]	[3-2.4]
<b>QUALITY/RESULTS</b>	[3-3.1]	[3-3.2]	[3-3.3]	[3-3.4]
<b>SAFETY</b>	[3-4.1]	[3-4.2]	[3-4.3]	[3-4.4]
<b>RISK</b>	[3-5.1]	[3-5.2]	[3-5.3]	[3-5.4]
<b>IMPLEMENTATION</b>	[3-6.1]	[3-6.2]	[3-6.3]	[3-6.4]
<b>OPPORTUNITY</b>	[3-7.1]	[3-7.2]	[3-7.3]	[3-7.4]

**Table 2-2. Project Conditions.**

		<b>DEMOLISH</b>	<b>RECYCLE</b>	<b>RECOVER</b>	<b>DECONSTRUCT</b>
<b>PROJECT SCOPE</b>		[4-1.1]	[4-1.2]	[4-1.3]	[4-1.4]
<b>HAZARDOUS MATERIALS</b>	<b>Asbestos Containing Material (ACM)</b>	[4-2.1.1]	[4-2.1.2]	[4-2.1.3]	[4-2.1.4]
	<b>Lead-Based Paint (LBP)</b>	[4-2.2.1]	[4-2.2.2]	[4-2.2.3]	[4-2.2.4]
<b>SITE ACCESSIBILITY</b>		[4-3.1]	[4-3.2]	[4-3.3]	[4-3.4]
<b>LANDFILL BURDEN</b>		[4-4.1]	[4-4.2]	[4-4.3]	[4-4.4]
<b>RESOURCES</b>		[4-5.1]	[4-5.2]	[4-5.3]	[4-5.4]
<b>MARKETS</b>		[4-6.1]	[4-6.2]	[4-6.3]	[4-6.4]

## CHAPTER 3

### PROJECT OBJECTIVES

3-1 **COST.** There will be a cost associated with each method of building removal. For comparison, costs relative to conventional demolition with a standard demolition contract will be used as a benchmark. Total costs include the cost for demolition and the cost for disposal. According to case study data, the cost of disposal can represent up to 50 percent of the total demolition cost. This makes it desirable to explore alternative methods to reduce disposal costs. Project objectives to minimize the cost of building removal should consider initial costs, cost offsets, income potential, and life cycle costs associated with each alternative.

3-1.1 **Demolish (Cost).** Initial costs for demolition are low. The cost of conventional demolition (not including asbestos removal or tipping fees) ranges from \$3 to \$4 per square foot of floor area. If all debris is landfilled, tipping fees may add \$2 to \$3 per square foot of floor area.

Landfill tipping fees for C&D waste landfills vary widely depending on geographic location. Studies show that the national average for C&D tipping fees has risen over the past 20 years from \$4.90 to \$32.00 per ton. In Portland, OR, tipping fees for C&D debris are high, around \$75 per ton. In densely populated areas like northern New Jersey, tipping fees exceed \$140 per ton.

Demolishing and landfilling building waste incurs significant life cycle expense to the government as landfill space diminishes. The cost of managing and maintaining landfills, along with rising tipping fees, makes this option the least preferable.

3-1.2 **Recycle (Cost).** The cost of a recycling program includes payment of wages for separation and removal of desired materials either on-site or off-site. Separating recyclable materials on-site as they are removed from the building adds to the initial cost, but increases the value of the recycled material. These additional costs to extract materials range from \$1 to \$2 per square foot of building area. The need for added recycling collection containers at the site also increases costs. Table 3-1 lists rental rates for dumpsters.

Table 3-1. Typical Rental Rates for Dumpsters.

	(Cubic Yard)	(Ton)	(Cost)
Weekly	6	2	\$300.00
Dumpster	10	4	\$385.00
Rental	30	10	\$650.00
	40	13	\$775.00

If waste materials are commingled for delivery to a materials recovery facility for recycling, the costs associated with transportation are a significant part of the dynamics

of a recycling operation. The distance that aggregates can be hauled economically varies regionally. Each kilometer that a ton of aggregates is hauled can add 10 to 20 cents to its costs, depending on local aggregates supply and market conditions.

In many instances, a demolition budget can be reduced with a carefully planned salvage and recycle operation. Experience shows that recycling can help achieve cost savings of \$1 to \$2 per square foot of building floor area. If the contractor saves money by recycling, these savings can be passed on to the government in the bid or price for demolition. The more material that is recycled, the less waste that ends up in the landfills.

Reducing the volume of debris also reduces tipping fees at the landfill. In the recycling industry, landfill-tipping fees have a major impact on the success of a recycling operation. When tipping fees are high, there is more incentive to recycle to save money. In rural areas where land is relatively inexpensive, the economics of recycling are such that it costs less money to landfill C&D debris. The tipping fee in Moscow, ID, is \$20 per ton compared to \$75 per ton in Portland, OR. When landfill-tipping fees are low, there is a higher tendency to landfill the material even though it is not environmentally preferable.

Materials with high recycle potential include aggregates, metals, wood, asphalt, concrete, and cardboard. Materials with possible recycle potential include glass, plastics, carpeting, and gypsum wallboard. A large quantity of a recyclable material has potential of returning a profit if there is a market demand for it. Handling and hauling costs may be recovered through the value of the recycled materials. However, there is little potential to generate income from simple recycling.

There is a wide variation in product prices for processed C&D waste. For example, highly specialized products such as painted landscape rock may sell for as much as \$15 per ton, while poor quality fill material might sell for less than \$1 per ton. The price for roadbase, the principal market for recycled aggregates, is much narrower. The reported U.S. sales prices for roadbase ranges from \$2.76 to \$6.70 per ton. The U.S. market price for wood, sold as a cogeneration fuel, ranges from \$5.00 to \$17.50 per ton.

Using recycled materials in place of virgin materials is a closed loop process that extends the life of natural resources. Life cycle costs can be reduced depending on the level of recycling done. Also, recycled products of all types require less energy to create than their virgin-material counterparts do. As the C&D recycling infrastructure grows, these benefits will begin to contribute to reduced construction product costs.

**3-1.3 Recover (Cost).** The handling of materials during salvage creates the cost of recovery. Extra care is needed in the removal of salvageable materials so that they are not damaged. This, in turn, results in additional costs. Additional costs to remove components from a building before demolition can range from \$2 to \$3 per square foot of building floor area. Table 3-2 lists typical components/materials with a high recovery potential.

Table 3-2. Typical Components/Materials with a High Recovery Potential

Appliances	Dimensional Lumber	Light Fixtures	Plywood	Tile
Bathroom Fixtures	Doors	Marble	Shelving	Trim
Bricks	Ductwork	Metal Framing	Siding	Windows
Cabinets	Flooring	Paneling	Soil	Wood Beams
Carpeting	Insulation	Pipes	Stairs	

Buildings containing large quantities of these specialty items may offer significant returns through the resale of the recovered materials. Proceeds from the sale or reuse of the salvaged materials can be used to offset the cost of recovery. Salvaged building materials generally sell for about half the price of new materials. If the materials are sold to a scrap dealer, the return is about half of that, or about 25 percent of the purchase price for new materials. Table 3-3 lists estimated salvage values for some commonly recovered materials. Prices will vary regionally and over time. Table 3-3 includes reasonable estimates based on the year 1999 values.

Table 3-3. Estimated Salvage Values for Some Commonly Recovered Materials

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Retail Unit Value</b>	<b>Estimated Salvage Value</b>
Metals	Aluminum Scrap	Ton		\$480.00
	Brass Scrap	Ton		\$560.00
	Copper Scrap	Ton		\$980.00
	Lead Scrap	Ton		\$380.00
	Steel Scrap	Ton		\$35.00
Oak Flooring	2-1/4" wide	SF	\$2-\$2.50	\$0.65-\$1.00
	3-1/4" wide	SF	\$2-\$2.50	\$0.65-\$1.00
Framing Lumber "higher" quality (#2 grade)	2 x 4 (8'-10')	EA	\$≅3.00	\$0.90-\$1.10
	2 x 4 (12'-14')	EA	\$≅4.50	\$2.00-\$2.40
	2 x 8 (12')	EA	\$≅8.75	\$3.90-\$4.80
	2 x 8 (14'-15')	EA	\$≅10.00	\$4.50-\$5.50
Framing Lumber "lower" quality (construction grade)	2 x 4 (8'-10')	EA	\$≅3.00	\$0.30-\$0.75
	2 x 4 (12' x 14')	EA	\$≅4.50	\$0.45-\$1.10
	2 x 8 (12')	EA	\$≅8.75	\$0.90-\$2.20
	2 x 8 (14'-15')	EA	\$≅10.00	\$1.00-\$2.50
	2 x 12 (10')	EA	\$≅10.00	\$1.00-2.50
Brick	Flush	EA	\$0.30-\$0.35	\$0.10-\$0.20
Windows (double-glazed, aluminum replacements)	31" x 54"	EA	\$90-150	\$15-\$30
	34" x 45"	EA	\$90-150	\$15-\$30
	20" x 36"	EA	\$90-150	\$10-\$15
Doors	36" ext. panel	EA		\$0-\$15
	18" paneled	EA		\$5-\$10
	24" paneled	EA		\$5-\$10
	30" paneled	EA		\$5-\$10
Tubs/toilets/sinks	Cast iron tub/ stainless steel	EA		\$5-\$10
Stair units, treads	Oak treads/ units include stringers	EA		\$25-\$50

Extra resources are required to handle and manage a resale operation. Recovered materials need to be stored and if no space is available, renting storage space will add to the overall cost. The government can benefit if the recovered material can be utilized for another project, thus avoiding costs elsewhere. For example, concrete can be crushed and reused on-site as fill material. This saves money by avoiding the hauling and dumping charges as well as the cost of the new material.

Recovering materials not only keeps them from filling up the landfills, but also

conserves natural resources. The availability of natural resources varies from region to region. Where these resources are scarce, an active resale industry exists. Regions with high demand and markets for used materials include the West Coast (California, Nevada, Oregon, Washington and Idaho) and the southwest (Arizona, New Mexico, Texas, Oklahoma, Arkansas, and Louisiana).

Recovering materials for reuse has a high potential to reduce the cost for building removal. However, there is relatively little potential of generating income through reuse. The value of recovered material along with reduced dump fees can enable a contractor to reduce the bid price for demolition. Case studies show that recovery and reuse of components can yield a cost avoidance of a few cents to \$4 or \$5 per square foot of building.

**3-1.4 Deconstruct (Cost).** Initial costs for deconstruction are relatively high. Based on case studies, the cost for deconstruction can add up to an additional \$2 to \$3 per square foot of building floor area. The single most expensive element of deconstruction is labor. Careful dismantling is labor intensive. Other costs include equipment rental, storage of materials before resale, and transportation of materials.

However, decreased costs from avoided time and expense needed to bring heavy machinery to a job site, salvage values, and reduced disposal costs can make deconstruction a viable alternative to conventional demolition. Case studies show that the sale of recovered materials could offset expenses by \$2 to \$3 per square foot of building floor area. When the costs associated with long-term landfill life are considered, deconstruction is the preferable method. In an area with high tipping fees and well-established end-use markets, it may even be possible to profit from the deconstruction of a building.

**3-2 TIME.** If time is critical, then conventional demolition may be the only feasible option. Other methods require additional time for contract development, salvage, on-site waste separation and waste removal. "Time is money." For recycling to be feasible, the additional time spent segregating waste must be offset by the revenue of materials and reduced disposal costs for alternative methods of building removal.

**3-2.1 Demolish (Time).** Mechanical demolition is the most time efficient method in terms of physical work. It requires the least amount of on-site labor hours. Mechanical demolition yields a commingled pile of debris that can be quickly loaded up and hauled away. Unless there is some contaminated debris requiring mitigation, a demolition operation can be completed within a matter of days as opposed to weeks or even months with some other methods.

**3-2.2 Recycle (Time).** There is no specific time disadvantage to removing materials for recycling if all debris is removed and separated off-site. The time required for on-site removal and separation increases depending on the degree of separation. To save time, a salvage outlet may be contracted to pick up and haul away the materials from the site.

Initially, additional time will be required for contract development. Once a recycling contract has been developed and accepted, future contracts for recycling can be readily implemented and contract development is no longer a factor.

**3-2.3 Recover (Time).** Recovering building materials for reuse is a viable option when time is not constrained. The time involved in handling, sorting, cleaning, cutting, and selling second hand building materials is substantial and can undermine the feasibility of salvage at a demolition job. Duration on-site depends on the extent of the recovery and hand labor required to extract recoverable materials. Extra care and time must be taken to reduce the chances of damaging the materials as they are removed. Separating and sorting materials as they are recovered from the building will increase the total time for on-site removal, but will produce higher quality materials and much higher financial returns. References for deconstruction can also be used for determining the time requirements for recovery. These references are included in the paragraphs below.

**3-2.4 Deconstruct (Time).** Relocating or removing the entire building intact and panelized deconstruction, are rapid forms of deconstruction. However, manual deconstruction is labor intensive and will naturally increase the overall duration of the project. The time requirements for disassembly may vary between three to eight times that of mechanical wrecking. Case studies conducted in the military and private sector show that manual deconstruction proceeds at a rate of about 0.3 SF per man-hour for a wood frame building. For example, a 3,600 SF typical wood frame WWII building, at 0.3 SF per man-hour, with a 10-person crew, requires roughly 3 weeks to manually deconstruct. This figure includes handling, on-site processing and project management and is consistent with R.S. Means productivity data.

Table 3-4 lists labor hours recorded for the disassembly and salvage of components from a 2,000 square foot building made up of four residential units that was deconstructed as part of the Riverdale Case Study. The Riverside Case Study was a multi-agency (EPA/NAHB/HUD) deconstruction project in Baltimore that implemented pilot deconstruction.

These labor hours can be used in combination with more comprehensive references, such as R.S. Means *Building Construction Cost Data*, Micro Computer-Aided Cost Engineering Systems (MCACES), and a Job Order Contracting (JOC) handbook for estimating deconstruction/demolition square foot costs.

Table 3-4. Labor Hours for Disassembly and Salvage of a 2,000 SF Building.

Component	Tasks (hours)			Component Total	Labor Hours	Unit
	Disassem bly	Processi ng	Supp ort			
Interior						
Doors, frames	5.75	5.25		11.0	0.55	EA
Trim, baseboards	4.75	5.0		9.75	0.19	LF
Cabinets	2.75	0.5		3.25	0.27	EA
Plumbing fixtures	7.75	1.75		9.5	0.59	EA

Component	Tasks (hours)			Component Total	Labor Hours	Unit
	Disassembly	Processing	Support			
Radiators	1.5	0.5		2.0	0.13	EA
Appliances	0.25	2.75		3.0	0.60	EA
Bathroom floor tile	2.5	0.50		3.0	0.038	SF
Oak strip flooring	19.25	27.0	0.25	46.50	0.038	SF
Plaster – 1st level	34.25	10.0	5.50	49.75	0.012	SF (plaster area)
Plaster – 2nd level	23.75	10.75	2.0	36.50	0.009	SF (plaster area)
Piping and wiring	6.75	3.25	0.50	10.50	0.0072	LBS
Partition walls	6.25	24.75	3.0	34.0	0.18	LF
Windows and trim	10.0	2.5	0.50	13.0	0.54	EA
Ceiling joists	1.0	4.75	0.5	6.25	0.0075	LF
Load-bearing walls	2.75	15.5	1.75	20.0	0.027	LF
Sub-floor – 2nd	16.0	6.0	1.25	23.25	0.023	SF
Joists – 2nd level	7.25	16.25	1.5	25.0	0.027	LF
Sub-floor – 1st	7.75	8.0		15.75	0.016	SF
Joists – 1st level	7.0	10.0		17.0	0.020	LF
Stairs	2.5	0.75	0.75	4.0	0.3	Riser
Exterior						
Gutters, fascias	2.25	1.0		3.25	0.014	LF
Chimney	33.25	40.5	4.75	78.5	0.16	CU FT
Gable Ends	8.0	3.0	0.75	11.75	0.053	SF
Masonry walls – upper	14.75	104.5	20.5	139.75	0.25	SF (brick area)
Masonry walls – lower	15.75	84.0	5.25	105.0	0.078	SF (brick area)
Roof						
Roofing material	17.75	18.25	1.75	37.75	2.68	SF
Sheathing boards	21.25	14.5	1.5	37.25	0.028	100 SF
Framing	7.25	9.75	7.0	24.0	0.021	LF
Shed roof framing	1.25	2.25		3.5	0.036	LF

While the R.S. Means approach does not address deconstruction specifically, it does provide labor costs associated with selective demolition tasks. For a more complete cost estimate, refer to *R.S. Means Building Construction Cost Data*, 57<sup>th</sup> Annual Edition, 1999, R.S. Means Publishers, Kingston, MA.

The MCACES is a multi-user software program used for the preparation of detailed construction cost estimates for military, civil works, and Hazardous, Toxic, and Radiological Waste (HTRW) programs. The supporting databases include a unit price book (UPB), crews, assemblies, labor rates, equipment ownership schedule costs and models. All databases work in conjunction with each other to produce a detailed cost estimate. For additional information on the MCACES program, call or e-mail Jim Nichols, CEHNC-ED-ES-A, at (256) 895-1842 or:

[James.E.Nichols@hnd01.usace.army.mil](mailto:James.E.Nichols@hnd01.usace.army.mil).

The JOC technique is based on a comprehensive set of general specifications and a related Unit Price Book (UPB) adjusted for the area where the work will be performed to reflect the cost and type of work anticipated. The UPB contains between 40,000 and 60,000 priced line items, organized in 16 Construction Specification Institute (CSI) divisions, which, when factored by the contractor's pricing coefficient, are used to establish firm fixed price delivery orders under the contract. For additional information on the JOC program write or call Marie Raglind, CEHNC-CT-S, at the U.S. Army Engineering and Support Center, Huntsville, AL (256) 895-1139 or e-mail at:

[marie.raglind@hnd01.usace.army.mil](mailto:marie.raglind@hnd01.usace.army.mil).

The MCACES databases and the JOC book list specific demolition jobs with the cost and time requirements. The JOC also includes an added line item for the cost of demolition and removal before selective remodeling tasks. The labor and cost required for a salvage or deconstruction operation can be calculated using this data.

**3-3 QUALITY / RESULTS.** Future plans for the use of the site may affect the selection of the method for removal. Mechanical equipment may be required for cleaning up the site and restoring it to grade. The quality of work and results will vary for each alternative method of building removal and for each building type. If performance objectives are based on volume of waste reduction the following results can be expected for each building type.

Brick or concrete structures generate about 3.0 cu ft of demolition debris per square foot of floor area and wooden structures generate about 4.5 cu ft of demolition debris per square foot of total floor area. A predominately brick structure can contain up to 80 percent brick by volume. Thus, an active brick-salvaging program could eliminate much of the solid wastes resulting from demolition of this type of structure. For concrete structures, approximately 50 percent of the demolition waste is composed of concrete—most of which can be recycled and reused. A “typical” WWII barracks, which is a predominately wood structure, contains up to 90 percent wood. A careful salvaging operation can provide high-quality lumber and reduce solid waste generation.

**3-3.1 Demolish (Quality/Results).** Demolition takes down the entire structure and

hauls away the debris leaving nothing behind. The site surface is typically cleared to grade on completion of the demolition project or contract. Subsurface components are typically abandoned.

All debris is landfilled under a conventional demolition project contrary to the objective of reducing solid waste. Opportunities exist to reduce the volume of solid waste using different machinery or techniques for the demolition.

**3-3.2 Recycle (Quality/Results).** Recycling is generally efficient for site surface restoration. Recycling bins are organized at the site and site clean up is coordinated with other demolition activities to clear the site to grade on completion of the project.

Recycling is favorable for waste diversion and potentially reduces the amount of solid waste that ends up in a landfill. Site/source separation will yield a greater amount of material that can be recycled. Approximately 70 percent of demolition debris can be diverted from the landfill and recycled, but this figure will vary depending on the type of building being demolished, and the effectiveness of the local recycling infrastructure

**3-3.3 Recover (Quality/Results).** This method is generally efficient for site surface restoration. Provisions for removing and disposing of unrecoverable materials and restoration of the site to grade would have to be included in the contract. Typically, subsurface components would be abandoned.

With recovery and reuse, there is significant potential to reduce solid waste. Depending on the condition of the structure and material removed, the volume of waste ending up in a landfill can be greatly reduced. Typically, recovering selected building materials for reuse (in addition to the recycling activities described above) can divert as much as 85 percent of the demolition waste.

**3-3.4 Deconstruct (Quality/Results).** Manual deconstruction may leave the site with some building structure remaining. Restoring the site to grade will generally require heavy machinery to remove such elements as the concrete foundation. If the deconstruction requires that materials be sorted and stored before resale or reuse, clean up may be a problem. The site is likely to be neglected and left disorderly.

Deconstruction dramatically reduces the amount of waste that must be shipped to landfills. The amount of reusable lumber and architectural fixtures that can be salvaged for reuse increases with hand demolition. As materials are removed, they can be carefully separated to avoid cross-contamination, thus yielding a higher volume of material for recycling or reuse. Removing a building or major portions thereof intact (in addition to the recycling and recovery activities described above) can typically divert as much as 90 percent of building waste from the landfill.

**3-4 SAFETY.** The Occupational Safety and Health Administration (OSHA) governs demolition safety with published rules in 29 CFR 1926. Also USACE EM 385-1-1 and UFGS 01525N Safety Requirements address safety and health requirements for demolition activities. These requirements address in detail the types of worker

activities and the materials that are regulated. Two materials used extensively in buildings are asbestos and lead-based paint (LBP). Both of these are occupational health hazards and require special management and removal in compliance with OSHA and USACE safety standards. Unified Facilities Guide Specifications (UFGS) address Asbestos Abatement activities, including demolition and Lead Hazard Control Activities . (See various specifications in Division 13 – *Special Construction* Series. Contracts for demolition activities should include these UFGS, as appropriate. For in-house activities, the procedures described in the UFGS should be implemented.

**3-4.1 Demolish (Safety).** Demolition contractors are required by OSHA to take appropriate safety measures when removing hazardous waste and operating heavy mechanical equipment. Noise, dust, and falling debris are the major environmental problems associated with mechanical demolition. Airborne asbestos and/or lead-containing dust is possible if either is found in high concentrations. Suitable measures to prevent dust formation during wrecking should be instituted. Other hazardous materials such as polychlorinated biphenyls (PCB) and mercury may also be encountered in demolition debris. All workers must be protected in accordance with applicable OSHA regulations.

**3-4.2 Recycle (Safety).** Recycling, with the separation of materials, increases the number of tasks performed and creates additional physical and environmental exposure to hazards. Effective implementation of OSHA, USACE, and Navy safety and health regulations will control exposure of hazards to personnel performing recycling operations. There may be some concern about asbestos and LBP-contaminated materials being introduced into the recycled materials market. Effective removal of asbestos, LBP, PCB, mercury, and other hazardous materials must be monitored to ensure that they are not recycled into feedstock. Generally, recycling does not pose a hazard to the public.

**3-4.3 Recover (Safety).** Recovering materials may result in additional occupational exposure to physical and environmental hazards. Workers need to take extra safety precautions when manually removing building components, including asbestos and LBP. Effective implementation of OSHA, USACE, and Navy safety and health regulations will control exposure of hazards to personnel performing recycling operations.

**3-4.4 Deconstruct (Safety).** Deconstruction, like recycling, is labor intensive, increases the number of tasks performed, and creates additional physical and environmental exposure to hazards. Effective implementation of OSHA, USACE, and Navy safety and health regulations will control exposure of hazards to personnel performing deconstruction operations.

**3-5 RISK.** Certain risks are associated with jobsite physical and environmental hazards. The government is responsible for requiring and enforcing appropriate control measures, but the contractor is ultimately responsible for maintaining appropriate control measures. There is typically no risk to the public if a demolition project is performed in accordance with prevailing safety and environmental standards.

**3-5.1 Demolish (Risk).** The government is in a generally favorable position to manage risk relative to cost, time, and environmental hazards. The government is in somewhat of a less favorable position to manage risk relative to contractor performance. The government assumes risk and liability for differing conditions encountered during demolition. The government can reduce the probability of differing conditions through a thorough survey of the building and an accurate description of conditions in the contract documents. The government is exposed to time and cost impacts relative to differing project conditions resulting in contract changes. If a demolition project is performed in accordance with prevailing safety and environmental standards, there is typically no risk to the public.

**3-5.2 Recycle (Risk).** A recycling program may delay subsequent activities such as the ability to use the site. Unless sufficient liquidated damage provisions are included in the contract, the government assumes indirect effects of deficient contract performance. There is typically no risk to the public if a demolition project is performed in accordance with prevailing safety and environmental standards. There is possible exposure to the hazards of asbestos and/or lead if contaminated materials are released to the public through recycling or reuse. The government should require a contractor to monitor and control release of contaminated materials into recycled material feedstock.

**3-5.3 Recover (Risk).** The government assumes the risk and liability for differing conditions encountered during recovery and removal. The contractor assumes the risk of recovery expenses and the value of recovered materials. Transferring this risk holds the government harmless, but at a reduced income due to contingencies. There is possible exposure to the hazards of asbestos and/or lead if contaminated materials are released to the public through recovery and reuse.

**3-5.4 Deconstruct (Risk).** Personal injury liability is an issue when deconstructing a building since manual labor is used to perform most of the work. The probability of jobsite hazards can be reduced through the administration of a safety management program and adherence to safety and health regulations. With deconstruction, there is a risk of encountering unforeseen conditions. The government can transfer the risk of differing conditions, but at a significant price due to inflated contractor contingencies.

**3-6 IMPLEMENTATION.** Solicitations for traditional demolition contracts are generally in the form of a Request for Proposal (RFP). The lowest qualified bidder is generally selected as the contractor. A typical demolition RFP requires contractors to submit such information as qualifications and description of the proposing organization, a list of sub-contractors, a project schedule, and a list of completed projects and references. Since the method of demolition is irrelevant, no plan or proposal beyond a schedule is usually required. Where UFGS 01572 *Construction and Demolition Waste Management* is included in the contract documents, a waste plan is required that encourages reuse and recycling, and explicit requirements can be added.

To achieve higher rates of recovery, building material reuse and recovery must be part of the project planning and contracting process. A typical demolition contract, however,

will not work well to ensure maximum waste reduction, reuse, and recycling. These goals need to be explicitly outlined and negotiated before selection of a contractor.

Some standard contract formats limit the feasibility of reuse and recycling. Federal, State, and local contracting authorities should identify and remove barriers to material reuse, and recycling in the language, process, and procedures of public contracting. There are model contracts for past projects that can be customized for individual agencies. For example, East Bay Conversion and Reinvestment Commission developed a model Request for Proposal and Scope of Work for building deconstruction at the former Alameda Naval Air Station. The scope includes specific deconstruction, salvage, reuse, and recycling requirements. The following paragraphs are examples of language found in the Request for Proposals from two different projects.

Excerpt from the East Bay Conversion and Reinvestment Commission for deconstruction, demolition, and removal at the former Alameda Naval Air Station:

Deconstruction Plan: Submit proposed deconstruction, salvage, demolition and removal procedures to the City Contract Administrator for approval before work is started. The deconstruction/demolition plan shall include procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of all shoring, equipment, and methods to be used for each operation and the sequence of deconstruction operations. Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, State provisions for securing the safety of the workers throughout the performance of this work.

Excerpt from the Bayview Military Housing Project RFP Amendment encouraging material recovery:

The Contractor is encouraged to recycle salvageable materials such as doors and windows that are unpainted, plumbing fixtures, lighting fixtures, and other materials that are not contaminated by hazardous materials such as asbestos and lead paint, and that are easily removed and reused. A public offering to sell or give away materials on government property is allowed if the following conditions are met:

The materials to be given away or sold on the premise must be marshaled in a location approved by the Contracting Officer.

The traffic of buyers or takers of the sale or give away materials shall provide adequate safety for all concerned. The traffic routing must be approved by the Contracting Officer.

Compliance with all laws and regulations.

The proposer/contractor is encouraged to recycle concrete and asphaltic concrete materials to be reused as fill under new paved areas, and under building foundation and slabs on grade. The recycled concrete and asphalt concrete are required to have all

hazardous materials and reinforcing steel removed before being crushed for use as fill materials. Crushing operation is allowed at the job site as allowed by local laws and regulations. Compliance with local Air Quality control and safety regulations will be required.

**3-6.1 Demolish (Implementation).** Demolition requirements are implemented as standard practice for building removal in DoD projects for new construction, and contract methods for standard demolition are already established. However, all new demolition contracts need to include specification requirements for the contractor to track and report the amount of waste disposed in landfills in order to satisfy installation reporting requirements under the DoD Solid Waste Measure of Merit. Demolition is typically executed through competitive bidding or an existing JOC contract. Boilerplate language from a standard model is used in the contract. The nature and extent of the work to be performed is usually described in the “scope of work” section of the document. The same language is also included in the bid solicitation.

**3-6.2 Recycle (Implementation).** The requirement to recycle materials is typically not included in a standard demolition contract, but an incentive clause can simply be added to the contract. In an incentive contract, the contractor has a cost for traditional demolition and waste disposal, but is encouraged to use waste reduction and recycling techniques. The contractor gets paid fully for his awarded bid, but is allowed to profit from any cost reductions realized through recycling. Provisions for handling tasks and the recyclable materials will have to be added to the scope of work.

In general, technical requirements and contract provisions shall be developed to include:

- control of physical hazards
- control of environmental hazards
- procedures and points of contact for the installation recycling program manager to work with the contractor to identify local markets for recycled materials
- disposition of recyclable material and material to be landfilled
- DRMO (Defense Reutilization Marketing Office) (Defense Reutilization Marketing Office) practices for items removed from buildings
- procedures for tracking and reporting the amounts of waste recycled and disposed in order to satisfy the Solid Waste Measure of Merit metrics of others.

**3-6.3 Recover (Implementation).** Most demolition contracts do not contain special language requiring materials recovery. Alternative procedures will have to be described in detail to explain how contractors plan to achieve maximum recovery in their bid response. The weight of materials recovered must be tracked and reported along with

the weight of materials recycled, to support the DoD Solid Waste Measure of Merit metrics. A standard demolition contract with bid alternatives allows contractors to submit an alternate bid for reducing and reusing the predominant C&D materials found in the building. The variations for bid alternatives are endless and offer maximum flexibility.

The sale of the building materials from demolition is atypical of traditional practices and may necessitate the development of an entirely new type of agreement. Provisions for transfer of property and material recovery will have to be included in the contract's scope of work.

**3-6.4 Deconstruct (Implementation).** Development of a contract for deconstruction will require additional time and advanced planning. There are many issues that need to be addressed, as conditions will vary greatly from one project to the next so no standard contract may be acceptable. One way to handle this is to issue a RFP similar to a traditional design or construction RFP. Here the contractor would be given a delivery order for an entire deconstruction project. Another strategy is to use a standard contract with bid alternatives in which bidders are asked to submit an alternate bid for deconstructing the building. This plan for deconstruction before the award of the contract can require guaranteed minimum salvage quantities and allow the contracting entity to compare proposed deconstruction plans to meet project goals.

**3-7 OPPORTUNITY.** The manual disassembly of wood-framed WWII barracks, as well as other construction types, represents an excellent opportunity to train low-skilled workers or military personnel with an aptitude and interest in learning the building trades. Trainees learn carpentry and physical worksite-related skills, including safety procedures, equipment operation and maintenance, and proper material handling. Also, trainees gain general employment skills, build a work ethic, and learn about leadership, decision-making and team building.

**3-7.1 Demolish (Opportunity).** In demolition there is little potential for construction-related training for military personnel. Demolition jobs require skilled labor in the areas of transportation and heavy equipment operation.

**3-7.2 Recycle (Opportunity).** The same is true for recycling as for demolition. There is limited potential for construction-related training for military personnel. Contractors hire trained crews to perform these operations.

**3-7.3 Recover (Opportunity).** If hand demolition techniques are used to disassemble a building and separate out the recoverable materials, there is significant potential for construction-related training.

**3-7.4 Deconstruct (Opportunity).** The highest potential exists for construction-related training in a building deconstruction project. Unskilled labor can obtain necessary experience. Deconstruction introduces opportunities for training at a level requiring only worker endurance, ability, and willingness to learn. Trainees can learn and practice construction-related skills by performing necessary tasks, but with less concern for risks

of poor workmanship.

## CHAPTER 4

### PROJECT CONDITIONS

4-1 **PROJECT SCOPE.** The scope of a project will affect the viability of each method of building removal. Depending on the method of building removal, there will be certain project constraints. An installation or facility can package projects to optimize the alternative methods. In most cases, the most successful strategy of building removal will involve a combination of demolition and deconstruction to recycle and recover useful materials.

4-1.1 **Demolish (Project Scope).** The scope of a project has no impact on the viability of landfilling debris from demolition.

4-1.2 **Recycle (Project Scope).** A project in which materials are recycled instead of landfilled is viable if the scope of the project is such that there is a high yield of materials for reprocessing. The overall size of the demolition project affects the feasibility, but the success of a recycling operation will also depend on the available recycling facilities in the area. Lack of these facilities in a project area may make the recycling of some materials expensive and/or impractical. The economies of transporting the materials long distance must be weighed against local disposal.

4-1.3 **Recover (Project Scope).** A recovery operation is generally effective if the scope of the project contains a large square footage of building to be removed. Larger projects can take advantage of economies of scale to reduce the extra labor costs of on-site preparation and save on landfill fees. Success will depend on the condition and the quantity of the recovered materials. Recovery is feasible if the total value of the items removed, plus the avoided costs for landfill disposal, compensates for the added cost of removal and storage.

4-1.4 **Deconstruct (Project Scope).** Buildings should be identified and deconstructed for their suitable components. Warehouses and certain types of industrial buildings are often good deconstruction candidates, since they are relatively simple structures with few interior partitions and are often unpainted. Valuable materials, (e.g., wood) are relatively easy to access, debris is minimized, and LBP is less likely to be an issue. Barracks are generally the second most desirable group of buildings to deconstruct since they are also relatively simple. Although offices and residences are usually less desirable structures, they should still be surveyed for deconstruction since some structures may contain valuable materials or fixtures. Case studies show that a scope of less than five buildings (approximately 10,000 total SF) is still sufficient to attract participation in a deconstruction operation. On the other hand, if a great number of buildings are to be removed at one time (hundreds), the glut of recovered materials may depress resale prices, thus inhibiting economic benefits.

4.2 **HAZARDOUS MATERIALS AND WASTE MANAGEMENT.** Check specific environmental requirements while in the project planning phase. Federal requirements

are found in the Code of Federal Regulations (40 CFR for environmental, 49 CFR for transportation, and 29 CFR for OSHA) and will apply in all states. State environmental requirements may be more stringent; if so, they are layered on top of the Federal requirements and must also be followed to avoid potential legal liability and/or fines. The States will have varying disposal and notification requirements for asbestos-containing material (ACM), lead based paint (LBP) debris, polychlorinated biphenyls (PCB), mercury and other materials. Due to the vintage of military facilities, many structures on military bases contain these hazardous materials. Because of the presence of these materials, additional measures and precautions are necessary to both demolish a structure and/or recover materials for reuse and recycling. It is the responsibility of the property owner to make reasonable efforts to identify hazardous materials on the site before demolition. Asbestos, lead, PCB and mercury abatement should occur in advance for every building that is being demolished, deconstructed, or relocated. More detailed information about establishing an installation-wide C&D management program and the specific environmental requirements for handling contaminated C&D debris, is found in the AFCEE *C&D Waste Management Guide* is available for downloading at <http://www.afcee.brooks.af.mil/eq/programs/summary.asp?rsclD=870>. This Guide also includes seven self-calculating spreadsheets for estimating and tracking the amounts and costs for C&D materials that are recycled and disposed in renovation and demolition projects.

**4-2.1 ASBESTOS CONTAINING MATERIAL (ACM).** At one time, many different types of building materials contained asbestos because it was plentiful, inexpensive, nonflammable, strong yet flexible, resistant to chemical corrosion, and a good thermal and sound insulation. Asbestos is most commonly found in beam spray, insulation, mastic, floor tile, ceiling tile, siding, transite board and roof shingles. Asbestos is only a health concern when it is exposed, disturbed, and friable. Materials become friable if asbestos is liberated from the material matrix. Substances easily crumbled or reduced to powder by hand pressure are termed “friable.” Friable ACM requires full containment, monitoring, notification, and disposal at a special hazardous waste landfill. Substances not producing powder with hand pressure are “non-friable” and can be removed with minimal amount of containment. Unified Facilities Guide Specifications in Division 13 describe asbestos related safety, health, and disposal requirements and procedures to be implemented for building demolition activities. Public Works Technical Bulletin 420-70-8, *Installation Asbestos Management Program*, provides the latest information for the Army on asbestos management and safety procedures.

A building probably has asbestos if:

- it was built 1955-1978 and has ceilings that are bumpy, as if coated with cottage cheese or popcorn
- it was built 1940-1955 and has hard, rock-like shingles or siding
- it was built 1940-1983 and has vinyl flooring
- it was built 1955-1978 and has gypsum drywall walls
- it has ductwork sealed with white duct tape
- it has steam lines
- it has pipe insulation that looks like corrugated cardboard

- it was built 1920-1978 and has pipe insulation that is wrapped in canvas.

To be certain if a building material contains asbestos, a pre-design survey must be accomplished to obtain detailed data regarding ACM locations and content in building areas to be impacted. Samples must be taken by a person trained to do so and analyzed in an accredited laboratory. The results will indicate whether the material is positive (>1 percent asbestos) or negative (= <1 percent asbestos). Engineering Pamphlet (EP) 1110-1-30 details a scope of work for such asbestos surveys.

The OSHA construction industry asbestos standard, 29 CFR 1926.1101 ([http://www.access.gpo.gov/nara/cfr/waisidx\\_01/29cfrv8\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/29cfrv8_01.html)) provides detailed work practice and engineering control requirements for asbestos work.

EPA's National Emission Standards for Hazardous Air Pollutants (NESHAPs) protect the public from exposure to airborne contaminants, including asbestos. The complete text is found at [http://www.access.gpo.gov/nara/cfr/waisidx\\_01/40cfr61\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/40cfr61_01.html). Sections 140, 141, 145, and 150 apply.

The asbestos NESHAP requires the owner or operator of a demolition or renovation activity to thoroughly inspect the facility for the presence of asbestos, including nonfriable ACM. If a threshold amount of asbestos will be disturbed, then the installation must provide written notification at least 10 days before beginning work, to the local Pollution Control Agency responsible for NESHAP enforcement in accordance with Title 40 CFR 61.145(b), "Notification requirements." The installation must also comply with asbestos emission control requirements contained in Title 40 CFR 61.145(c), "Procedures for asbestos emission control." If less than the threshold amount of asbestos will be disturbed, only the reporting requirements of Title 40 CFR 61.145(b) apply. Neither the reporting or emission control requirements apply if less than the threshold amount of asbestos is disturbed in a building undergoing renovation.

The threshold asbestos amounts that trigger the reporting requirements are:

- 80 linear meters (260 linear feet) of regulated asbestos-containing materials (RACM) on pipes
- 15 square meters (160 square feet) of RACM on other facility components
- One cubic meter (35 cubic feet) of facility components where the amount of RACM previously removed from pipes and other facility components could not be measured before stripping.

Roofing materials have been specially addressed by EPA in Appendix A to the asbestos NESHAPS. The notification, wetting, and disposal requirements are defined for different situations and materials. A/C shingles that are removed and disposed of without crumbling, pulverizing, or reducing **them** to powder, are not subject to the NESHAP waste disposal requirements. This Appendix is not found on the CFR web site, so please consult your legal office or environmental management function for the details.

Wallboard typically does not contain asbestos, but the joint compound may. OSHA considers the joint compound and wallboard separate materials. NESHAPs considers them as a whole. Therefore, it may be necessary to test samples of both wallboard and joint compound separately to determine worker safety requirements, and also test composite samples of wallboard and joint compound to determine disposal requirements.

#### DEMOLISH (ACM)

Materials that have a high probability of being crumbled, pulverized, or reduced to powder as part of demolition must be removed before demolition begins. Friable and most non-friable ACM should be removed by qualified personnel using appropriate controls and protective devices in accordance with OSHA standards and the Clean Air Act Asbestos NESHAP. The disposal of non-friable ACMs is not regulated at the Federal level; however, States may have more stringent regulations. ACM that is removed must be labeled as such, wetted, bagged, transported in covered vehicles with no visible emissions, and disposed of at an authorized landfill. In most cases, these materials can be disposed of in a C&D or municipal solid waste landfill, but State and local regulations should be checked beforehand. State and local agencies which require handling and licensing procedures for landfills can supply a list of "approved" or licensed asbestos disposal sites upon request.

Specific demolition and cleanup practices for ACM are provided in Corps of Engineers Guide Specification (UFGS13280), Asbestos Abatement, and the Environmental Protection Agency publication, *Demolition Practices Under the Asbestos NESHAP*, EPA/340/1-92-013, 1992.

#### RECYCLE (Asbestos Containing Material)

Any materials containing asbestos shall not be recycled and must be disposed of properly in accordance with State and local landfill regulations.

#### RECOVER (Asbestos Containing Material)

Any materials containing asbestos shall not be recovered or reused. Asbestos removal and remediation cost will be a strong factor in the fate of a structure, whether or not it is economical to reuse or demolish.

#### DECONSTRUCT (Asbestos Containing Material)

Before deconstruction and any further activity, all the ACM must be removed by qualified personnel using the appropriate control and protective devices in accordance with OSHA standards and the Clean Air Act Asbestos NESHAP (40 CFR 61sections140 - 157, [http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr61\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr61_00.html)).

#### OFFSITE TRANSPORTATION

Offsite transportation of asbestos material is regulated under 40 CFR 61 part 150 ([http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr61\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr61_00.html)) and also the Department of Transportation regulations in 49 CFR 171 – 178 ([http://www.access.gpo.gov/nara/cfr/waisidx\\_01/49cfrv2\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/49cfrv2_01.html)). These regulations should be consulted prior to transportation.

**4-2.2 Lead-Based Paint (LBP).** If a structure was built before 1978, it should be assumed that it is coated with LBP. LBP was primarily applied in kitchens, baths, and on wood trim and siding. When an architectural component coated with LBP is displaced and separated from a building during abatement or demolition activities, lead-contaminated debris is generated.

Public Works Technical Bulletin 420-70-2 provides technical guidance to identify and control lead hazards from lead-contaminated paint, dust, soil, and from other sources in Army-owned facilities constructed before 1978. Unified Facilities Guide Specifications in Division 13 describes the safety, health, and disposal requirements and procedures to be implemented for LBP removal and material handling activities.

The rules for storing, handling, record keeping, and disposing of LBP debris are changing. To reduce the costs and remove the obstacles associated with disposal of LBP debris, the USEPA is proposing a rule to shift the regulations from management and disposal of LBP from the Resource Conservation and Reservation Act (RCRA) to a tailored program under the Toxic Substances Control Act (TSCA). Currently, Federal facilities are required under Title IV of the Toxic Substance Control Act, Lead Exposure Reduction (Public Law 102-550), to comply with State and local regulations on LBP. Under the RCRA, installations and facilities are currently required to characterize their LBP waste and dispose of it by an approved method. If LBP debris is determined to be hazardous (equaling or exceeding 5 mg/liter lead according to the EPA Toxicity Characteristic Leaching Procedure, or TCLP), then the waste is strictly managed from identification to disposal.

Many states have regulations that are more stringent than the Federal standards and installations are required to comply with these more restrictive state standards. Workers exposed to lead are protected by standards established by OSHA.

In August 2000, the USEPA issued a policy clarification on how they will regulate the disposal of LBP debris under RCRA. Essentially, any LBP debris from a "residential" building will be considered non-hazardous, by definition. See the following URL for the latest EPA guidance: <http://www.epa.gov/lead/fslbp.htm> . Of course, states will have their own interpretations.

DEMOLISH (Lead-Based Paint)

LBP debris can be removed from the C&D waste stream and be managed separately, or it can remain in the larger contaminated waste stream which will then all have to be managed as LBP debris. Waste managers must determine whether it is more cost effective to simply dispose of the commingled debris in appropriate landfills, or to remove LBP debris and handle it separately so that the rest of the waste can be reused

or recycled.

Whole Building Demolition waste, as one commingled pile of rubble, is seldom regarded as hazardous waste under the RCRA. Often, LBP in demolition debris is not found in high enough concentrations to be hazardous waste and may be disposed of in a C&D landfill among other options. Burning of wood LBP debris, however, may result in lead releases since lead is a metal that is not destroyed through burning. The burning of LBP debris should be discouraged due to potential liabilities associated with disposal of the ash resulting from the burn. Before accepting LBP debris for burning activities, a facility should ensure that there would be no violations of the Clean Air Act permit conditions for burning buildings and that the facility will handle all ash in accordance with Federal/State hazardous waste regulations.

During demolition, mitigation measures to reduce the dust clouds associated with common demolition should be employed to decrease the exposure to lead. Exposure occurs through the inhalation of lead dust or ingestion of deteriorated LBP. Fugitive dust blown to neighboring property can contaminate soil and pass through open windows to settle on exposed surfaces. Typical mitigation involves spraying with water during demolition, watering down rubble pile, and spraying with water during loading and handling. A HEPA vacuum may be used on-site for cleaning up small debris and for vacuuming clothes and tools before exiting the site.

#### RECYCLE (Lead-Based Paint)

LBP debris may be recycled and reused in situations where there will be no human contact. The recycling and reuse of LBP debris as mulch, ground cover, or topsoil may cause health risks through ingestion of LBP, dust, or contaminated soil and should be avoided. If the wood waste is going to be recycled and reprocessed for mulch, composting or biomass fuel, painted or treated wood in general is highly undesirable.

#### RECOVER (LBP)

There are essentially three options available for the recovery and reuse of lumber that is coated with LBP. Each of these options must be looked at very carefully. If the building, intact, would be hazardous waste, then the performance of any of these three treatments would require a RCRA permit prior to execution of the work. One option is to remove the lead paint from the wood. All LBP removed from a substrate by virtually any method will, almost without exception, be hazardous waste and will be subject to RCRA disposal requirements. The second option is to encapsulate the LBP by painting over it, thus eliminating the exposure pathway of the lead. However, in future demolition, the LBP will be exposed again. The third option is to enclose and permanently seal lead painted materials in place. This process has many applications such as covering lead-painted drywall with new drywall, or reversing the painted surface of lumber to expose the unpainted portion of the lumber. Again, this eliminates the pathway for human contact, but would lead to re-exposure under future demolition of the structure. If LBP is transferred to another party for any reason you must notify the recipient in writing of the presence of LBP debris.

If the proposed USEPA regulation takes effect, items such as doors and windows that

contain lead-based paint could not be reused because the lead could still be harmful to children. According to the proposed rule, LBP components, which have deteriorated LBP on them, must be stripped completely of LBP before being reused. This stipulation severely limits materials that can be recovered and recycled because the cost of removing lead-based paint becomes too expensive.

#### DECONSTRUCT (Lead-Based Paint)

Deconstruction results in the disturbance or removal of painted surfaces. Effective implementation of OSHA, USACE, and Navy safety, health, and disposal requirements and procedures will control LBP exposure hazards to personnel performing deconstruction operations.

#### OFFSITE TRANSPORTATION

The offsite transportation of LBP contaminated debris will be subject to RCRA waste manifest and requirements only if the debris has been characterized as hazardous waste under RCRA. . If so, 40 CFR Parts 262 and 263 ([http://www.access.gpo.gov/nara/cfr/waisidx\\_01/40cfrv22\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/40cfrv22_01.html)) should be consulted prior to packaging, labeling and transportation.

**4-2.3 POLYCHLORINATED BIPHENYLS (PCB).** At one time PCBs were common components of hydraulic fluids, lubricants, heat transfer fluids, and insecticides. They were also used as plasticizers in paints, plastics, and rubber products. PCBs were primarily manufactured as dielectric fluid for transformers and capacitors because of their ability to absorb heat, low flammability, low electrical conductivity, and favorable dielectric constant. Currently, heat transfer fluids residing in old transformers and capacitors used in power distribution systems are the main sources of PCBs. There may also be PCB-contaminated soil in places where transformers and capacitors have been stored or serviced, transformer fires have occurred, or PCBs have been sprayed as insecticides. Non-Liquid PCBs (NLPCBs) can be found in various items such as fluorescent light ballast potting material, ceiling tile coatings, and certain painted surfaces.

PCBs are regulated before disposal by their use (i.e., transformers, carbon paper, etc.). However, once the decision is made to end their use, disposal is regulated differently. PCB disposal requirements depend on the type of material being disposed, and the concentration of PCBs in the waste. C&D debris is usually regulated as "PCB bulk product waste." However, PCB bulk product waste does not include debris from the demolition of buildings or other man-made structures that is contaminated by spills from regulated PCBs which have not been disposed of, decontaminated, or otherwise cleaned up in accordance with USEPA requirements.

Other types of PCB bulk product wastes are PCB-containing wastes from the shredding of automobiles, household and industrial appliances, or other white goods; PCB impregnated electrical, sound deadening, or other types of insulation and gaskets; or fluorescent light ballasts containing PCBs in the potting material.

#### DEMOLISH (PCB)

The Toxic Substances Control Act (TSCA) requires mixtures like construction and demolition debris that include PCB-containing materials to be regulated to the requirements of the highest classification of PCB concentration. For this reason, all known PCB materials should be removed and disposed properly prior to demolition. Manufacturers of PCB-containing materials and equipment were required to label these items with the PCB classification. Where this was not done, owners of these items were required to affix classification labels. Yet even fluorescent light ballasts labeled "no PCB" may contain PCBs in the potting material. Therefore, waste managers must use the TCLP sampling method to characterize waste known to contain either potting material that may contain PCBs or unlabeled capacitors and lighting ballasts.

Federal disposal requirements apply to C&D debris contaminated by 50 parts per million (ppm) or greater NLPCBs when originally removed from service, even if the current NLPCB concentration is less than 50 ppm. C&D debris that contained less than 50 ppm NLPCBs before removal from service is not regulated.

PCB disposal requirements are contained in 40 CFR Part 761, *Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions* ([http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr761\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr761_00.html)) and applicable state and local regulations. **NOTE:** Several states regulate PCBs and NLPCBs as hazardous waste, and in those states, HW disposal requirements must be followed in addition to the federal PCB requirements.

PCB bulk product wastes may be disposed of in an incinerator, chemical waste landfill, or hazardous waste landfill, or may be decontaminated in accordance with the detailed procedures in 40 CFR 761.79. The selection of disposal methods is detailed in 40 CFR 761.62.

There is also an option to dispose of certain PCB bulk product wastes in a State-permitted municipal landfill or non-municipal non-hazardous waste landfill. These items include:

- Plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos; non-liquid building demolition debris; or non-liquid PCB bulk product waste from the shredding of automobiles or household appliances from which PCB small capacitors have been removed (shredder fluff); and
- Other PCB bulk product waste, sampled in accordance with the protocols set out by the EPA that leaches PCBs at 10 µg/L of water measured using a procedure used to simulate leachate generation.

In order to dispose of PCB bulk product waste in a State-permitted municipal landfill or non-municipal non-hazardous waste landfill, there may be additional sampling,

recordkeeping and performance requirements that must be satisfied. Carefully review 40 CFR 761.62 if selecting this disposal option.

#### RECYCLE (PCB)

PCB bulk wastes must be disposed in accordance with 40 CFR 761.62 and shall not be recycled.

#### RECOVER (PCB)

PCB bulk wastes must never be recovered and reused without decontamination. The USEPA regulations for decontaminating PCB bulk product wastes are in two parts:

- The first part is a performance-based standard that specifies decontamination standards and requires analytical testing to demonstrate that decontamination has been achieved. Refer to 40 CFR 761.79 for the specific performance requirement. It allows PCBs from liquids, concrete, and non-porous surfaces to be removed using chopping, distilling, filtering, oil/water separation, stripping of insulation, spraying, soaking, wiping, scraping, and use of abrasives or solvents. Decontamination waste must be disposed as required based on the concentration of PCBs in the waste.
- The second part of the regulation provides a self-implementing decontamination procedure for PCB containers, movable equipment contaminated with PCBs, non-porous surfaces in contact with free flowing mineral oil dielectric fluid (MODEF), piping and hoses in air compressor systems, and decontamination of metal surfaces using thermal processes. Confirmatory sampling is not required for self-implementing decontamination procedures; however, documentation of compliance with the procedures must be maintained for 3 years after completion of the decontamination procedures (e.g., video recordings, photographs).

#### DECONSTRUCT (PCB)

Deconstruction may result in the disturbance or removal of PCB bulk wastes. Effective implementation of OSHA and USACE safety, health, and disposal requirements and procedures will control PCB exposure hazards to personnel performing deconstruction operations.

#### OFFSITE TRANSPORTATION

The offsite transportation of PCB contaminated debris is subject to RCRA waste manifest requirements (40 CFR Parts 262 and 263, ([http://www.access.gpo.gov/nara/cfr/waisidx\\_01/40cfrv22\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/40cfrv22_01.html))) and is also subject to Department of Transportation regulations 49 CFR Parts 171-178 ([http://www.access.gpo.gov/nara/cfr/waisidx\\_01/49cfrv2\\_01.html](http://www.access.gpo.gov/nara/cfr/waisidx_01/49cfrv2_01.html)). These regulations should be consulted prior to transportation.

#### **4-2.4 MISCELLANEOUS HAZARDOUS MATERIALS.**

Many common items contain hazardous waste that will contaminate the rest of the C&D materials if left onsite during demolition. The best management practice is to remove these items prior to demolition or during deconstruction.

- Mercury-containing materials and treated lumber are commonly found in construction and demolition debris. Mercury or mercury vapor can be found in fluorescent light bulbs, high-intensity discharge lamps, thermostats, old mercury-bearing wall switches, and a variety of switches, relays and gauges. Wastes containing these items must be characterized as hazardous or not using the TCLP method.
- Batteries are found in emergency lighting, exit signs, security systems and other alarms. They may contain lead and cadmium.
- Roof vent flashings often contain pure lead. Lead pipes may also be found in older buildings.
- Lumber treated with chemicals and preservatives and considered for disposal or reuse in a project may require special handling. It should never be shredded for composting or for use as mulch. Burning is inappropriate if the treatment chemical concentrations are high enough to cause the ash to be hazardous waste, or the smoke to be a pollutant. Treated lumber includes marine piling and fenders, utility poles, rail ties, and other dimensional lumber that has been coated or impregnated with pentachlorophenol, creosotes, and arsenic compounds. Project managers can reduce treated lumber waste by reusing it in landscaping, berms, parking barriers, retaining walls, fencing, pole barns, and other applications calling for treated lumber. Coordinate with environmental managers before reusing treated lumber in situations where chemicals could leach into the ground, or to determine disposal requirements if it cannot be reused.
- Buildings where plating operations or extensive parts cleaning occurred may have materials containing regulated heavy metals or solvent chemicals that were spilled. Paint, oil, pesticides or other materials stored on the site must always be removed and properly disposed before demolition.
- Blue and yellow paints and coatings may contain regulated levels of cadmium and chromium.

Project managers should coordinate with environmental managers when planning demolition or deconstruction. Environmental Impact Analysis Process (EIAP) and Installation Restoration Program (IRP) documents will provide clues to hazardous materials likely to be encountered. Ensure unspecified materials are sampled, tested, and characterized as hazardous or not and manage them accordingly.

4-3 **SITE ACCESSIBILITY.** The site's accessibility to equipment, the contractor or the public affects the viability of each method. Site conditions may be favorable for one method of building removal and less favorable for another. Deconstruction is generally

applicable to specific sites and situations where demolition by other methods cannot be employed either due to severe restrictions on site access or because it can cause serious nuisance and damage. Such sites are usually found in downtown areas, underground facilities, etc. In these situations, manual deconstruction is a matter of necessity.

**4-3.1 Demolish (Site Accessibility).** Conventional demolition requires that the site be accessible by truck. This method is generally efficient regardless of accessibility to the site and site conditions. High-rise buildings that are higher than 15 stories must be partially demolished by manual methods. Use of mechanical demolition methods for higher multi-story buildings can cause serious air pollution and hazard problems in the vicinity of these tall structures.

**4-3.2 Recycle (Site Accessibility).** If debris is separated for recycling off-site, site accessibility and site conditions have no impact on the effectiveness of recycling. If debris is separated on-site for pick-up, space will need to be available to accommodate separation activities and collection receptacles. On-site processing requires allocation of space for mobile crushers and screens, and space to pile sorted materials. Such space may not always be available.

**4-3.3 Recover (Site Accessibility).** Additional square footage at each building site should be available for separating, processing, and removing materials recovered from the building. The most desirable option is to reuse the recovered materials on site. However, that is not always possible and the recovered materials have to be transported to local markets. Truck access should be available around each building's perimeter. Extremely limited space availability and/or truck access to each building may adversely impact the effectiveness of recovery/reuse strategy.

**4-3.4 Deconstruct (Site Accessibility).** Deconstruction is most feasible if there is an open site that allows ample space for on-site handling and processing of materials as they are removed from the building. The site should be organized so that different types of materials can be segregated simultaneously without conflicting during processing. Marking on the ground with paint for varying dimensional lengths facilitates sorting by size and saves time. Where buildings (or major portions thereof) are to be removed intact, large clearances will be required. If heavy equipment is needed for removal, this will also require additional space on the site.

**4-4 LANDFILL BURDEN.** Tables 4-1 and 4-2 list the relative landfill burdens per building type. The amount of material generated from demolition activities is generally proportional to the size of the structure being demolished. The materials generated vary according to the construction type. The following examples (of commercial buildings) can be used to estimate the materials of value that can be extracted with each method.

**Table 4-1. Waste Generation Rates per Building Type.**

	<b>cubic feet of debris per square foot of floor area (cu ft/SF)</b>
Wood Building	4.5
Brick Building	3.0
Concrete Building	3.0

**Table 4-2. Waste Composition per Building Type.**

	<b>% Wood</b>	<b>% Brick</b>	<b>% Concrete</b>	<b>% Metal</b>	<b>% Paper Board</b>
Wood Building	60-75	17-22	10-30	2.5-3	<1
Brick Building	12-32	53-82	12-20	3	1-2
Concrete Building	18-20	20-22	50-51	3	5-7

**4-4.1 Demolish (Landfill Burden).** This method of building removal has the greatest adverse impact on landfills. The traditional method of mechanical demolition was developed without regard to potential environmental impacts. The disposal of wastes generated from conventional mechanical demolition consumes valuable landfill space. One way to reduce the landfill burden is to grind up the resulting demolition debris such that it will require less landfill volume. While this may not save on weight-based commercial tipping fees, it will save the life span of government-owned landfills. Grinding also affords the opportunity to liberate some recyclables, such as steel rebar.

**4-4.2 Recycle (Landfill Burden).** Recycling selected materials can typically divert 70 percent of the waste from ending up in a landfill. Using a sophisticated system of crushers, shakers, screens, magnets, and blowers, larger recovery operations can achieve diversion rates as high as 82 percent. Including a recycling operation into the demolition project is an effective means of reducing the landfill burden.

**4-4.3 Recover (Landfill Burden).** Recovering selected building materials for reuse, in conjunction with recycling, can typically divert as much as 85 percent of the waste from ending up in a landfill. Recovering for reuse is an effective means of reducing the landfill burden. According to the Center for Economic Conversion, the reuse of 1,000 board feet of properly salvaged lumber can replace the harvesting of approximately 10,000 board feet of standing timber

**4-4.4 Deconstruct (Landfill Burden).** Recent deconstruction demonstration projects show that high diversion rates may be achieved. Removing buildings (or major portions thereof) intact can divert up to 98 percent of building waste from landfilling. Deconstruction is highly effective in reducing landfill burden by diverting valuable materials from the nation's overflowing landfills. Relocation preserves both tangible and intangible resources embodied in the structure.

**4-5 RESOURCES.** Typical building removal requires certain labor and equipment

resources. Alternative methods may require other specialized resources that may create an advantage or disadvantage to the owner.

**4-5.1 Demolish (Resources).** The type of construction, building height, proximity to neighboring structures, and rights-of-way are some of the factors that determine the method of demolition. Wood-framed buildings are generally demolished by bulldozer, while masonry or concrete buildings are more likely to be demolished by wrecking ball. Mechanical demolition requires the use of heavy equipment including dump trucks, tractors, and loaders. Demolition requires workers with experience in the areas of transportation and heavy equipment operation. These jobs are typically high paying and require skilled labor.

**4-5.2 Recycle (Resources).** Common equipment and labor skills are used for on-site separation of materials. Manual labor is required to supplement mechanical equipment. The type of construction will determine what tools and equipment are required. "If you don't have the right tools, generating a profit from a C&D debris recycling operation can be as difficult as crushing a one-ton slab of concrete with your fist" (World Wastes, May 1998, p 62). Materials that are not recycled and reused on the site will need to be hauled away by dump trucks.

**4-5.3 Recover (Resources).** Recovery is generally effective using commonly available construction equipment and labor resources. Manually removing materials for reuse requires workers with common building construction skills. Some training may be required if non-construction labor is employed. If larger structural members are removed heavy equipment, such as a crane, is required. High-value/low-salvage cost items such as appliances, cabinets, lighting fixtures and architectural elements are targeted and salvaged before the heavy equipment is brought in to clean up the remaining items. More labor hours are required for a salvage operation. These additional handling costs can be reduced if the efficiency of the equipment is increased.

**4-5.4 Deconstruct (Resources).** Deconstruction is very labor intensive. Workers do not need to be highly skilled, but they do need to have endurance, ability, and willingness to learn. Deconstruction also adds another level of jobs including material handlers and distributors. In piece-by-piece wrecking, workers usually employ simple hand tools such as crowbars, sledgehammers, flat screwdrivers, wire-cutting pliers, a utility knife etc.

**4-6 MARKETS.** Markets and outlets for building construction materials greatly influence reuse and recycling activities. If reasonable profits can be expected from the sale of recycled materials there is a greater incentive for efficient recovery. If there is not a high demand for a commodity, the material may not be salvaged or recycled.

There are several sources that can provide information as to the local market demand, value, and outlets for each material or component type. Through DoD, and the Defense Reutilization and Marketing Service (DRMS) Reutilization Program, excess property no longer needed by the military is made available for redistribution. An installation may be able to use the DRMS to implement deconstruction and salvage. APPENDIX C to this

PWTB contains various Federal, State, and local resources throughout the United States for salvaged C&D waste materials.

4-6.1 **Demolish (Markets).** Demolition operations generate a far less desirable waste due to the non-uniform nature of the waste that is commingled with other materials. Very little reusable waste is yielded due to the practice of using heavy equipment to demolish structures.

4-6.2 **Recycle (Markets).** Recycling facilities will use their resources to recover materials if reasonable profits can be expected from the sale of recycled materials. If the commodity does not command a high enough price in the market, recycling may prove to be costly. Each project's unique regional situation influences how much profit a recycling operation can expect to make. Recycling rates continue to improve, but one undeniable roadblock to a successful recycling program is the lack of markets for some materials.

4-6.3 **Recover (Markets).** The most desirable option, and most cost effective, is to reuse recovered material on the site. For example, concrete can be crushed and used for fill on site. Salvaged lumber and other building materials that can be used on the site for new construction will minimize the cost associated with transportation and market development. One major barrier to increased recovery rates is the low cost of virgin construction materials. Recycled content materials often cost the same or more than new materials. However, salvaged materials can often be of higher quality than comparable new materials. Old-growth timber is one such example.

4-6.4 **Deconstruct (Markets).** Deconstruction minimizes contamination of demolition debris, thus increasing the potential for marketing the recovered materials. Before deconstruction, it helps to know what materials are worth salvaging so that materials with potential value are not inadvertently destroyed. Hand demolition significantly increases the amount of materials that can be reused and yields materials that are available for immediate resale or reuse.

## APPENDIX A

### REFERENCES

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4. Department of Defense
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b. Public Works Technical Bulletin 420-49-30, Alternatives to Demolition for Facilities Reduction, 10 February 2000.

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NFESC QRP Program  
<http://es.epa.gov/program/p2dept/defense/navy/nvy-recy.html>

7. Unified Facilities Guide Specifications  
and Unified Facilities Criteria

- a. 01525N Safety Requirements,  
December 2001
- b. 01572 Construction and Demolition  
Waste Management November  
2001
- c. 02220A Demolition, May 2001
- d. 02220N Site Demolition, March  
2000
- e. UFGS 13280A, Asbestos  
Abatement, November 2001.
- f. UFGS 13281N, Engineering Control  
of Asbestos Containing Material,  
January 2002
- g. UFGS 13281A, Lead Hazard
- h. UFGS 13282N Lead in  
Construction, February 2002
- i. 13283N Removal/Control and  
Disposal of Paint with Lead,  
February 2002

UFC 3-260-01 (TM 5-803-7/ Airfield and  
Heliport Planning and Design

AFMAN 32-1123(I)/NAVFAC P-971)  
UFC 3-260-03 (TI 826-01/ Airfield  
Pavement Evaluation  
AFMAN 32-1121V1(I)/  
NAVFAC DM 21.7)

**NON-GOVERNMENT PUBLICATIONS:**

- 1. Institute of Electrical and Electronics  
Engineers Inc. (IEEE)  
445 Hoes Lane, P.O. Box 1331  
Piscataway, NJ 08855-1331

Standard for Use of the International  
System of Units (SI): the Modern Metric  
System

World Wastes

May 1998 edition, p 62

## **APPENDIX B**

### **DEFINITIONS**

#### **DEMOLISH**

Demolition refers to the razing of a building with heavy equipment in such a way that the building components are rendered into rubble and are fit for nothing more than landfill.

#### **RECYCLE**

Recycling includes diverting materials that are not reusable in their current form from the solid waste stream and using these extracted materials as feedstock for reprocessing into useful products.

#### **RECOVER**

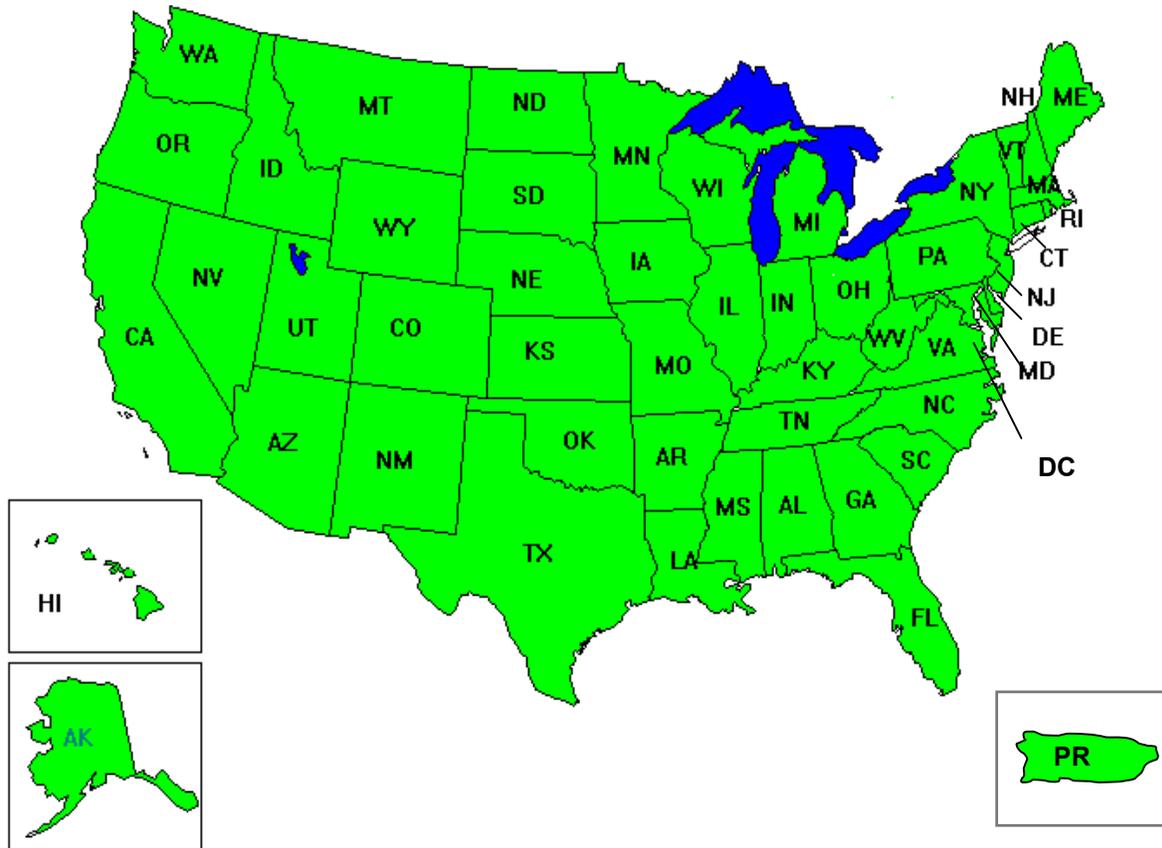
Recovery includes the removal of materials or components from the solid waste stream in a manner that retains its original form and identity, for the purpose of reuse in the same or similar form as it was produced.

#### **DECONSTRUCT**

Deconstruction means systematic dismantling of a building, preserving the integrity of the materials, with the goal of maximizing the recovery of salvageable materials for potential reuse and recycling.

APPENDIX C

INFORMATION RESOURCES FOR C&D WASTE RECOVERY,  
RECYCLING AND REUSE



Note: This is a selective, not a comprehensive, list of resources. This information is provided to increase the recycling and reuse of materials that would otherwise need to be disposed. The references listed below and for information purposes only and are not endorsements by the Department of the Army (DA). The DA is neither liable nor responsible for the character or content of any item listed or sold at non-profit or for-profit material exchanges.

FEDERAL AND NATIONAL ORGANIZATIONS AND ASSOCIATIONS

**Air Force Center for Environmental Excellence**

“C&D Waste Management Guide”

HQ AFCEE/EQ

3207 North Road

Brooks AFB, TX 78235-5363

DSN 240-4191

E-mail: karen.kivela@HQAFCEE.BROOKS.AF.MIL

<http://www.afcee.brooks.af.mil/>

**Aluminum Association**

900 19th Street, NW, Suite 300

Washington, DC 20006-2168

(202) 862-5100; Fax: (202) 862-5164

<http://www.aluminum.org/>

**American Institute of Constructors**

466 94th Avenue North

St. Petersburg, FL 33702

(813) 578-0317; Fax (813) 578-9982

E-mail: AICnatl@aol.com

<http://www.aicnet.org/>

**American Iron and Steel Institute**

1101 17th St., NW, Suite 1300

Washington, DC 20036

(202) 452-7100; 1-800-YES-1-CAN (937-1226)

<http://www.steel.org/environment/>

**American Plastics Council**

1300 Wilson Blvd., Suite 800

Arlington, VA 22209

(800) 2-HELP-90 (hotline) or (202) 974-5413

<http://www2.plasticsresource.com/>

**Appliance Recycling Information Center**

701 Pennsylvania Avenue NW, Suite 900

Washington, DC 20004

(202) 434-7492; Fax: (202) 434-7400

<http://www.aham.org/mfrs/atic/atic.htm>

**The Association of State and Territorial Solid Waste Management Officials**

444 North Capitol St., NW Suite 315

Washington, DC 20001-1512

(202) 624-5828; Fax: (202) 624-7875

E-mail: swmtrina@sso.org

<http://www.astswmo.org/>

**Community Environmental Council**

930 Miramonte Drive  
Santa Barbara, CA 93109  
(805) 963-0583; Fax: (805) 962-9080  
<http://www.grc.org/>

**Construction Materials Recycling Association**

P.O. Box 644  
Lisle, IL 60532  
(630) 548-4510; Fax: 630-548-4511

**Defense Reutilization and Marketing Service**

Federal Center  
74 North Washington St.  
Battle Creek, MI 49017  
(888) 352-9333; Fax: (616) 961-4201  
E-Mail: [custservice@dlis.dla.mil](mailto:custservice@dlis.dla.mil)  
<http://www.drms.dla.mil/>  
Earth's 911  
1-800-CLEANUP  
<http://www.1800cleanup.org/>

**Environmental Industry Associations**

4301 Connecticut Avenue, NW  
Suite 300, Washington, DC 20008  
(202) 244-4700 or (800) 424-2869; Fax: (202) 966-4818  
<http://www.envasns.org/>

**Glass Packaging Institute**

1627 K Street N, Suite 800  
Washington, DC 20006  
(202) 887-4850  
<http://www.gpi.org/>

**Global Recycling Network**

Brookhaven, NY 11719  
Fax: (516) 286-8471  
E-mail: [grn@grn.com](mailto:grn@grn.com)  
<http://grn.com/>

**Gypsum Association**

810 First St., NE, Suite 510  
Washington, DC 20002  
(202) 289-5440

**Institute for Local Self-Reliance, Midwest Office**

1313 Fifth Street SE  
Minneapolis, MN 55414-1546  
(612) 379-3815; Fax: (612) 379-3920  
<http://ilsr.org/>

**Institute for Local Self-Reliance, National Office**

2425 18th Street, NW  
Washington, DC 20009-2096  
(202) 232-4108; Fax: (202) 332-0463  
<http://ilsr.org/>

**Institute of Scrap Recycling Industries**

1325 G Street, NW, Suite 1000  
Washington, DC 20005-3104  
(202) 737-1770; Fax: (202) 626-0900  
E-mail: [isri@isri.org](mailto:isri@isri.org)  
<http://www.isri.org/>

**Investment Recovery Association**

5800 Foxridge Drive, Suite 115  
Mission, KS 66202-2333  
(913) 262-4597; Fax: (913) 262-0174  
E-mail: [ira@invrecovery.org](mailto:ira@invrecovery.org)  
<http://www.invrecovery.org/>

**Keep America Beautiful**

1010 Washington Boulevard  
Stamford, CT 06901-2202  
(203) 323-8987; Fax: (203) 325-9199  
E-mail: [keepamerbe@aol.com](mailto:keepamerbe@aol.com)  
<http://www.kab.org/>

**Mid-America Council of Recycling Officials**

1818 Fountain Square Court F-2  
Columbus, OH 43224  
(614) 265-6333

**Minerals, Metals & Materials Society**

184 Thorn Hill Road  
Warrendale, PA 15086  
(724) 776-9000, ext. 270; Fax: (724) 776-3770

**National Association of Demolition Contractors**

16 N. Franklin Street, Suite 200B  
Doylestown, PA 18901-3536  
(215) 348-4949 or (800)-541-2412; Fax: (215)348-8422  
E-mail: [nadc@voicenet.com](mailto:nadc@voicenet.com)  
<http://www.demolitionassn.com/>

**National Association of Home Builders**

400 Prince George's Blvd.  
Upper Marlboro, MD 20774-8731  
(202) 822-0200  
[http://www.nahbrc.org/builders/green/Decon\\_br.pdf](http://www.nahbrc.org/builders/green/Decon_br.pdf)  
<http://www.nahb.org/>

**National Association of Resale & Thrift Shops**

P.O. Box 80707  
St. Clair Shores, MI 48080-0707  
(800) 544-0751; Fax: (810) 294-6776

**National Recycling Coalition**

1727 King Street, Suite 105  
Alexandria, VA 22314-2070  
(703) 683-9025; Fax (703) 683-9026  
<http://www.nrc-recycle.org/>

**National Solid Wastes Management Association**

4301 Connecticut Avenue, NW, Suite 300  
Washington, DC 20008  
(202) 244-4700; Fax: (202) 966-4841  
<http://www.envasns.org/nswma/>

**Northeast Recycling Council**

139 Main Street Suite 401  
Brattleboro, VT 05301  
(802) 254-3636; Fax: (802) 254-5870  
E-mail: [nerc@sover.net](mailto:nerc@sover.net)  
<http://www.nerc.org/>

**Solid Waste Association of North America**

P.O. Box 7219  
Silver Spring, MD 20907-7219  
(301) 585-2898  
<http://www.swana.org/>

**Steel Recycling Institute**

680 Anderson Dr., Foster Plaza 10  
Pittsburgh, PA 15220-2700  
(800) 876-7274  
<http://www.recycle-steel.org/>

**United States Environmental Protection Agency**

Office of Solid Waste

<http://www.epa.gov/osw/>

"Characterization of Building-Related Construction and Demolition Debris in the United States."

**US Green Building Council**

110 Sutter Street, Suite 410  
San Francisco, CA 94104  
(415) 445-9500; Fax: (415) 445-9911  
E-mail: [info@usgbc.org](mailto:info@usgbc.org)  
<http://www.usgbc.org/>

**Waste Policy Center**

211 Loudon St. SW  
Leesburg, VA 20175-2718  
(703) 777-9800; Fax: (703) 777-3733  
<http://www.winporter.com/>

**Waste Wise**

U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460  
800 EPA-WISE (372-9473); Fax (703) 308-8686  
E-mail: [Tumarkin.Jeff@epamail.epa.gov](mailto:Tumarkin.Jeff@epamail.epa.gov)  
<http://www.epa.gov/wastewise/>

**ALABAMA**

**Alabama Department of Environmental Management**

P.O. Box 301463  
Montgomery, AL 36130-1463  
(334) 271-7700  
<http://www.ademstate.al.us/>

**Alabama Cooperative Extension Service**

202 Duncan Hall  
Auburn, AL 36849-5614  
(205) 844-4451; Fax: (205) 844-9650  
E-mail: [rmcoord@acenet.auburn.edu](mailto:rmcoord@acenet.auburn.edu)

**Alabama Waste Materials Exchange**

411 East Irvine Avenue  
Florence, AL 35630-4621

**ALASKA**

**Alaska Department of Environmental Conservation**

Compliance Assistance Office  
555 Cordova Street  
Anchorage, AK 99501  
(800) 510-ADEC (inside AK) or (907) 269-7586 (outside AK); Fax: (907) 269-7600  
E-mail: [CompAsst@envircon.state.ak.us](mailto:CompAsst@envircon.state.ak.us)  
[http://www.state.ak.us/dec/dsps/compasst/cao\\_home.htm](http://www.state.ak.us/dec/dsps/compasst/cao_home.htm)

**Cooperative State Research, Education, and Extension Service**

University of Alaska Fairbanks  
2221 E. Northern Lights Blvd, Suite 118  
Anchorage, AK 99508-4143  
(907) 279-6575; Fax: (907) 277-5242  
E-mail: [afwgv@acad2.alaska.edu](mailto:afwgv@acad2.alaska.edu)

**Alaska Materials Exchange**

Compliance Assistance Office  
555 Cordova Street  
Anchorage, AK 99501  
(907) 269-7586 or (800) 510) 2332; Fax: (907) 269-7600  
E-mail: [compasst@envircon.state.ak.us](mailto:compasst@envircon.state.ak.us)  
<http://www.state.ak.us/dec/dsps/compasst/answers.htm>

**Anchorage Recycling Center**

6161 Rosewood Street  
Anchorage, AK 99518  
(907) 562-2267; Fax: (907) 273-2799  
<http://www.anchoragerecycling.com/>

**ARCO & BP Investment Recovery**  
P.O. Box 196612  
Anchorage, AK 99516  
(907) 659-4205; Fax: (907) 659-4369  
E-mail: pbusurplusteamleader@bp.com

## **ARIZONA**

**Arizona Department of Environmental Quality**  
3033 North Central Avenue  
Phoenix, AZ 85012  
(602) 207-2300 or (800) 234-5677 (inside AZ)  
Solid Waste: (602) 207-4117  
Recycling and Data Management Unit: (602) 207-4171  
Recycling Database: (602) 207-4173  
<http://www.adeq.state.az.us/>

**Arizona Recycling Coalition**  
P.O. Box 2533  
Phoenix, AZ 85002-2533  
(602) 264-5466  
<http://www.azrc.org/>

**Regional Recycling Information Exchange**  
Maricopa Association of Governments  
Environmental Planner  
302 N. 1st Avenue, Suite 300  
Phoenix, AZ 85003  
E-mail: ddudley@mag.maricopa.gov

<http://www.mag.maricopa.gov/rrie/rrie.htm> **Southwest Public Recycling Association**  
P.O. Box 27210  
Tucson, AZ 85726  
(520) 791-4069  
<http://www.spra-recycling.org/>

**Cooperative State Research, Education, and Extension Service**  
University of Arizona  
450 S. Haskell Ave  
Wilcox, AZ 85643  
(602) 384-3594; Fax: (602) 384-3681

**Arizona Resource Exchange**

University of Arizona  
Facility Management #49  
Tucson, AZ 85721-0049  
(520) 626-1266; Fax: (520) 621-6086  
E-mail: azre@mail.fm.arizona.edu

**Arizona Waste Exchange**

4725 E. Sunrise Dr., # 215  
Tucson, AZ 85718  
(520) 626-1266

**Valley of the Sun Habitat for Humanity ReStore**

P.O. Box 20186  
Phoenix, AZ 85036-0186  
(602) 268-9022

**ARKANSAS**

**Department of Environmental Quality**

8001 National Drive  
Little Rock, AR 72209  
(501) 682-0744  
Solid Waste Management Division: (501) 682-0600  
Material Recovery Facilities: (501) 682-0608  
Transfer Stations: (501) 682-0601  
<http://www.adeq.state.ar.us/solwaste/main.htm>

**Pulaski County Regional Solid Waste Management District**

100 South Broadway  
Little Rock, AR 72201  
(501) 340-8787; Fax (501) 340-8785  
E-mail: sgele@aristotle.net  
<http://www.pulaskiswdistrict.org/>

**East Arkansas Planning & Development District**

P.O. Box 1403  
Jonesboro, AR 72403  
(870) 932-3957; Fax: (870) 932-0135  
E-mail: eastdist@eapdd.com  
<http://www.eapdd.com/>

**Arkansas Recycling Coalition**

312 South Pulaski  
Little Rock, AR 72201  
(501) 399-9696; Fax: (501) 374-2217  
E-mail: [mail@recycleark.org](mailto:mail@recycleark.org)  
<http://www.recycleark.org/>

**Arkansas Cooperative Extension Service**

P.O. Box 391  
Little Rock, AR 72203  
(501) 671-2080; Fax: (501) 671-2251  
E-mail: [triley@uaex.edu](mailto:triley@uaex.edu)

**Arkansas Industrial Development Council**

1 Capitol Mall, Room 4B215  
Little Rock, AR 72201  
(501) 682-1370; Fax: (501) 682-7341

**ScrapMatch**

**Arkansas Department of Economic**

One State Capitol Mall  
Little Rock, AR 72201  
(501) 682-7332 or (501) 682-7317; Fax: (501) 682-2703  
<http://www.aedc.state.ar.us/>

**CALIFORNIA**

**Environmental Protection Agency**

Cal/EPA Communications Office  
555 Capitol Mall Suite 525  
Sacramento, CA 95814  
(916) 445-3846  
E-mail: [cepacomm@calepa.ca.gov](mailto:cepacomm@calepa.ca.gov)  
<http://www.calepa.ca.gov/>

**California Integrated Waste Management Board**

8800 Cal Center Drive  
Sacramento, CA 95826  
(916) 255-2200  
<http://www.ciwmb.ca.gov/>  
Construction & Demolition: (916) 255-2495  
<http://www.ciwmb.ca.gov/ConDemo/>  
E-mail: Mark Fong: [mfong@ciwmb.ca.gov](mailto:mfong@ciwmb.ca.gov)

**Alameda County Waste Management Authority**  
Alameda County Source Reduction and Recycling Board  
777 Davis Street, Suite 100  
San Leandro, CA 94577  
(510) 614-1699; Fax: (510) 614-1698  
Recycling Hotline: (877) STOPWASTE (786-7927)  
<http://www.stopwaste.org/>

**Fort Ord Reuse Authority**  
100 12th Street, Bldg. 2880  
Marina, CA 93933  
(831) 883-3672; Fax: (831) 883-3675  
<http://www.fora.org/>

**The East Bay Conversion and Reinvestment Commission**  
1333 Broadway, Suite 1020  
Oakland, CA 94612  
(510) 834-6928; Fax: (51) 834-8913  
Urban Ore  
1333 Sixth Street  
Berkeley, CA 94710  
(510) 559-4454; Fax: (510) 235-0198  
<http://bayarea.citysearch.com/E/V/SFOCA/0010/52/88/1.html>

**California Resource Recovery Association**  
P.O. Box 162789  
Sacramento, CA 95816  
916-441-CRRA (441-2772); Fax: 916-451-9150  
E-mail: [crra@aol.com](mailto:crra@aol.com)  
<http://www.crra.com/>

**Cooperative State Research, Education, and Extension Service**  
University of California  
Riverside, CA 92521  
(909) 787-3333; Fax: (909) 787-5522  
E-mail: [david.crohn@ucr.edu](mailto:david.crohn@ucr.edu)

**Green Building Resource Guide Salvaged Building Materials Exchange**  
The Architectural Machine  
P.O. Box 3808  
Redwood City, CA 94064  
Fax: (650) 364-5116  
<http://www.greenguide.com/exchange/>

**Beyond Waste**

3262 Wilder Rd.  
Santa Rosa, CA 95407  
(707) 792-2555; Fax: (707) 792-2565  
E-mail: [precycle@sonic.net](mailto:precycle@sonic.net)  
<http://www.sonic.net/~precycle/>

**California Materials Exchange (CalMAX)**

California Integrated Waste Management Board  
8800 Cal Center Drive, MS23  
Sacramento, CA 95826-3268  
(916) 255-2369; Fax: (916) 255-4580  
E-mail: [CalMAX@ciwmb.ca.gov](mailto:CalMAX@ciwmb.ca.gov)  
<http://www.ciwmb.ca.gov/calmax/>

**California Waste Exchange**

Department of Toxic Substances Control  
P.O. Box 806  
Sacramento, CA 95812-0806  
(916) 322-4742; Fax: (916) 327-4495  
E-mail: [KPAYNE@DTSC.CA.GOV](mailto:KPAYNE@DTSC.CA.GOV)  
<http://www.dtsc.ca.gov/hwcwe.htm>

**Tijuana/San Diego Habitat for Humanity ReStore**

3562 Grove Street  
Lemon Grove, CA 91945  
(619) 465-7576

**San Fernando/Santa Clarita Valley Habitat for Humanity ReStore**

5525 Cahuenga Blvd.  
North Hollywood, CA 91601-2920  
(818) 487-9600

**Habitat for Humanity of Ventura County ReStore**

167 Lambert Street  
Oxnard, CA 93030-1044  
(805) 485-6065

**Habitat for Humanity Riverside ReStore**

P.O. Box 70 -R  
San Bernardino, CA 92492  
(909) 787-6754

**Los Angeles County Materials Exchange**

900 South Fremont Avenue  
Alhambra, CA 91803  
(626) 458-5167 or (626) 458-3593; Fax: (626) 458-3593  
E-mail: rbarker@dpw.co.la.ca.us  
<http://dpw.co.la.ca.us/epd/lacomax/>

**ProMax**

Ecology Action  
P.O. Box 1188  
Santa Cruz, CA 95061-1188  
(408) 426-5925, x12; Fax: (408) 425-1404  
E-mail: promax@ecoact.org  
<http://www.crutio.com/~ecoact/ProMax.html>

**The Reuse People**

477 Marina Parkway  
Chula Vista, CA 91910  
(619) 427-0430; Fax: (619) 427-0020

**Sonoma County Materials Exchange (SonoMax)**

575 Administration Drive, Room 117A  
Santa Rosa, CA 95403  
(707) 527-3668; Fax: (707) 527-3701  
Eco-Desk Hotline (707) 565-DESK(3375).  
E-mail: sonomax@ap.net  
<http://www.recyclenow.org/sonomax/>

**Ventura County Material Exchange (VCMAX)**

Ventura County Solid Waste Management Department  
800 S. Victoria Ave.  
Ventura, CA 93009  
(805) 648-9226; Fax (805) 648-9233  
E-mail: swmd@rain.org  
<http://www.rain.org/~swmd/vcmax/vcmaxfrm.html>

**COLORADO**

**Colorado Department of Public Health and Environment**

Hazardous Materials and Waste Management  
4300 Cherry Creek Drive South  
Denver, CO 80222  
(303) 692-3445 or (303) 692-3300; Fax: (303) 759-5355  
E-mail: glenn.mallory@state.co.us  
<http://www.cdphe.state.co.us/cdphehom.asp>

**Governor's Office of Energy Management and Conservation**

1675 Broadway, Suite 1300  
Denver, CO 80202-4613  
(303) 620-4292 or (800) OEC-6662; Fax: (303) 620-4288  
E-mail: [oecc@csn.net](mailto:oecc@csn.net)  
<http://www.state.co.us/oecc/>

**Solid Waste Association of North America**

Rocky Mountain Chapter  
Mark McMullen, President  
165 S. Union Blvd., Suite 1000  
Lakewood, CO 80220  
(303) 914-1768; Fax: (303) 914-1709

**Southwest Public Recycling Association**

Colorado Office  
216 16th St., Suite 1500  
Denver, CO 80202  
(303) 640-7497; Fax: (303) 640-3233  
E-mail: [hffowler452@aol.com](mailto:hffowler452@aol.com)

**Southeast/East Central Recycling Association**

P.O. Box 1412  
Lamar, CO 81502  
(719) 336-2384; Fax: (719) 336-2384  
Colorado Recycles  
8745 W. 14th Ave., Suite 216  
Lakewood, CO 80215-4850  
(303) 231-9972

**Colorado Association for Recycling**

4591 Ivy St.  
Denver, CO 80216  
(303) 322-7887; Fax: (303) 322-9757  
<http://www.cafr.org/>

**Colorado State University Cooperative Extension**

Room 1, Administration Bldg.  
Fort Collins, CO 80523-0002  
(970) 491-6281; Fax: (970) 491-6208  
E-mail: [dlaamm@vines.colostate.edu](mailto:dlaamm@vines.colostate.edu)

**Rocky Mountain Institute**

1739 Snowmass Creek Road  
Snowmass, CO 81654-9199  
(303) 927-3851; Fax: (970) 927-3420  
<http://www.rmi.org/>

**Colorado Materials Exchange (COMEx)**

University of Colorado - Boulder  
Campus Box 207  
Boulder, CO 80309-0207  
(303) 492-8307; Fax: (303) 492-1897  
E-mail: [debell@spot.colorado.edu](mailto:debell@spot.colorado.edu)  
<http://www.colorado.edu.cure/>

**Rocky Mountain Materials Exchange**

999 18th Street, Suite 2750  
Denver, CO 80202  
(303) 297-0180, ext.103; Fax: (303) 297-0188  
E-mail: [rmorris@csn.net](mailto:rmorris@csn.net)  
<http://www.rmmex.com/>

**Habitat for Humanity of Loveland, Colorado ReStore**

1410 East Eisenhower-R  
Loveland, CO 80537  
(970) 669-7343

**TSDX Corporation**

1667 Cole Blvd. Suite 400  
Golden, CO 80401  
(303) 202-6620; Fax: (303) 237-1103  
E-mail: [edc@tsdx.com](mailto:edc@tsdx.com)  
<http://www.tsdcentral.com/>

**CONNECTICUT**

**Art Barber Excavating, Inc.**

New State Road  
Manchester, CT 06040  
(203) 875-3892

**American Materials Corp.**

100 Old Iron Ore Rd.  
Bloomfield, CT 06095  
(203) 242-6023

**Hubert E. Butler**

Route 66  
Portland, CT 06480  
(203) 342-3880

**Department of Environmental Protection**  
Waste Management Bureau  
Source Reduction and Recycling Program  
79 Elm Street  
Hartford, CT 06106-5127  
(860) 424-3365  
Beneficial Use of Solid Waste: (860) 424-3022  
<http://dep.state.ct.us/>

**Cooperative State Research, Education, and Extension Service**  
University of Connecticut  
1376 Storrs Road  
Storrs, CT 06269-4087  
(860) 486-2840; Fax: (860) 486-5408  
E-mail: [jbartok@canr1.cag.uconn.edu](mailto:jbartok@canr1.cag.uconn.edu)

**The EnviroXchange**  
11 Mountain Ave., Suite 203  
Bloomfield, CT 06002  
(860) 286-0666; Fax: (860) 286-0671  
E-mail: [Feedback@enviroxchange.com](mailto:Feedback@enviroxchange.com)  
<http://www.enviroxchange.com/>

**ConnTAP Materials Exchange**  
50 Columbus Boulevard, 4th Floor  
Hartford, CT 06106  
(203) 241-0777; Fax: (203) 244-2017  
Construction & Demolition Aggregate Recycling Facilities  
<http://dep.state.ct.us/wst/recycle/constrct.htm>

**Recycled Concrete Products**  
Apothecaries Road  
East Windsor, CT 06106  
(800) 742-6701  
Bedrock, Inc.  
15 South Smith Street  
East Norwalk, CT 06855  
(203) 348-2775

**Roncari Industries**  
1776 South Main  
East Granby, CT 06026  
(203) 527-1825

**Soneco Services**  
185 South Road  
Groton, CT 06340  
(203) 445-2457

**Tilcon Connecticut**

Colt Highway, Route 6  
Farmington, CT 06032  
(203) 677-1643

**Valley Sand & Gravel**

400 North Frontage Road  
North Haven, CT 06473  
(203) 467-6328

**Waste Conversion Technologies, Inc.**

221 Old Gate Lane  
Milford, CT 04460  
(203) 445-2457

**John J. Brennan Construction**

2 Riverdale Avenue  
Shelton, CT 06484  
(203) 929-6314

**Burns Construction**

Housatonic Avenue  
Bridgeport, CT 06604  
(203) 375-1383

**O & G Industries, Inc.**

240 Bostwick Avenue  
Bridgeport, CT 06604  
(203) 366-4586

**Wilcox Trucking**

83 Old Windsor Road  
Bloomfield, CT 06095  
(203) 243-8870

**DELAWARE**

**Department of Natural Resources and Environmental Control**

89 Kings Highway  
Dover, DE 19901  
Solid Waste Management Branch: (302) 739-3820  
Pollution Prevention Program: (302) 739-3822 or (302) 739-6400  
<http://www.dnrec.state.de.us/del-cnst.htm>

**Delaware Solid Waste Authority**

RECYCLE DELAWARE Program

1128 South Bradford Street

Dover, DE 19901

(302) 739-5361

<http://www.dswa.com/>

**Delaware Recycling Exchange**

Delaware Manufacturing Extension Partnership

400 Stanton - Christiana Rd. Suite A-158

Newark, DE 19713

(302) 283-3131; Fax: (302) 283-3137

E-mail: [demep@demep.org](mailto:demep@demep.org)

<http://www.demep.org/>

**Cooperative State Research, Education and Extension Service**

University of Delaware

Newark, DE 19717

(302) 831-2468; Fax: (302) 831-3651

E-mail: [william.ritter@mvs.udel.edu](mailto:william.ritter@mvs.udel.edu)

**DISTRICT OF COLUMBIA**

**Metropolitan Washington Council of Governments**

Department of Environmental Programs

Regional Recycling Programs

777 North Capitol Street Northeast

Washington, DC 20002

(202) 962-3200; Fax: (202) 962-3203

<http://www.mwcog.org/>

**Cooperative State Research, Education and Extension Service**

University of District of Columbia

901 Newton Street, NE

Washington, DC 20017

(202) 576-6951; Fax: (202) 576-8712

E-mail: [jhazel@eslusda.gov](mailto:jhazel@eslusda.gov)

**USDA-Cooperative State Research, Education, and Extension Service**

USDA-CSREES  
Natural Resources & Environment  
Waste Management Program  
Stop 2210  
Washington, DC 20250-2210  
(202) 401-4601; Fax: (202) 401-1706  
E-mail: [awidener@reeusda.gov](mailto:awidener@reeusda.gov)

**FLORIDA**

**Florida Department of Environmental Protection**

Division of Waste Management  
2600 Blair Stone Road  
Tallahassee, FL 32399  
(904) 487-3299  
<http://www.dep.state.fl.us/dwm/>

**University of Florida**

M.E. Rinker, Sr. School of Building Construction  
Center for Construction and Environment  
Fine Arts C 101  
P.O. Box 115703  
Gainesville, FL 32611-5703  
(352) 392-9029; Fax: (352) 392-9606  
<http://www.bcn.ufl.edu/sustainable>

**Florida Center for Solid and Hazardous Waste Management**

2207-D NW 13th Street  
Gainesville, Florida 32609  
(352) 392-6264; Fax: (352) 846-0183  
E-mail: [center@floridacenter.org](mailto:center@floridacenter.org)  
<http://www.floridacenter.org/>

**RecycleFlorida Today, Inc.**

1015 US 301 S., # 2425  
Tampa, FL 33619  
(813) 441-6425; Fax: (813) 626-5865  
<http://www.enviroworld.com/Resources/RFT.html>

**Cooperative State Research, Education and Extension Service**

University of Florida  
P.O. Box 110415  
Gainesville, FL 32611-0415  
(352) 392-1511; (352) 392-2389  
E-mail: [whs@gnv.ifas.ufl.edu](mailto:whs@gnv.ifas.ufl.edu)

**American Salvage**

9200 NW 27th Avenue  
Miami, FL 33147  
(305) 691-2455  
E-mail: [trw@americansalvage.com](mailto:trw@americansalvage.com)  
<http://www.americansalvage.com/>

**Commercial Materials Exchange**

6 South Wadworth Road  
Beverly Hills, FL 34465  
(352) 527-1897; Fax: (352) 527-2872  
E-mail: [dburfl@juno.com](mailto:dburfl@juno.com)

**Florida Waste Exchange**

A Service of Environmental Research and Restoration Corp.  
2848 N State Road #7  
Hollywood, FL 33021  
(954) 967-0011 or (877) 663-5336; Fax: (954) 989-3377  
E-mail: [dpkart@icanect.net](mailto:dpkart@icanect.net)

**Alachua Habitat for Humanity ReStore**

2317 SW 13th St.  
Gainesville, FL 32608  
(352) 378-4663

**Habitat's Builders' Surplus ReStore**

8100 N. Florida Avenue  
Tampa, FL 33604  
(813) 935-8805

**Industrial Materials Exchange, Inc.**

1001 SW 2nd Avenue, Suite 234  
Boca Raton, FL 33487  
(800) 541-9444; Fax: (407) 995-7156

**Intercontinental Waste Exchange**

6401 Congress Avenue, Suite 200  
Boca Raton, FL 33487  
(800) 541-9444; Fax: (407) 367-0499

**Southern Waste Information Exchange (SWIX)**

P.O. Box 960  
Tallahassee, FL 32302  
(800) 441-SWIX (7949); Fax: (850) 386-4321  
E-mail: [swix@mailier.fsu.edu](mailto:swix@mailier.fsu.edu)  
<http://www.wastexchange.org/>

**GEORGIA**

**Department of Natural Resources**

Environmental Protection Division  
205 Butler Street, S.E. Suite 1258 East Tower  
Atlanta, GA 30334  
(404) 362-2692  
<http://www.dnr.state.ga.us/>

**Georgia Department of Community Affairs**

Office of Waste Management  
60 Executive Park South  
Atlanta, GA 30329  
(404) 679-4940  
<http://www.dca.state.ga.us/>  
<http://www.dca.state.ga.us/waste/waste2.html>

**Georgia Pollution Prevention Assistance (P2AD)**

Department of Natural Resources  
7 Martin Luther King, Jr. Drive, Suite 450  
Atlanta, GA 30334-9004  
(404) 651-5120 or (800) 685-2443; Fax: (404) 651-5130  
E-mail: [p2ad@ix.netcom.com](mailto:p2ad@ix.netcom.com)  
<http://www.ganet.org/dnr/p2ad/>

**Georgia Environmental Facilities Authority**

2090 Equitable Building  
100 Peachtree Street, NW  
Atlanta, GA 30303  
(404) 656-0939  
<http://www.gefa.org/>

**Cooperative State Research, Education and Extension Service**

University of Georgia  
Athens, GA 30602  
(706) 542-2340; Fax: (706) 542-2375  
E-mail: [wmclauri@uga.cc.uga.edu](mailto:wmclauri@uga.cc.uga.edu)

**EnviroShare Materials Exchange**

Hall County Resource Recovery  
Post Office Drawer 1435  
Gainesville, GA 30503  
(770) 535-8284; Fax: (770) 531-3966  
E-mail: rfoote@mindspring.com  
<http://www.enviroshare.org/>

**Habitat for Humanity ReStore**

Habitat for Humanity International  
121 Habitat Street  
Americus, GA 31709-3498  
(912) 924-6935  
<http://www.habitat.org/env/restoreusa.html>

**Fint River Habitat for Humanity ReStore**

P.O. Box 710  
Albany, GA 31702-0710  
(912) 430-7942

**HAWAII**

**Department of Land and Natural Resources**

1151 Punchbowl Street, Room 311  
Honolulu, HI 96813  
(808) 587-0077; Fax: (808) 587-0080  
E-mail: dlnc@pixi.com  
<http://www.state.hi.us/dlnc>

**Cooperative State Research, Education and Extension Service**

University of Hawaii Department of Agriculture Engineering  
3050 Maile Way, Gilmore 203  
Honolulu, HI 96822  
(808) 956-9459; (808) 956-6442  
E-mail: agng8uhunix.uhcc  
Hawaii Materials Exchange (HIMEX)  
P.O. Box 121  
Wailuku, HI 96793  
(808) 667-7744 or (808) 572-6668; Fax: (808) 572-4817  
E-mail: sjoy@maui.net  
<http://www.maui.net/~mrghimex>

## IDAHO

### **Division of Environmental Quality**

1410 N. Hilton  
Boise, ID 83706  
(208) 373-0502; Fax: (208) 373-0417  
<http://www.state.id.us/deq/>

### **Cooperative State Research, Education and Extension Service**

University of Idaho Biology & Agriculture Engineering  
Engineering/Physics Building  
Moscow, ID 83844-0904  
(208) 885-7626; (208) 885-8923  
E-mail: rrynk@uidaho.edu

## ILLINOIS

### **Environmental Protection Agency**

1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276  
Helpline: (888) EPA-1996  
<http://www.epa.state.il.us/>

### **Department of Commerce and Community Affairs**

620 East Adams Street  
Springfield, IL 62701  
(217) 782-7500; Fax: (217) 524-3701  
Environmental Assistance Helpline: (800) 252-3998  
"Construction and Demolition Site Recycling Guidebook"  
"Construction and Demolition Site Recycling Directory"  
<http://www.commerce.state.il.us/>

### **Illinois Waste Management and Research Center**

One East Hazelwood Drive  
Champaign, IL 61820  
(217) 333-8940; Fax: (217) 333-8944  
<http://www.wmrc.uiuc.edu>

### **Illinois Recycling Association**

P.O. Box 3717  
Oak Park, IL 60303-3717  
(708) 358-0050; Fax: (708) 358-0051  
E-mail: ilrecycle@aol.com  
<http://www.ilrecyclingassn.org/>

**Cooperative State Research, Education and Extension Service**

University of Illinois  
116 Mumford Hall  
1301 Gregory Drive  
Urbana, IL 61801  
(217) 333-9025; (217) 0-333-1952  
E-mail: bloomep@cesadmin.ag.uiuc.edu

**Chicago Board of Trade Recyclables Exchange**

141 West Jackson Boulevard  
Chicago, IL 60604-2994  
(312) 435-3500; Fax: (516) 286-8471  
<http://www.cbot-recycle.com/>

**Industrial Materials Exchange Service**

1021 North Grand Ave., East  
P.O. Box 19276, #34  
Springfield, IL 62794-9276  
(217) 782-0450; Fax: (217) 782-9142  
E-mail: epa8605@epa.state.il.us

**Habitat for Humanity of McLean County ReStore**

P.O. Box 3432  
Bloomington, IL 61702-3432  
(309) 827-3931

**Habitat for Humanity/Lake County, Illinois ReStore**

3601 N. Hwy 41-R  
North Chicago, IL 60085-4207  
(847) 623-1020

**INDIANA**

**Department of Environmental Management**

Office of Solid & Hazardous Waste Management  
Indiana Government Center North  
100 N. Senate  
P.O. Box 6015  
Indianapolis, IN 46206-6015  
(317) 233-3656 or (800) 451-6027 (inside IN); Fax: (317) 232-3403  
<http://www.state.in.us/idem/index.html>

**Association of Indiana Solid Waste Management Districts**

899 South College Mall Road  
Bloomington, IN 47401  
(812) 349-2117; Fax: (812) 349-2872  
E-mail: aiswmd@aol.com

**Solid Waste Association of North America**

Indiana Hooiser Chapter  
401 Pennsylvania Parkway, Suite 104  
Indianapolis, IN 46280  
(317) 581-9585; Fax: (317) 581-9635  
E-mail: burgessma@cdm.com

**Indiana Recycling Coalition, Inc.**

P.O. Box 20444  
Indianapolis, IN 46220-0444  
(317) 283-6226 or (877) 283-9550 (inside IN); Fax: (317) 283-6111  
E-mail: recyclin@in.net  
<http://www.papertrail.com/irc/>

**Indiana Institute on Recycling**

921 School of Education,  
Indiana State University  
Terre Haute, IN 47809  
(812) 237-3000 or (800) 242-4467 (inside IN); Fax: (812) 237-4371  
<http://web.indstate.edu/recycle/home.html>

**Cooperative State Research, Education and Extension Service**

Purdue University  
Krannert Building  
West Lafayette, IN 47907  
(317) 494-0594; Fax (317) 494-5876  
E-mail: cp1@mace.cc.purdue.edu

**Indiana Materials Exchange**

P.O. Box 2931  
Indianapolis, IN 46206-2931  
(740) 397-7675 or (800) 968-8764 (inside IN); Fax: (740) 397-7649  
E-mail: IMExchange@ecr.net  
<http://www.state.in.us/idem/imex/>

**Reuse Development Organization (ReDO)**

P.O. Box 441363  
Indianapolis, IN 46244  
(317) 631-5395; Fax: (317) 631-5396  
E-mail: [info@redo.org](mailto:info@redo.org)  
<http://www.redo.org/>

**IOWA**

**Department of Natural Resources**

Waste Management Assistance Division  
502 E. 9th Street  
Des Moines, IA 50319-0034  
(515) 281-4367; Fax: (515) 281-8895  
E-mail: [blaning@max.state.ia.us](mailto:blaning@max.state.ia.us)  
<http://www.state.ia.us/dnr/organiza/wmad/index.html>

**On-line Recycling Directory**

[http://www.state.ia.us/dnr/organiza/wmad/directories/recycling/introduction\\_i.html](http://www.state.ia.us/dnr/organiza/wmad/directories/recycling/introduction_i.html)  
Recycle Iowa  
Iowa Department of Economic Development  
200 East Grand Ave.  
Des Moines, IA 50312  
(515) 242-4755 or (800) 532-1216; Fax: (515) 242-4776  
E-mail: [david.cretors@ided.state.ia.us](mailto:david.cretors@ided.state.ia.us)  
<http://www.recycleiowa.org/>

**Iowa Waste Exchange (IWE)**

University of Northern Iowa  
75-BRC  
Cedar Falls, IA 50614-0185  
(800) 422-3109 or (319) 273-2079; Fax: (319) 273-2893  
E-mail: [jennifer.drenner@uni.edu](mailto:jennifer.drenner@uni.edu)  
<http://www.recycleiowa.org/exchange.htm>

**IWE Area Resource Specialists**

**AREA "A"**

**Iowa Western Community College**

2700 College Road, P.O. Box 4-C  
Council Bluffs, IA 51502  
(712) 325-3309 or (800) 432-5852, ext. 309; Fax: (712) 325-3408  
E-mail: [bpendgraft@iwcc.cc.ia.us](mailto:bpendgraft@iwcc.cc.ia.us)

**Western Iowa Tech Community College**

4647 Stone Avenue, P.O. Box 5199  
Sioux City, IA 51102-5199  
(712) 274-8733 or (800) 352-4649, ext. 1560; Fax: (712) 274-6429  
E-mail: demilif@witcc.com

**AREA "B"**

**Region XII Council of Governments**

1009 East Anthony St., P.O. Box 768  
Carroll, IA 51401  
(712) 792-9914; Fax: (712) 792-1751  
E-mail: rxiiicog@netins.net

**AREA "C"**

**Iowa Northland Regional Council of Governments**

501 Sycamore Street, Suite 333  
Waterloo, IA 50703  
(319) 235-0311; Fax: (319) 235-2891  
E-mail: jbeneke@inrcog.org

**North Iowa Area Community College**

500 College Drive  
Mason City, IA 50401  
(515) 422-4352; Fax: (515) 422-4129  
E-mail: tornqpat@niacc.cc.ia.us

**AREA "D"**

**Eastern Iowa Community College**

306 West River Dr.  
Davenport, IA 52801-1221  
(319) 336-3319 or (800) 462-3255; Fax: (319) 336-3350  
E-mail: sheil@eiccd.cc.ia.us

**Northeast Iowa Community College**

10250 Sundown Road  
Peosta, IA 52068-9988  
(319) 556-5110 or (800) 728-7367, ext. 327; Fax: (319) 557-0349  
E-mail: mihalakm@nicc.cc.ia.us

**AREA "E"**

**Des Moines Area Community College**

Economic Development Group, Bldg. 18  
2006 South Ankeny Blvd.  
Des Moines, IA 50021-3993  
(515) 964-6346; Fax: (515) 964-6206  
E-mail: dahayworth@dmacc.cc.ia.us

**AREA "F"**

**Kirkwood Community College**

6301 Kirkwood Blvd. S.W., P.O. Box 2068  
Cedar Rapids, IA 52406  
(319) 398-5665 or (319) 398-4904; Fax: (319) 398-5432  
E-mail: rmeyers@kirkwood.cc.ia.us or btjaden@kirkwood.cc.ia.us

**AREA "G"**

**Indian Hills Community College**

623 Indian Hills Drive  
Ottumwa, IA 52501  
(515) 683-5269 or (800) 726-2585, ext. 5269; Fax: (515) 683-5263  
E-mail: ecdev@ihcc.cc.ia.us

**Iowa Waste Reduction Center**

University of Northern Iowa  
1005 Technology Parkway  
Cedar Falls, IA 50614-0185  
(800) 422-3109 or (319) 273-8905; Fax: (319) 268-3733  
E-mail: jennifer.drenner@uni.edu

**Recycling Reuse Technology Transfer Center**

University of Northern Iowa  
2244 McCollum Science Hall  
Cedar Falls, IA 50714-0421  
(319) 273-7090; Fax: (319) 273-5815  
E-mail: catherine.zeman@uni.edu  
<http://www.rttc.uni.edu/>

**Cooperative State Education, Research and Extension Service**

Dept of Agriculture & Biosystems Engineering  
200A Davidson Hall  
Iowa State University  
Ames, IA 50011-3080  
(515) 294-0463; Fax: (515) 294-9973  
E-mail: [tglanvil@iastate.edu](mailto:tglanvil@iastate.edu)

**By-Products & Waste Search Service**

Waste Reduction Center  
University of Northern Iowa  
Cedar Falls, IA 50614-0185  
(319) 273-2079; Fax: (319) 273-2926

**KANSAS**

Department of Health and Environment  
Bureau of Waste Management  
Forbes Field, Building 740  
Topeka, KS 66620  
(785) 296-1600; Fax: (785) 296-1592  
<http://www.kdhe.state.ks.us/waste.html>

**Cooperative State Research, Education and Extension Service**

Kansas State University  
2014 Throckmorton Hall  
Manhattan, KS 66506-5504  
(913) 532-5776; Fax: (913) 532-6315  
E-mail: [weberle@oz.oznet.ksu.edu](mailto:weberle@oz.oznet.ksu.edu)

**Kansas Materials Exchange**

P.O. Box 70  
Hutchinson, KS 67504-0070  
(316) 662-0551; Fax: (316) 662-1413

**Surplus Exchange**

121 N. Mead  
Wichita, KS 67211  
(316) 267-2553; Fax: (316)-274-8068

**KENTUCKY**

Department for Environmental Protection  
Division of Waste Management  
Solid Waste Branch  
14 Reilly Road  
Frankfort, KY 40601  
(502) 564-6716 or (502) 564-2225, ext. 240  
E-mail: Gruzesky\_r@NRDEP.nr.state.ky.us

**The Northern Kentucky Solid Waste Management Area**

16 Spiral Drive  
P.O. Box 668  
Florence, KY 41022-0668  
(606) 283-1885; Fax: (606) 283-8178  
E-mail: trashnate@writeme.com  
<http://www.nkadd.org/>

**Cooperative State Research, Education and Extension Service**

Department of Agriculture Engineering  
217 Agriculture Engineering Building  
Lexington, KY 40546-0276  
(606) 257-3000, ext. 217; Fax: (606) 257-5671  
E-mail: rwarner@aen.uky.edu

**Cooperative Extension Program**

Kentucky State University  
Box 196  
Frankfort, KY 40601  
(502) 227-6389; (502) 227-5933  
E-mail: nwilliam@ca.uky.edu

**Kentucky Industrial Materials Exchange**

Kentucky Pollution Prevention Center  
420 Academic Building, U of L  
Louisville, KY 40292  
(502) 852-0965 or (800) 334-8635, ext. 0965; Fax: (502) 852-0964  
E-mail: kime@kppc.org  
<http://www.kppc.org/>

**LOUISIANA**

**Department of Environmental Quality**

Office of Waste Services  
P.O. Box 82178  
Baton Rouge, LA 70884-2178  
(225) 765-0261; Fax: (225) 765-0617  
<http://www.deq.state.la.us/>  
<http://www.deq.state.la.us/oshw/oshw.htm>

**Louisiana Energy & Environmental Resource & Information Center**

Louisiana State University  
One East Fraternity Circle  
Baton Rouge, LA 70803-0301  
(225) 388-4600; Fax: (225) 388-4541  
<http://www.leeric.lsu.edu/>

**War On Waste**

P.O. Box 86 St.  
Martinville, LA 70582  
(318) 394-3217

**Louisiana Cooperative Extension Service**

185 Knapp Hall  
Baton Rouge, LA 70803-1900  
(504) 388-6998; (504) 388-2478  
E-mail: xtbran@lsuvm.sncc.lsu.edu

**Habitat for Humanity St. Tammany West ReStore**

P.O. Box 3082  
Covington, LA 70434-3082  
(504) 893-3172

**Louisiana/Gulf Coast Waste Exchange**

Baton Rouge, LA  
(504) 388-4594; Fax: (504) 388-4945

**Transcontinental Materials Exchange**

College of Civil & Environmental Engineering  
1419 CEBA  
Baton Rouge, LA 70803  
(504) 388-4594; Fax: (504) 388-8652  
E-mail: rlcce@uno.edu

**MAINE**

**Maine Department of Environmental Protection**

17 State House Station  
Augusta, ME 04333-0017  
(207) 287-7688 or (800) 452-1942  
Bureau of Remediation and Waste Management: (207) 287-2651  
<http://janus.state.me.us/dep/home.htm>

**Maine State Planning Office**

Waste Management and Recycling Program  
38 State House Station  
Augusta, ME 04333-0038  
(207) 287-8050 or (800) 662-4545  
E-mail: lisa.m.baldwin@state.me.us  
<http://www.state.me.us/spo>

**WasteCap Maine**

317 Main St.  
Yarmouth, ME 04096  
(207) 846-0935; Fax: (207) 846-8079  
E-mail: WasteCapME@aol.com.  
<http://mainetoday.koz.com/maine/wastecap>

**University of Maine Cooperative Extension**

5741 Libby Hall  
Orono, ME 04469-5741  
(207) 581-2722; Fax: (207) 581-1387  
E-mail: nhallee@umce.umext.maine.edu

**Building Materials Exchange**

169 Lewiston Rd.  
Gray, ME 04039  
(207) 657-2957; Fax: (207) 657-5910

**Mid Coast Habitat for Humanity ReStore**

P.O. Box 785  
Camden, ME 04843-0785  
(207) 236-4974

**Maine Materials Exchange (M2X)**

93 Maquoit Drive  
Freeport, ME 04032  
(207) 865-6621; Fax: (207) 865-6621  
E-mail: H.Arndt@Juno.com

**MARYLAND**

Department of the Environment  
Waste Management Administration  
2500 Broening Highway  
Baltimore, MD 21224  
(410) 631-3336

**Recycling Services Division: (410) 631-3315**

Waste Management Administration: (410) 631-3305  
E-mail: hmiller@mde.state.md.us  
<http://www.mde.state.md.us/was/solidwaste/index.html>

**Maryland Recyclers Coalition**

584 Bellerive Drive, Suite 3-D  
Annapolis, MD 21401  
(410) 974-4472  
<http://www.marylandrecyclers.org/>

**Cooperative State Research, Education and Extension Service**

University of Maryland  
4701 Cliff City Rd  
Chestertown, MD 21620  
(410) 778-7676; (410) 778-9075  
E-mail: hb23@umail.umd.edu

**The Loading Dock, Inc.**

2523 Gwynns Falls Pkwy  
Baltimore, MD 21216  
(410) 728-DOCK; Fax: (410) 728-3633  
<http://www.loadingdock.org/>

**Millennium Exchange, Ltd.**

P.O. Box 4875  
Annapolis, MD 21403  
(410) 280-2080; Fax: (410) 280-0025  
E-mail: trade@mmex.com  
<http://www.mmex.com/>

**Northeast Industrial Waste Exchange, Inc.**

P.O. Box 2171  
Annapolis, MD 21404-2171  
(410) 280-2080; Fax: (410) 280-0025  
E-mail: niwe@pop.erols.com

**MASSACHUSETTS**

Department of Environmental Protection  
1 Winter Street  
Boston, MA 02108  
(617) 292-5500  
Solid Waste: (617) 292-5988  
Bureau of Waste Prevention: (617) 292-5963 or (617) 292-5574  
Greg.Cooper@state.ma.us  
<http://www.magnet.state.ma.us/dep/dephome.htm>

**Department of Environmental Management**

100 Cambridge Street, 19th Floor  
Boston, MA 02202  
(617) 626-1250  
<http://www.magnet.state.ma.us/dem/dem.htm>

**WasteCap of Massachusetts**

376 Boylston Street, Suite 303  
Boston, MA 02116  
(617) 236-7715; Fax: (617) 236-7141  
E-mail: wastecap@wastecap.org  
<http://www.wastecap.org/>

**Center for Ecological Pollution Prevention**

P.O. Box 1330,  
Concord, MA 01742-1330  
(978) 369-3951  
E-mail: EcoP2@hotmail.com

**Cooperative State Research, Education and Extension Service**

Amherst University  
Stockbridge Hall, Room 218  
Amherst, MA 01003  
(413) 545-2188; Fax: (413) 545-6555  
E-mail: gwalker@umass.coopext.edu

**South Shore Habitat for Humanity ReStore**

28 River Street  
Braintree, MA 02184-3235  
(781) 843-9080

**Western Massachusetts Material Exchange**

Center for Ecological Technology  
26 Market Street  
Northampton, MA 01060  
(413) 586-7350; Fax: (413) 586-7351  
E-mail: cetnoho@aol.com

**MICHIGAN**

**Department of Environmental Quality**

Environmental Assistance Division  
Town Center, 2nd floor  
P.O. Box 30457  
333 S. Capitol  
Lansing, MI 48909-7957  
(517) 373-1322; Fax: (517) 335-4729  
<http://www.deq.state.mi.us/ead/recycle/>

**University of Michigan**

National Pollution Prevention Center for Higher Education  
Dana Bldg., 430 E. University  
Ann Arbor, MI 48109-1115  
(734) 764-1412; Fax: (734) 647-5841  
E-mail: nppc@umich.edu  
<http://www.umich.edu/~nppcpub/index.html>

**Michigan Recycling Coalition**

1609 E Kalamazoo St., Suite 1  
P.O. Box 10240  
Lansing, MI 48912  
(517) 371-7073; Fax: (517) 371-1509  
<http://www.mienv.org/mrc/>

**Waste Reduction Information Network**

(517) 485-WRIN (9746)

**Upper Peninsula Recycling Coalition**

(906) 387-4127 or (906) 786-9212

**Washtenaw County Department of Environment and Infrastructure Services**

P.O. Box 8645  
Ann Arbor, MI 48107-8645  
(734) 971-6947; Fax: (734) 971-4542 or (734) 971-1441  
<http://www.co.washtenaw.mi.us/DEPTS/eis.htm>

**Cooperative State Research, Education and Extension Service**

Michigan State University  
311 Natural Resources Building  
East Lansing, MI 48824-1222  
(517) 355-9578; Fax: (517) 353-8994  
E-mail: 22331fri@msu.edu

**Michigan Resources Exchange Services**

P.O. Box 18036  
Lansing, MI 48901-8036  
(517) 371-7171

**Recycle Ann Arbor**

Ecology Center of Ann Arbor  
2420 South Industrial Highway  
Ann Arbor, MI 48104  
(734) 662-6288; Fax: (734) 662-7749  
E-mail: recyclea2@aol.com  
<http://comnet.org/recycleannarbor/>

**Michigan On-line Waste Exchange**

Michigan Dept of Environmental Quality  
Pollution Prevention Section - Environmental Assistance Division  
P.O. Box 30457  
Lansing, MI 48909-7957  
(800) 662-9278 or (517) 373-1322; Fax: (517) 335-4729  
E-mail: doroshkl@state.mi.us  
<http://www.co.washtenaw.mi.us/depts/eis/eisex.htm>

**MINNESOTA**

**Office of Environmental Assistance**

520 Lafayette Rd.  
St. Paul, MN 55155  
(612) 296-3417  
(612) 215-0246  
<http://www.moea.state.mn.us/>

**Environmental Quality Board at Minnesota Planning**

658 Cedar St.  
St. Paul, MN 55155  
(651) 296-3985; Fax: (651) 296-3698

**Minnesota Pollution Control Agency**

520 Lafayette Road  
St. Paul, MN 55155-4194  
(651) 296-6300 or (800) 657-3864  
<http://www.pca.state.mn.us/waste/index.html>

**Minneapolis Division of Solid Waste & Recycling**

309 2nd Avenue South, Room 210  
Minneapolis, MN 55401  
(612) 673-2917

<http://www.ci.minneapolis.mn.us/citywork/public-works/solid-waste/> **Sharing Environmental Education Knowledge (SEEK)**

525 S. Lake Ave., Ste. 400  
Duluth, MN 55802  
(218) 529-6258 or (800) 657-3843  
<http://www.seek.state.mn.us/>  
Association of Recycling Managers, Inc.  
E-mail: [armweb@concentric.net](mailto:armweb@concentric.net)  
<http://www.mnrecyclingmanagers.org/>

**Recycling Association of Minnesota**

890 Dawn Avenue  
Shoreview MN 55126-6403  
(651) 486-0455; Fax: (651) 766-7948

**City of Bloomington Solid Waste Division**

Bloomington City Hall  
2215 West Old Shakopee Road  
Bloomington MN 55431-3096  
(612) 948-8750; Fax: (612) 948-3868  
E-mail: [jbuckley@ci.bloomington.mn.us](mailto:jbuckley@ci.bloomington.mn.us)  
<http://www.ci.bloomington.mn.us/cityhall/dept/pubworks/solidwas/solidwas.htm>

**Twin Cities Free Market**

Saint Paul Neighborhood Energy Consortium  
624 Selby Avenue  
Saint Paul, MN 55104.  
(651) 222-SORT (7678); Fax: (651) 221-9831  
E-mail: [info@twincitiesfreemarket.org](mailto:info@twincitiesfreemarket.org)  
<http://www.twincitiesfreemarket.org/>

**Minnesota Materials Exchange (MnTAP)**

Minnesota Technical Assistance Program  
1313 Fifth St. S.E., Suite 207  
Minneapolis, MN 55414-4504  
(612) 627-4646 or (800) 247-0015; Fax: (612) 627-4769  
E-mail: neshe005@maroon.tc.umn.edu  
<http://www.mntap.umn.edu/>

**Metro Area eXchange (MAX)**

1313 Fifth St. S.E., Suite 207  
Minneapolis, MN 55414-4504  
(612) 627-4646 or (800) 247-0015; Fax: (612) 627-4769

**Olmsted County Materials Exchange:**

2122 Campus Dr. S.E.  
Rochester, MN 55904  
E-mail: stansfield.jack@co.olmsted.mn.us  
(507) 285-8231; Fax: (507)287-2320

**Southeast Minnesota Recyclers' Exchange (SEMREX):**

(800)247-0015  
<http://www.semrex.org/>

**Northeast Minnesota Material Exchange**

Western Lake Superior Sanitary District  
2626 Courtland St.  
Duluth, MN 55806  
(218) 722-3336, ext. 440; Fax: (218) 727-7471  
E-mail: heidi.carlson@wlssd.duluth.mn.us

**Minnesota Environmental Initiative**

219 North Second Street #201  
Minneapolis, MN 55401-1453  
(612) 334-3388; Fax: (612) 334-3093  
<http://www.mn-ei.org/>

**The Green Institute**

1433 E. Franklin Avenue, Suite 7A  
Minneapolis, MN 55404  
(612) 874-1148; Fax: (612) 874-6470  
E-mail: green@greeninstitute.org  
<http://www.greeninstitute.org/>

**The ReUse Center**

2216 East Lake Street  
Minneapolis, MN 55407  
(612) 724-2608; Fax: (612) 724-2288

**Cooperative State Research, Education and Extension Service**

247 Coffey Hall  
1420 Eckles Ave  
St. Paul, MN 55108  
(612) 624-9298; Fax: (612) 625-6227  
E-mail: [sbl@dir.mes.umn.edu](mailto:sbl@dir.mes.umn.edu)

**Cooperative State Research, Education and Extension Service**

University of Minnesota  
216 Soils Building  
1529 Gortner Ave  
St. Paul, MN 55108  
(612) 625-3135; Fax: (612) 625-2208  
E-mail: [thalbach@mes.umn.edu](mailto:thalbach@mes.umn.edu)

**American Plastics Exchange, Inc.**

1425 Hampshire Avenue S, Suite 113  
Minneapolis, MN 55426  
(612) 544-1100 or (800) 746-2739; Fax: (612) 544-9811  
E-mail: [apexq@concentric.net](mailto:apexq@concentric.net)

**Minnesota Materials Exchange**

Minnesota Office of Environmental Assistance  
520 Lafayette Road, Second Floor  
St. Paul, MN 55155-4100  
(612) 215-0216; Fax: (612) 215-0246  
E-mail: [stacy.stinson@moea.state.mn.us](mailto:stacy.stinson@moea.state.mn.us)  
<http://www.mnexchange.org/>

**Minnesota Materials Exchange Alliance**

1313 5th St SE, Suite 207  
Minneapolis, MN 55414  
(612) 627-1900; Fax: (612) 627-4769

**Olmsted County Materials Exchange**

Olmsted County Public Works  
2122 Campus Drive  
Rochester, MN 55904  
(507) 285-8231; Fax: (507) 287-2320  
E-mail: [olmpwhh1@millcomm.com](mailto:olmpwhh1@millcomm.com)  
<http://www.olmstedcounty.com/publicworks/solidwaste/wastereduction/exchange.htm>

**Southeast Minnesota Recycler's Exchange (SEMREX)**

171 West 3rd Street  
Winona, MN 55987  
(507) 457-6464; Fax: (507) 457-6469  
E-mail: [amorse@NT1.co.winona.mn.us](mailto:amorse@NT1.co.winona.mn.us)  
<http://www.wis.com/SEMREX>

**MISSISSIPPI**

Department of Environmental Quality  
Environmental Resource Center  
P.O. Box 20305  
Jackson, MS 39289-1385  
(601) 961-5666; Fax: (601) 961-5349  
<http://www.deq.state.ms.us/newweb/homepages.nsf>

**Mississippi Cooperative Extension Service**

P.O. Box 5446  
Mississippi State, MS 39762  
(601) 325-3141; Fax: (601) 325-8407  
E-mail: [joes@mces.msstate.edu](mailto:joes@mces.msstate.edu)

**Metro Jackson Habitat for Humanity ReStore**

P.O. Box 55634  
Jackson, MS 39296-5634  
(601) 353-6060

**MISSTAP**

P.O. Box 9595  
Mississippi State, MS 39762  
(601) 325-8454; Fax: (601) 325-2482

**MISSOURI**

**Department of Natural Resources**

Division of Environmental Quality  
Solid Waste Management Program  
P. O. Box 176  
Jefferson City, MO 65102  
(573) 751-5401  
E-mail: [swmp@mail.dnr.state.mo.us](mailto:swmp@mail.dnr.state.mo.us)  
<http://www.dnr.state.mo.us/deq/swmp>

**Division of Environmental Quality**

P. O. Box 176  
Jefferson City, Missouri 65102  
(800) 361-4827 or (800) 334-6946  
E-mail: [tap@mail.dnr.state.mo.us](mailto:tap@mail.dnr.state.mo.us)  
<http://www.dnr.state.mo.us/deq/homedeq.htm>

**Missouri Recycling Association**

P.O. Box 2144  
Jefferson City, MO 65102  
(888) 325-MORA  
<http://www.mora.org/>

**Region D Solid Waste District**

P.O. Box 164  
Clarksdale, MO 64430  
(816) 393-5250; Fax: (816) 393-5269  
E-mail: [regiond@ccp.com](mailto:regiond@ccp.com)  
<http://www.ccp.com/~regiond/>

**University of Missouri Extension**

1031 E. Battlefield, Suite 214  
Springfield, MO 65807  
(417) 889-5000; Fax: (417) 889-5012  
E-mail: [steinwam@ext.missouri.edu](mailto:steinwam@ext.missouri.edu)

**St. Louis Habitat for Humanity ReStore**

4501 Westminster Place  
St. Louis, MO 63108-1801  
(314) 367-6869

**MONTANA**

Department of Environmental Quality  
Air & Waste Management Bureau: (406) 444-3490

Metcalf Building Office:  
1520 E. Sixth Avenue  
P.O. Box 200901  
Helena, MT 59620  
(406) 444-2544

Phoenix Building Office:  
2209 Phoenix  
P.O. Box 200901  
Helena, MT 59620-0901  
<http://www.deq.state.mt.us/>

**Center for Resourceful Building Technology**

P.O. Box 100  
Missoula, MT 59806  
(406) 549-7678  
E-mail: [crbt@montana.com](mailto:crbt@montana.com)  
<http://www.montana.com/crbt/>

**Cooperative State Research, Education and Extension Service**

Montana State University  
Taylor Hall  
Bozeman, MT 59717  
(406) 994-3451; (406) 994-5417  
E-mail: [acxmv@msu.oscs.montana.edu](mailto:acxmv@msu.oscs.montana.edu)

**Montana Material Exchange**

Montana Pollution Prevention Program  
MSU Extension Service  
Taylor Hall, P.O. Box 173580  
Bozeman, MT 59717-3580  
(406) 994-3451 or (888) MSU-MTP2; Fax: (406) 994-5417  
E-mail: [uedld@montana.edu](mailto:uedld@montana.edu)  
<http://www.montana.edu/wwwated>

**NEBRASKA**

Department of Environmental Quality  
Integrated Waste Management: (402) 471-4210  
1200 "N" Street, Suite 400  
P.O. Box 98922  
Lincoln, NE 68509  
(402) 471-2186; Fax: (402) 471-2909  
<http://www.deq.state.ne.us/>

**Nebraska State Recycling Association**

1941 S. 42nd St., # 512  
Omaha, NE 68105  
(402) 444-4188; Fax: (402) 444-3953

**Cooperative State Research, Education and Extension Service**

University of Nebraska-Lincoln  
253 L.W. Chase Hall  
Lincoln, NE 68583-0726  
(402) 472-8656; Fax: (402) 472-6338  
E-mail: [bsen010@unlvm.unl.edu](mailto:bsen010@unlvm.unl.edu)

**Nebraska Materials Exchange Program**

Keep Nebraska Beautiful, Inc.  
3201 Pioneers Blvd., Suite 306  
Lincoln, NE 68502  
(402) 486-4563 or (800) 486-4562  
E-mail: [egilmore@knb.org](mailto:egilmore@knb.org)  
<http://www.knb.org/knb/exchange.html>

**NEVADA**

**Division of Environmental Protection**

333 W. Nye Lane, Room 138  
Carson City, NV 89706-0851  
(775) 687-4670; Fax: (775) 687-5856

**Bureau of Waste Management**

123 West Nye Lane, Room 120  
Carson City, NV 89706-0851  
(775) 687-4670; Fax: (775) 687-6396  
<http://www.state.nv.us/ndep/>  
Nevada Recycling Hotline  
(800) 597-5865

**Solid Waste Association of North America**

Great Basin Chapter  
1711 N. Roop St.  
Carson City, NV 89701  
(775) 887-2190 ext. 106

**Cooperative State Research, Education and Extension Service**

University of Nebraska-Lincoln  
253 L.W. Chase Hall  
Lincoln, NE 68583-0726  
(402) 472-8656; Fax: (402) 472-6338  
E-mail: [bsen010@unlvm.unl.edu](mailto:bsen010@unlvm.unl.edu)

**Cooperative State Research, Education and Extension Service**

University of Nevada, Reno  
College of Agriculture/222  
Reno, NV 89557-0004  
(702) 784-6611; Fax: (702) 784-4227  
E-mail: [usingerj@fs.scs.unr.edu](mailto:usingerj@fs.scs.unr.edu)

**Clark County District Health Department**

P.O. Box 3902  
Las Vegas, NV 89127-0902  
(702) 383-1027

**Douglas County Community Development**

P.O. Box 218  
Minden, NV 89423  
(775) 782-9010

**Environmental Leadership**

P.O. Box 10786  
Reno, NV 89510  
(702) 323-3433  
<http://www.vironleader.org/>

**Keep Truckee Meadows Beautiful**

P.O. Box 7412  
Reno, NV 89510-7412  
(775) 328-3698

**Rebel Recycling Program**

Environmental Studies Department  
University of Nevada Las Vegas  
4505 South Maryland Parkway Box 454030  
Las Vegas, NV 89154-4030  
(702) 734-5607

**Nevada Recycling Coalition**

P.O. Box 5515  
Reno, NV 89513  
(775) 333-9322

**Nevada Recyclers Association**

550 E. Charleston Blvd.  
Las Vegas, NV 89104  
(702) 796-9100

**Waste Not**

893 Southwood Blvd.  
Incline Village, NV 89451  
(775) 831-8603

**RSW Recycling**

100 Vassar Street  
Reno, NV 89520  
(775) 329-8822 ext. 310

**Silver State Disposal**

P.O. Box 98508  
Las Vegas, NV 89193  
(702) 399-1112

**Washoe County (Nevada) Materials Exchange Network**

P.O. Box 10786  
Reno, NV 89510  
(702) 323-2866; Fax: 702 323-3766  
E-mail: ahabwolf@aol.com  
<http://www.environmentleader.org/intro.html>

**NEW HAMPSHIRE**

Department of Environmental Services  
Waste Management Division, Solid Waste Management Bureau  
6 Hazen Drive, P.O. Box 95  
Concord, NH 03301-6509  
(603)271-2900; Fax: (603)271-2456  
<http://www.des.state.nh.us/sw-6.htm>

**Department of Resources and Economic Development**

P.O. Box 1856  
Concord, NH 03302-1856  
(603) 271-2591  
NH Governor's Recycling Program  
2 1/2 Beacon Street  
Concord, NH 03301-4497  
(603) 271-1098

**Northeast Resource Recovery Association**

P.O. Box 721  
Concord, NH 03302-0721  
(603) 224-6996; Fax (603) 226-4466  
E-mail: nrra@conknet.com

**University of New Hampshire Cooperative Extension**

122 Taylor Hall  
Durham, NH 03824  
(603) 862-2033; Fax: (603) 862-1585  
E-mail: b\_marriott.unh.edu

**New Hampshire Materials Exchange**

WasteCap of New Hampshire  
122 N. Main Street  
Concord, NH 03301  
(603) 224-1517; Fax: (603) 224-2872  
E-mail: exchange@wastecapnh.org  
<http://www.wastecapnh.org/>

## NEW JERSEY

### Department of Environmental Protection

Division of Solid & Hazardous Waste

P.O. Box 414

401 E. State Street

Trenton, NJ 08625

(609) 984-6880; Fax: (609) 984-6874

Bureau of Recycling and Planning: (609) 984-3438; Fax: (609) 777-0769

Bureau of Landfill and Recycling Management: (609) 984-6650; Fax: (609) 777-0769

<http://www.state.nj.us/dep/dshw/>

### Association of New Jersey Recyclers

120 Finderne Avenue

Bridgewater, NJ 08807

(908) 722-7575; Fax (908) 722-8344

E-mail: [info@ANJR.com](mailto:info@ANJR.com)

<http://anjr.com/>

### Cooperative State Research, Education, and Extension Service

15 South Munn Ave.

East Orange, NJ 07018

(201) 678-7988; Fax: (201) 676-9826

E-mail: [essex@aesop.rutgers.edu](mailto:essex@aesop.rutgers.edu)

### Morris County MUA's Material Exchange Program

P.O. Box 370

Mendham, NJ 07945-0370

(973) 829-8006; Fax: (973) 285-8397

E-mail: [greengal@njhazwaste.com](mailto:greengal@njhazwaste.com)

### New Jersey Industrial Waste Information Exchange

50 West State Street, Suite 1310

Trenton, NJ 08608

(609) 989-7888; Fax: (609) 989-9696

## NEW MEXICO

### Environment Department

Solid Waste Bureau

P.O. Box 26110

Santa Fe, NM 87502

(505) 827-0197

<http://www.nmenv.state.nm.us/>

**New Mexico Recycling Coalition**

P.O. Box 16123  
Santa Fe, NM 87506  
(505) 473-7202; Fax: (505) 438-1447  
E-mail: [info@nmrecycle.org](mailto:info@nmrecycle.org)  
<http://www.nmrecycle.org/>

**getrecycled.com**

c/o New Mexico Recycling Coalition  
P.O. Box 16123  
Santa Fe, NM 87506  
E-mail: [service@getrecycled.com](mailto:service@getrecycled.com)

**Build New Mexico Beautiful**

Construction and Demolition Recycling Program  
(505) 344-3294 or (505) 883-5559  
<http://nmrecycle.org/builderguide.htm>

**Energy, Minerals, and Natural Resources Department**

State of New Mexico-Recycling  
408 Galisteo  
P.O. Box 1948  
Santa Fe, NM 87504  
(505) 827-7474

**Wemagination**

4010 Copper, NE  
Albuquerque, NM 87108  
(505) 277-4236

**Southwest Public Recycling Association**

Albuquerque, NM  
(505) 466-9715  
E-mail: [dthornton@aol.com](mailto:dthornton@aol.com).  
<http://www.spra-recycling.org/>

**City of Santa Fe**

P.O. Box 909  
Santa Fe, NM 87504-0909  
(505) 473-7209; Fax: (505) 438-1447  
E-mail: [cpadilla@ci.santa-fe.nm.us](mailto:cpadilla@ci.santa-fe.nm.us)  
<http://ci.santa-fe.nm.us/>

**Los Alamos County**

P.O. Box 30  
Los Alamos, NM 87544  
(505) 662-8050; Fax: (505) 662-8051  
E-mail: [sisnerosr@lac.losalamos.nm.us](mailto:sisnerosr@lac.losalamos.nm.us)

**Cooperative State Research, Education, and Extension Service**

New Mexico State University  
9301 Indian School Rd, NE, Suite 201  
Albuquerque, NM 87112  
(505) 275-2576; (505) 292-9815

**Albuquerque Habitat for Humanity ReStore**

3501 Campus Blvd. NE  
Albuquerque, NM 87106-1311  
(505) 265-0057

**New Mexico Material Exchange**

P.O. Box 904  
Farmington, NM 87499  
(505) 325-2157; (505) 326-0015

**NEW YORK**

New York State Department of Environmental Conservation  
Bureau of Waste Reduction and Recycling

50 Wolf Road  
Albany, NY 12233-4015  
(518) 457-6934; Fax: (518) 457-1283  
<http://www.dec.state.ny.us/>

**New York State Association for Reduction, Reuse and Recycling, Inc.**

P.O. Box 3913  
Albany, NY 12203  
(888) 925-7329; Fax: (888) 925-7329

**Cornell Waste Management Institute**

Rice Hall, Room 100A  
Ithaca, NY 14853  
(607) 255-8576; Fax: (607) 255-8207  
E-mail: [ezhl@cornell.edu](mailto:ezhl@cornell.edu)

**Association for Resource Conservation**

9 Bittersweet Court  
Centerport, NY 11721  
(516) 757-0894; Fax: (516) 757-0896  
E-mail: [arclink@Juno.com](mailto:arclink@Juno.com)

**Barn Raisers, Inc.**

227 S. Pearl Street  
Albany, NY 12202  
(518) 462-0139

**Hudson Valley Materials Exchange, Inc.**

207 Miton Turn Pike  
Milton, NY 12547  
(914) 795-5507; Fax: (914) 795-2892

**MAT-EX Western New York Materials Exchange**

GLOW Region Solid Waste Management Committee  
420 E. Main Street, 3rd Floor  
Batavia, NY 14020  
(800) 836-1154 or (716) 344-4035; Fax: (716) 344-4037  
E-mail: glow@eznet.net  
<http://www.recycle.net/matex/view.html>

**Recycler's World**

RecycleNet Corporation  
P.O. Box 1910  
Richfield Springs, NY 13439  
Recycler's World Help Line (519) 767-2913  
<http://www.recycle.net>  
Used Building Materials Section  
<http://www.recycle.net/recycle/build/index.html>

**Wa\$teMatch**

253 Broadway, Room 302  
New York, NY 10007  
(212) 240-6920; Fax: (212) 240-6879  
E-mail: wstmatch@tecnnet.org  
<http://www.itac.org/industry/waste.html>

**NORTH CAROLINA**

**Department of Environment and Natural Resources**

Division of Pollution Prevention and Environmental Assistance  
2728 Capital Boulevard  
Raleigh, NC 27605  
(919) 715-6500 or (800) 763-0136  
E-mail: nowaste@p2pays.org  
<http://www.p2pays.org/>

**Department of Environment and Natural Resources**

Division of Waste Management: Solid Waste Section  
401 Oberlin Road, Suite 150  
Raleigh, NC 27605  
(919) 733-4996 or (919) 733-0692  
<http://wastenot.enr.state.nc.us/>

**North Carolina Recycling Business Assistance Center (RBAC)**

Division of Pollution Prevention and Environmental Assistance  
RBAC Market Development Team  
(919) 715-6500 or (800) 763-0136

**North Carolina Recycling Association**

7330 Chapel Hill Rd., Suite 207  
Raleigh, NC 27607  
(919) 851-8444; Fax: (919) 851-6009  
E-mail: [NCRcycles@aol.com](mailto:NCRcycles@aol.com)  
<http://www.recycle.net/recycle/ncra/>

**Solid Waste Association of North America**

North Carolina Chapter  
Cumberland County Solid Waste Management  
147 Harbor View  
Sanford, NC 27330  
(919) 499-5549; Fax: (919) 498-1834  
E-mail: [topsy@alltel.net](mailto:topsy@alltel.net)  
<http://www.nc-swana.org/>

**Triangle J Council of Governments**

P.O. Box 12276  
Research Triangle Park, NC 27709  
(919) 549-0551; (919) 549-9390  
E-mail: [tjcog@tjcog.org](mailto:tjcog@tjcog.org)  
<http://www.tjcog.dst.nc.us/tjcog.htm>

**The Green Building Products and Materials Resource Directory**

<http://www.recycle.net/recycle/ncra/gbdbase.html>

**North Carolina Extension Service**

NC State University  
Box 7602  
Raleigh, NC 27695  
(919) 515-3252; Fax: (919) 515-5950  
E-mail: [jzublena@amaroz.ces.ncsu.edu](mailto:jzublena@amaroz.ces.ncsu.edu)

**Cooperative State Research, Education and Extension Service**

P.O. Box 7625  
Raleigh, NC 27695-7625  
(919) 515-6770; Fax: (919) 515-6772  
E-mail: [sherman@eos.ncsu.edu](mailto:sherman@eos.ncsu.edu)

**Charlotte Habitat for Humanity ReStore**

P.O. Box 34397  
Charlotte, NC 28234-4397  
(704) 376-2054

**Catawba Valley Habitat for Humanity ReStore**

772 4th St. Dr., SW  
Hickory, NC 28602  
(828) 345-1256

**New Bern Habitat for Humanity ReStore**

P. O. Box 1231  
New Bern, NC 28563-1231  
(252) 633-9599

**Wake County Habitat for Humanity ReStore**

2300 Capital Blvd.  
Raleigh, NC 27604-1440  
(919) 833-1999

**Harmony Industries, Inc.**

607 W Grimes Ave.  
High Point, NC 27260  
(336) 886-7225; Fax: (336) 886-7586  
E-mail: [dpendle@nr.infi.net](mailto:dpendle@nr.infi.net)  
<http://www.cebunet.com/harmony/>

**Southeast Waste Exchange**

Urban Institute  
UNC Charlotte  
9201 University Blvd.  
Charlotte, NC 28223-0001  
(704) 547-4289; Fax: (704) 547-3178  
E-mail: [mlmay@email.uncc.edu](mailto:mlmay@email.uncc.edu)

**NORTH DAKOTA**

**The State of North Dakota Office of Management and Budget**

Risk Management Division  
Norwest Bank Building  
400 E Broadway Ave, Suite 613  
Bismarck, ND 58501  
(701) 328-6514; Fax: (701) 328-6515  
Waste Management: (701) 328-5166  
<http://www.state.nd.us/risk/>

**Cooperative State Research, Education and Extension Service**  
North Dakota State University  
P.O. Box 5437  
Fargo, ND 58105  
(701) 237-7377; Fax: (701) 237-7044  
E-mail: gflasker@ndsuent.nodak.edu

## **OHIO**

**Department of Natural Resources**  
Division of Recycling & Litter Prevention  
Fountain Square, Building F-2  
Columbus, OH 43224  
(614) 265-6333; Fax: (614) 262-9387  
E-mail: drlp@dnr.state.oh.us  
<http://www.dnr.state.oh.us/odnr/recycling/>

**Ohio Environmental Protection Agency**  
Office of Pollution Prevention  
P.O. Box 1049  
Columbus, OH 43216-1049  
(614) 644-3469; Fax (614) 728-1245  
E-mail: p2mail@epa.state.oh.us  
<http://www.epa.ohio.gov/opp/wastex.html>

**Ohio Environmental Protection Agency**  
Division of Solid and Infectious Waste Management  
Lazarus Government Center  
P.O. Box 1049  
Columbus, OH 43216-1049  
(614) 644-2621; Fax: (614) 728-5315  
<http://www.epa.ohio.gov/dsiwm/dsiwmain.html>

**Solid Waste Authority of Central Ohio**  
Virtual Landfill  
4149 London-Groveport Road  
Grove City, OH 43123  
(614) 871-8105; Fax: (614) 871-8116  
E-mail: ischuber@BEOL.net  
<http://www.virtuallandfill.com/>

**Association of Ohio Recyclers**  
P.O. Box 70  
Mount Vernon, OH 43050  
(614) 397-7680; Fax: (614) 397-7649

**Cuyahoga County Solid Waste District**

323 Lakeside Avenue W., Suite 400  
Cleveland, OH 44113  
(216) 443-3749; Fax: (216) 443-3737  
E-mail: [ccswd@en.com](mailto:ccswd@en.com)  
<http://www.cyahogaswd.org/>

**Lake County Solid Waste District**

P.O. Box 70  
Mount Vernon, OH 43050  
(740) 397-7652; Fax: (740) 397-7649  
E-mail: [wastealt@aol.com](mailto:wastealt@aol.com)

**Ottawa/Sandusky/Seneca Solid Waste District**

610 Court Street  
Fremont, OH 43420  
(419) 334-7223; Fax: (419) 334-8626  
E-mail: [tw@ossjswmd.org](mailto:tw@ossjswmd.org)

**Community Resource Center**

2630 Glendale-Milford Rd.  
Cincinnati, OH 45241  
(513) 554-4944; Fax: (513) 554-4966

**Extension CNRD**

2120 Fyffe Road  
Columbus, OH 43210  
(614) 292-8436; Fax: (614) 292-7443  
E-mail: [heimlich.l@agvax2.ohio-state.edu](mailto:heimlich.l@agvax2.ohio-state.edu)

**OMEx: Ohio's Materials Exchange**

c/o Assoc. of Ohio Recyclers  
P. O. Box 70  
Mt. Vernon, OH 43050  
(888) 718-OMEx (6639); Fax-on-Demand: (888) 718-OMEx (6639); Fax: (740) 397-7649  
E-mail: [Tryomex@ecr.net](mailto:Tryomex@ecr.net)  
<http://www.epa.state.oh.us/opp/recyc/omex.html>

**The Interchange Materials Exchange Service**

Hamilton County Environmental Services  
1632 Central Parkway  
Cincinnati, OH 45210  
(513) 333-4705; Fax: (513) 651-9528  
E-mail: [holly.miller@does.hamilton-co.org](mailto:holly.miller@does.hamilton-co.org)

**Mahoning Valley Materials Exchange**

YSU CERTT  
One University Plaza  
Youngstown, OH 44555  
(330) 742-2742; Fax: (330) 742-1542  
E-mail: certt@cc.ysu.edu

**Northwest Ohio Commodities Exchange**

University of Toledo - MIME Department  
Toledo, OH 43606  
(419) 530-8202; Fax: (419) 530-8206  
E-mail: muerling@eng.utoledo.edu

**ReUse Industries**

74815 US Highway 50  
Albany, OH 45710  
(740) 698-8200 or (800) 837-7600 (inside 740 area code); Fax: (740) 698-4014  
E-mail: reuse@eurekanet.com  
<http://www.eurekanet.com/~reuse>

**Center for Environmental Science Technology and Policy**

Cleveland State University  
Cleveland, OH 44115-2440  
(216) 687-9306; Fax: (216) 687-5429  
E-mail: h.merwin@mail.asic.csuohio.edu  
<http://www.cestp.csuohio.edu/orphan/orphan.html>

**Greater Columbus Habitat for Humanity ReStore**

3529 Cleveland Avenue  
Columbus, OH 43224-0309  
(614) 267-7778

**South Dayton Waste Exchange**

3848 Ellsworth Drive  
Beavercreek, OH 45431  
(937) 429-5998; Fax: (937) 429-5998  
E-mail: sdwe@infinet.com  
<http://www.sdwe.com/>

**Wastelink, Division of Tencon, Inc.**

140 Wooster Pike  
Milford, OH 45150  
(513) 248-0012; Fax: (513) 248-1094

## OKLAHOMA

### Department of Environmental Quality

Waste Management Division  
P.O. Box 1677  
Oklahoma City, OK 73101-1677  
(405) 702-5100; Fax: (405) 702-5101  
<http://www.deq.state.ok.us/>

### Cooperative State Research, Education, and Extension Service

#### Oklahoma State University

508 Agriculture Hall  
Stillwater, OK 74078  
(405) 744-6081; Fax: (405) 744-8210  
E-mail: [gad@okway.okstate.edu](mailto:gad@okway.okstate.edu)

#### Oklahoma Waste Exchange Program (OKMaX)

Oklahoma Department of Environmental Quality  
P.O. Box 1677  
Oklahoma City, OK 73101-1677  
(800) 869-1400 or (405) 702-9100; Fax: (405) 271-8425  
E-mail: [deq.OKMaX@deqmail.state.ok.us](mailto:deq.OKMaX@deqmail.state.ok.us)  
<http://www.deq.state.ok.us/okmax.htm>

## OREGON

### Department of Environmental Quality

Solid Waste Policy and Program Development Section  
811 SW Sixth Avenue  
Portland, OR 97204  
(503) 229-5913 or (800) 452-4011 (inside OR)  
E-mail: [ALSDORF.william.h@deq.state.or.us](mailto:ALSDORF.william.h@deq.state.or.us)  
<http://www.deq.state.or.us/wmc/solwaste/rsw.htm>

#### METRO, Portland

Solid Waste Department  
600 NE Grand Ave  
Portland, OR 97232  
(503) 797-1650; Fax: (503) 797-1797  
Metro Recycling Information: (503) 234-3000; Fax: (503) 797-1851  
E-mail: [mri@metro.dst.or.us](mailto:mri@metro.dst.or.us)  
<http://www.metro-region.org/>

**River City Resource Group, Inc.**

P.O. Box 22744  
Portland, OR 97269  
(503) 654-7570 or (503) 248-4550

**Association of Oregon Recyclers**

P.O. Box 483  
Gresham OR 97030-0107  
(503) 661-4475; Fax: (503) 524-2373  
E-mail: [aor@mindspring.com](mailto:aor@mindspring.com)  
<http://www.mindspring.com/~aor/>

**Oregon Environmental Council**

520 SW 6th Avenue, Suite 940  
Portland, OR 97204-1535  
(503) 222-1963; Fax: (503) 222-1405  
E-mail: [oecc@orcouncil.org](mailto:oecc@orcouncil.org)  
<http://www.orcouncil.org/>

**Cooperative State Research, Education, and Extension Service**

1421 S. Hwy 97  
Redmond, OR 97756  
(541) 548-6088; Fax: (541) 548-8919  
E-mail: [bauerm@oes.orst.edu](mailto:bauerm@oes.orst.edu)

**Hippo Hardware and Trading Company**

1040 E. Burnside  
Portland, OR 97214  
(503) 213-1444 or (800) 869-1444; Fax: (503) 231-5708  
E-mail: [sales@hipponet.com](mailto:sales@hipponet.com)  
<http://www.hipponet.com/>

**Portland Chemical Consortium**

P.O. Box 751  
Portland, OR 97207-0751  
(503) 725-4270; Fax: (503) 725-3888  
<http://www.adm.pdx.edu/user/pcc/default.htm>

**Rejuvenation House Parts**

1100 SE Grand Avenue  
Portland, OR 97214  
(503) 238-1900; Fax; (503) 230-2656  
E-mail: [store@rejuvenation.com](mailto:store@rejuvenation.com)  
<http://www.rejuvenation.com/>

**PENNSYLVANIA**

**Department of Environmental Protection**

Bureau of Land Recycling and Waste Management  
P.O. Box 8471  
Harrisburg, PA 17105-8471  
(717) 783-2388 or (717) 787-9871  
E-mail: [snyder.james@dep.state.pa.us](mailto:snyder.james@dep.state.pa.us)  
<http://www.dep.state.pa.us/>

**Elk County Solid Waste Authority**

P.O. Box 448  
Ridgway, PA 15853  
(814) 776-5373; Fax: (814) 776-5379

**Professional Recyclers of Pennsylvania**

P.O. Box 25  
Bellwood, PA 16617  
(800) 769-PROP (7767) or (814) 742-7777; Fax: (814) 742-8838  
E-mail: [prop@epix.net](mailto:prop@epix.net)  
<http://www.proprecycles.org/>

**Pennsylvania Resources Council**

Environmental Center  
3606 Providence Road  
Newtown Square, PA 19073  
(610) 353-1555; Fax: (610) 353-6257

Pittsburgh Office of PRC:  
64 South 14th Street  
Pittsburgh, PA 15203  
(412) 488-7490; PenFax Fax On Demand: (610) 353-5696  
<http://www.prc.org/>

**The Pennsylvania State University Cooperative Extension**  
246 Agriculture Engineering Bldg.  
University Park, PA 16802  
(814) 865-7154; Fax: (814) 863-1031  
E-mail: jwg10@psu.edu

## **PUERTO RICO**

**Agricultural Extension Service**  
P.O. Box 21120  
San Juan, PR 00928-1120  
(787) 751-1784; Fax: (787) 250-8659  
E-mail: g\_pico@seam.upr.clu.edu

**Puerto Rico Waste Exchange**  
West 339 Calderon Street  
San Juan, PR 00926  
(809) 748-0433  
E-mail: sanchez@coqui.net

## **RHODE ISLAND**

Department of Environmental Management  
Office of Waste Management  
235 Promenade Street  
Providence, RI 02908  
(401) 222-2797; Fax: (401) 222-3812  
E-mail: ashulman@dem.state.ri.us  
<http://www.state.ri.us/dem/>

**Cooperative State Research, Education and Extension Service**  
University of Rhode Island  
Kingston, RI 02881  
(401) 792-4540; Fax: (401) 792-2494

**Southern New England Materials Exchange**  
Rhode Island Resource Recovery Corporation  
65 Shun Pike  
Johnston, RI 02919-4512  
(401) 942-1430, ext. 115; Fax: (401) 946-5174  
E-mail: recycle@loa.com  
<http://www.rirrc.org/>

## **SOUTH CAROLINA**

**Department of Health and Environmental Control**  
Bureau of Land and Waste Management  
Division of the Office of Solid Waste Reduction and Recycling  
2600 Bull Street  
Columbia, SC 29201  
(803) 896-4201  
<http://www.state.sc.us/dhec/eqc/lwm/>

**Department of Natural Resources**  
P.O. Box 167  
Rembert C. Dennis Building  
Columbia, SC 29202

**Land Resources Division**  
2221 Devine St., Suite 222  
Columbia, SC 29205-2418  
(803) 734-9100  
<http://water.dnr.state.sc.us/>

**Cooperative State Research, Education and Extension Service**  
Clemson University  
260 Barre Hall  
P.O. Box 340355  
Clemson, SC 29634-0355  
(803) 656-3475; Fax: (803) 656-5776  
E-mail: ewynn@clemson.edu

**South Carolina Waste Exchange**  
Rt. 1, Box 388A  
Prosperity, SC 29127  
(803) 364-1008; Fax: (803) 364-0667

## **SOUTH DAKOTA**

### **Department of Environment & Natural Resources**

Waste Management Program  
523 East Capitol Avenue  
Pierre, SD 57501-3181  
(605) 773-3153 Fax: (605) 773-6035.

Rapid City Office:  
2050 West Main, Suite 1  
Rapid City, SD 57702-2493  
(605) 394-2229; Fax: (605) 394-5317

Watertown Office:  
913 5th Street Southeast  
Watertown, SD 57201-5134  
(605) 882-5111; Fax: (605) 882-5066  
<http://www.state.sd.us/state/executive/denr/des/wastemgn/wasteprg.htm>

### **Cooperative State Research, Education and Extension Service**

Room 152 Agriculture Hall  
P.O. Box 2207 D  
South Dakota State University  
Brookings, SD 57007  
(605) 688-5131; Fax: (605) 688-6347  
E-mail: [ag04@sdsu.edu](mailto:ag04@sdsu.edu)

## **TENNESSEE**

### **Department of Environment and Conservation**

Division of Solid/Hazardous Waste Management  
401 Church Street  
Nashville, TN 37243-1535  
(615) 532-0780 or (888) 891-TDEC (8332)  
<http://www.state.tn.us/environment/waste.htm>  
<http://www.state.tn.us/environment/swm/index.html>

### **Tennessee Recycling Coalition**

P.O. Box 23796  
Nashville, Tennessee 37202  
E-mail: [info@trc-online.org](mailto:info@trc-online.org)  
<http://www.trc-online.org/>

**Knoxville Recycling Coalition**

1904 Ailor Avenue, Suite 206  
Knoxville, TN 37921  
(423) 525-9694 or the Hotline: (423) 521-9900  
E-mail: [knoxrecycl@aol.com](mailto:knoxrecycl@aol.com)  
<http://www.kornet.org/recycle/>

**The Tennessee Volunteer Chapter of the Solid Waste Association of North America**

304 Ben Lomond Drive  
McMinnville, TN 37110  
(931) 473-8235; Fax: (931) 473.1717  
Email: [info@swana-volunteer.org](mailto:info@swana-volunteer.org)  
<http://www.swana-volunteer.org/>

**Recycling Marketing Cooperative for Tennessee, Inc.**

501 Union Street, 6th Floor  
P.O. Box 190447  
Nashville, TN 37219  
(615) 880-3538; Fax: (615) 880-3539  
<http://www.rmct.org/>

**The Tennessee Materials Exchange**

University of Tennessee Center for Industrial Services (CIS)  
226 Capitol Boulevard, Suite 606  
Nashville, Tennessee 37219-1804  
(615) 532-8881 or (615) 532-8657; Fax: (615) 532-4937  
E-mail: [buggeln@utk.edu](mailto:buggeln@utk.edu)  
[http://web.utk.edu/~cis/tme\\_frm.htm](http://web.utk.edu/~cis/tme_frm.htm)

**Cooperative State Research, Education and Extension Service**

University of Tennessee  
P.O. Box 1071  
Knoxville, TN 37901  
(615) 974-1840; Fax: (615) 974-2765

**TEXAS**

Natural Resource Conservation Commission  
Office of Waste Management  
12100 Park 35 Circle  
P.O. Box 13087  
Austin, TX 78711-3087  
(512) 239-2104; Fax: (512) 239-5151  
<http://www.tnrcc.state.tx.us/>

**City of Austin Solid Waste Services**

P.O. Box 1088  
Austin, TX 78767  
(512) 494-9400

<http://www.ci.austin.tx.us/sws/>

**City of Austin Green Builder Program**

P.O. Box 1088  
Austin, TX 78767  
(512) 505-3703

<http://www.greenbuilder.com/>

**Recycle Texas Online**

<http://www.recycletexasonline.org/>

**Recycling Coalition of Texas**

**Central Texas Recycling Association**

P.O. Box 220  
Austin, TX 78767-0220  
(512) 473-4085 or (512) 469-6079; Fax: (512) 473-3390  
E-mail: [info@recycletx.org](mailto:info@recycletx.org)

<http://www.recycletx.org/>

**Texas Recycled**

(512) 239-3100  
E-mail: [recycle@tnrcc.state.tx.us](mailto:recycle@tnrcc.state.tx.us)

<http://www.texasrecycled.org/>

**Texas Agricultural Extension Service**

P.O. Box 38  
Overton, TX 75684  
(903) 834-6191; Fax: (903) 834-7140  
E-mail: [ml-baker@tamu.edu](mailto:ml-baker@tamu.edu)

**Texas Agricultural Extension Service**

Texas A&M University  
Agricultural Communications  
Mail Stop 2112  
College Station, TX 77843-2112  
(409) 847-9318; Fax: (409) 845-2214  
E-mail: [echenualt@taexco3n.tamu.edu](mailto:echenualt@taexco3n.tamu.edu)

**RENEW**

Texas Natural Resource Conservation Commission  
P.O. Box 13087, MC-112  
Austin, TX 78711-3087  
(512) 239-3171; Fax: (512) 239-3165  
E-mail: [hcastill@tnrcc.state.tx.us](mailto:hcastill@tnrcc.state.tx.us)  
<http://www.tnrcc.state.tx.us/exec/oppr/renew/renew.html>

**UTAH**

**Department of Environmental Quality**

Division of Solid and Hazardous Waste  
288 North 1460 West  
P.O. Box 144880  
Salt Lake City, UT 84114-4880  
(801)538-6170; Fax: (801)538-6715  
<http://www.deq.state.ut.us/eqshw/dshw-1.htm>

**Recycling Coalition of Utah**

P.O. Box 112045  
Salt Lake City, UT 84147-2045  
<http://www.recycle.utah.org/>

**Recycle Utah**

1951 Woodbine Way  
P.O. Box 682998  
Park City, UT 84068-2998  
<http://www.recycleutah.org/>

**Cache Valley Clean Team**

Logan Department of Environmental Health  
950 W. 600 N  
Logan, UT 84321-7806  
(435) 750-9953; Fax: (435) 752-4007  
<http://www.cvcleanteam.org/home.html>

**Cooperative State Research, Education and Extension Service**

Utah State University  
Logan, UT 84322-2300  
(801) 750-3389; Fax: (801) 750-3268

**VERMONT**

**Environmental Board & Waste Facility Panel**

National Life Records Center Building, Drawer 20  
Montpelier, VT 05620-3201  
(802) 828-3309  
E-mail: [mzahner@envboard.state.vt.us](mailto:mzahner@envboard.state.vt.us)  
<http://www.state.vt.us/envboard/>

**Agency of Natural Resources Department of Environmental Conservation**

Waste Management Division  
West Office Building, 103 S. Main Street  
Waterbury, VT 05671-0407  
(802) 241-3444; Fax: (802) 241-3296  
<http://www.anr.state.vt.us/>

**Association of Vermont Recyclers**

P.O. Box 1244  
Montpelier, VT 05601  
(802) 229-1833  
E-mail: [recycle@sover.net](mailto:recycle@sover.net)  
<http://www.vtrecyclers.org/>

**Vermont Business Materials Exchange**

P.O. Box 430  
Newfane, VT 05345  
(800) 895-1930; Fax: (802) 365-7996  
Email: [ppress@sover.net](mailto:ppress@sover.net)  
<http://www.enviro-source.com/vbmx/>

**UVM Extension System**

RR 4, Box 2298  
Comstock Road, Berlin  
Montpelier, VT 05602-8927  
(802) 223-2389; Fax: (802) 223-6500

## **VIRGINIA**

Department of Environmental Quality  
629 East Main Street  
P.O. Box 10009  
Richmond, VA 23219  
(804) 698-4000 or (800) 592-5482 (inside VA)

Waste Management: (804) 698-4155  
E-mail: [wmb@deq.state.va.us](mailto:wmb@deq.state.va.us)  
<http://www.deq.state.va.us/>

### **Virginia Tech Extension Service**

424 Smyth Hall  
Crop & Soil Environmental Sciences  
Blacksburg, VA 24061-0403  
(540) 231-9739; Fax: (540) 231-3075  
E-mail: [gevanylo@vt.edu](mailto:gevanylo@vt.edu)

### **WasteNot Recycling, Inc.**

13852 Park Center Road, Bay-A  
Herndon, VA 20171  
(703) 787-0200; Fax: (703) 787-0660  
E-mail: [wastenot@aol.com](mailto:wastenot@aol.com)

## **WASHINGTON**

### **Department of Ecology**

Northwest Regional Office: Solid Waste Services Program  
3190 160th Avenue SE  
Bellevue, WA 98008-5452  
Recycling Hotline: (800) RECYCLE  
(206) 649-7048; Fax: (206) 649-7098  
<http://www.wa.gov/ecology/>  
<http://www.wa.gov/ecology/swfa/swhome.html>

### **King County Solid Waste Division**

King Street Center  
201 S. Jackson Street, Suite 701  
Seattle, WA 98104  
(206) 296-6542 or (800) 325-6165, ext. 6542; Fax: (206) 296-0197  
E-mail: [website.swd@metrokc.gov](mailto:website.swd@metrokc.gov)  
<http://www.metrokc.gov/dnr/swd/index.htm>

**Clean Washington Center**

2001 6th Avenue, Suite 2700  
Seattle, WA 98121  
(206) 464-7040; Fax: (206) 464-6902  
E-mail: [info@cdc.org](mailto:info@cdc.org)  
<http://www.cdc.org/>

**Pierce County Public Works & Utilities**

Solid Waste Division  
9116 Gravelly Lake Drive S.W.  
Lakewood, WA 98499-3190  
(253) 798-4050  
E-mail: [pcsolidwaste@co.pierce.wa.us](mailto:pcsolidwaste@co.pierce.wa.us)  
<http://www.co.pierce.wa.us/services/home/environ/waste/recycle/cdl.htm>

**Seattle Solid Waste Utility**

710 Second Avenue, Suite 505  
Seattle, WA 98104  
(206) 684-7666; Fax (206) 684-8529

**Washington State Recycling Association**

6100 Southcenter Blvd., Suite 180  
Tukwila, WA 98188  
(206) 244-0311; Fax: (206) 244-4413  
E-mail: [wsra@wsra.net](mailto:wsra@wsra.net)  
<http://www.wsra.net/>

**Washington State Community, Trade and Economic Development**

906 Columbia Street S.W.  
P.O. Box 48300  
Olympia, WA 98504-8300  
(360) 753-7426; Fax: (360) 586-3582  
<http://www.cted.wa.gov/>

**Business and Industry Recycling Venture**

1301 5th Avenue, Suite 2400  
Seattle, WA 98101  
(206) 389-7304; Fax: (206) 903-3462  
<http://www.seattlechamber.com/BIRV/>

**Pacific Northwest Pollution Prevention Resource Center**

1326 Fifth Ave., Suite 650  
Seattle, WA 98101  
(206) 223-1151  
E-mail: [office@pprc.org](mailto:office@pprc.org)  
<http://www.pprc.org/pprc/>  
1-800-RECYCLE ONLINE

**Washington State Department of Ecology**

P.O. Box 47600  
Olympia, WA 98504-7600  
(800) RECYCLE or (360) 407-6352; Fax: (360) 407-6305  
<http://1800recycle.wa.gov/>

**CRD Cooperative Extension**

Washington State University  
411 Hulbert Hall  
Pullman, WA 99164-6230  
(509) 335-2937; Fax: (509) 335-2926

**Cooperative Extension**

7612 Pioneer Way East  
Puyallup, WA 98371-4998  
(206) 840-4512; Fax: (206) 840-4721

**Industrial Materials Exchange (IMEX)**

Local Hazardous Waste Management Program in King County  
Seattle-King County Dept. of Public Health  
1st Interstate Center  
999 3rd Ave., Suite 700  
Seattle, WA 98104-4099  
(206) 296-4899; Fax: (206) 296-3997  
E-mail: [imex@metrokc.gov](mailto:imex@metrokc.gov)  
<http://www.metrokc.gov/hazwaste/imex/>

**Pacific Materials Exchange**

1522 N. Washington, # 202  
Spokane, WA 99205  
Reusable Building Materials Exchange  
Climate Solutions  
610 East Fourth Avenue  
Olympia, WA 98501  
(360) 943-4595; Fax: (360) 943-4977  
E-mail: [info@climatesolutions.org](mailto:info@climatesolutions.org)  
<http://www.rbme.com/>

**WEST VIRGINIA**

**Division of Environmental Protection**

Office of Waste Management  
1356 Hansford St.  
Charleston, WV 25301  
(304) 558-5929; Fax: (304) 558-0256  
<http://www.dep.state.wv.us/wm/index.html>

**Solid Waste Management Board**

1615 Washington Street, East  
Charleston, WV 25311-2126  
(304) 558-0844; Fax: (304) 558-0899  
E-mail: [cjordan@gwmail.state.wv.us](mailto:cjordan@gwmail.state.wv.us)  
<http://www.state.wv.us/swmb/>

**Cooperative State Research, Education and Extension Service**

2104 Agriculture Science Building  
P.O. Box 6108  
Morgantown, WV 26506-6108  
(304) 293-3408; Fax: (304) 293-6954  
E-mail: [hooper@wvnmvms.wvnet.edu](mailto:hooper@wvnmvms.wvnet.edu)  
Materials Exchange

**West Virginia Solid Waste Management Board**

(304) 558-0844  
E-mail: [swmbexch@mail.wvnet.edu](mailto:swmbexch@mail.wvnet.edu)

**West Virginia Materials Exchange**

1615 Washington Street, East  
Charleston, WV 25311-2126  
(304) 558-0844; Fax: (304) 558-0899  
E-mail: [swmbexch@mail.wvnet.edu](mailto:swmbexch@mail.wvnet.edu)  
<http://www.state.wv.us/swmb/exchange/>

**WISCONSIN**

Department of Natural Resources  
Waste Management Program WA/3  
P.O. Box 7921  
Madison, WI 53791-9087  
(608) 266-2111; Fax: (608) 267-2768

**Construction and Demolition Waste: (608) 267-7574**

E-mail: [connej@dnr.state.wi.us](mailto:connej@dnr.state.wi.us)  
<http://www.dnr.state.wi.us/>

**Wisconsin Recycling Markets Directory**

DNR Recycling at (608) 267-7566  
E-mail: [WRMD@mail01.dnr.state.wi.us](mailto:WRMD@mail01.dnr.state.wi.us)

**Waste Management Program Waste Reduction & Recycling Information**

Markets for Recyclable Materials  
Construction & Demolition Debris  
(414) 483-3842

**WasteCap Wisconsin**

2647 N. Stowell Avenue  
Milwaukee, WI 53211-4299  
(414) 961-1100; Fax: (414) 961-1105  
E-mail: [wastecap@envirolink.org](mailto:wastecap@envirolink.org)  
<http://www.enviroweb.org/wastecap-wi/>

**Cooperative State Research, Education and Extension Service**

1997 University of Wisconsin-Stevens Point  
Stevens Point, WI 54481  
(715) 346-0123  
E-mail: [webmaster@uwsp.edu](mailto:webmaster@uwsp.edu)

**University of Wisconsin-Madison Campus Ecology**

1225 University Avenue, Room 205A  
Madison, WI 53706  
E-mail: [daniel.einstein@ccmail.adp.wisc.edu](mailto:daniel.einstein@ccmail.adp.wisc.edu)  
<http://wiscinfo.doit.wisc.edu/campusecology/>

**University of Wisconsin Extension**

Solid and Hazardous Waste Education Center (SHWEC)  
432 North Lake Street, Room 625  
Madison, WI 53706  
(608) 262-1748; Fax: (608) 262-9166  
E-mail: [walshp@wisplan.uwex.edu](mailto:walshp@wisplan.uwex.edu)  
<http://www.uwex.edu/shwec/index.htm>

**Business Material Exchange of Wisconsin (BMEX)**

136 West Grand Ave.  
Beloit, WI 53511  
(608) 364-1131; Fax: (608) 364-1161  
E-mail: [bmex@wr.net](mailto:bmex@wr.net)  
<http://www.bmex.org/>

**SWAP**

Solid Waste Alternatives Program (Surplus With a Purpose)  
University of Wisconsin-Madison  
2102 Wright St.  
Madison, WI 53704  
(608) 245-2908  
E-mail: [swap@bussvc.wisc.edu](mailto:swap@bussvc.wisc.edu)  
<http://www.bussvc.wisc.edu/swap/swap.html>

**WYOMING**

**Department of Environmental Quality**

Solid and Hazardous Waste Division  
122 West 25th Street, Herschler Building, 4th Floor West  
Cheyenne, WY 82002  
(307) 777-7752; Fax: (307) 777-5973

*Division Offices:*

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Lander, WY 82520  
(307) 332-6924; Fax: (307) 332-7726

3030 Energy Lane, Suite 200  
Casper, WY 82604  
(307) 473-3450; Fax: (307) 473-3458  
E-mail: [DEQWYO@missc.state.wy.us](mailto:DEQWYO@missc.state.wy.us)  
<http://deq.state.wy.us/shwd.htm>

**Wyoming Recycling Association**

P.O. Box 539  
Laramie, WY 82070  
(307) 332-6924  
<http://www.trib.com/WYOMING/RECYCLE/>

**Cooperative State Research, Education and Extension Service**

University of Wyoming  
P.O. Box 3354  
Laramie, WY 82071  
(307) 766-5479; Fax: (307) 766-3998 or 766-6403  
E-mail: [jhillier@uwyo.edu](mailto:jhillier@uwyo.edu)