

# NEW MEXICO CONSTRUCTION & DEMOLITION RECYCLING GUIDE



Produced by the  
**New Mexico Recycling Coalition**



In conjunction with the New Mexico Construction & Demolition Recycling Task Force

This guide is also available online at [www.recyclenewmexico.com](http://www.recyclenewmexico.com)

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Special credit to Mark Lennon and The Institution Recycling Network (IRN) for use of sections in their excellent resource "Recycling Construction and Demolition Wastes: A Guide for Architects and Contractors", published April 2005. Information gleaned from the IRN guide come from years of hands-on experience.

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# C&D RECYCLING OVERVIEW

## New Mexico Recycling Coalition

The New Mexico Recycling Coalition is a non-profit statewide professional membership organization that has a mission to lead New Mexico to value waste as a resource. This goal is reached primarily through education and advocacy projects. With 260 recycling members, the organization supports itself from dues, trainings and conference revenue. Several special projects are funded by grants. Joining NMRC helps support efforts such as this to educate professionals and the public about the value of recycling.

## Construction & Demolition (C&D) Recycling Task Force

- ◆ Supports development of end-markets via private business and municipalities.
- ◆ Supports builders, contractors, facility managers and designers with resources and outreach.
- ◆ Comprised of a diverse group of builders, architects, solid waste managers, haulers, recycled-content businesses and private recycling businesses.

## C&D Recycling Summary for New Mexico

- ◆ C&D debris represents from 19-28% depending on the year by weight of waste sent to New Mexico landfills.
- ◆ Building renovation and demolition accounts for 91% of the C&D generated each year, while new construction accounts for only 9%.
- ◆ Composition studies have found 75%+ of C&D material is recyclable, depending on recycling outlets in the region. Several Leadership in Energy & Environmental Design (LEED) projects in Appendix B: NM Case Studies have reached 78%, 80% and 83% diversion rates.
- ◆ Bernalillo County produced 147,184 tons in 2008 (down from 323,000 in 2004) tons of C&D. Sandoval County produced 199,212 tons of C&D waste, which was greater than the Municipal Solid Waste (MSW) tonnage accepted.
- ◆ New Mexico has a legislated goal in the Solid Waste Management Act (1990) with a target of 50% of MSW to be diverted from the landfill by the year 2000 (using baseline of 1992). This goal has not been met, as the current recycling rate for MSW diverted from the landfill measured in 2009 is about 12.4%. The NM Environment Department: Solid Waste Bureau has an annual report at [www.nmenv.state.nm.us/SWB](http://www.nmenv.state.nm.us/SWB) with waste generation statistics.

## Why Recycle on the Job Site?

- ◆ Commitment to environmental responsibility for positive marketing aspect;
- ◆ LEED and other green building program points;
- ◆ Cleaner worksite and thus increased safety;
- ◆ Some collection haulers provide a rebate after the recyclable products are sold, offering a reduction in cost;
- ◆ Recycling reduces pollution, greenhouse gas emissions, and landfill space requirements. Information about online greenhouse gas emission reduction calculations are on page 4.
- ◆ Recycling conserves energy – think about logging, mining and other resource extraction activities;
- ◆ Recycling creates jobs. It takes on average 5 more people to work in the recycling field than one job in landfilling.

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## Incentives to Recycle C&D Debris

Looking at models around the country and locally, here are a few examples that a community could implement to encourage increased C&D recycling.

- ◆ Municipal commitment to support C&D material diversion and recycling by ordinance, e.g. Portland mandates all projects over \$25,000 to require job-site recycling, Chicago mandates 50% recycling by weight for all projects.
- ◆ Permitting and Planning Department Partnership: Require recycling plan for all building projects. Incentives include deposit for waste (of which deposit returned for tons recycled) or fast-track approval or reduced fees.
- ◆ Landfills to offer lower tip fees for recyclable materials, e.g. Los Alamos County's regular tip fee is \$45/ton. For concrete, the tip fee is reduced to \$29.50/ton. The facility is able to re-sell that material to an end-market to help offset the management costs of that material. Thus, the ability to accept the material at a reduced rate. And an incentive to the customer to recycle.
- ◆ Include language with sub-contractor agreements that require the recycling/reuse of materials or use of recycled-content products, go to Appendix C.
- ◆ Develop and identify partnership programs for companies that produce and then reclaim items such as carpeting, wood, metals, etc.
- ◆ Recognition or special awards for contractors/builders/designers who demonstrate excellence in recycling and reuse of C&D materials.

## Challenges to C&D Recycling in New Mexico

- ◆ Market and Business Development. Recycling is a new component to building in New Mexico and the industry is just starting to support all potential recyclable products, e.g. LaFarge accepts concrete debris and recycles it to become base course or concrete again.
- ◆ Expense. There is an emerging recycling collection infrastructure. As more haulers offer recycling, we will see more competitive pricing.
- ◆ Drywall. Up until recently, there has been no drywall recycling end-market in New Mexico (see topic on page 8).
- ◆ Education. Need to impart message of urgency that this aspect of building is important to all job site workers on a regular, if not daily basis. One of the biggest challenges to proper recycling collection is contamination. Contractor agreements must specify recycling requirements and penalties must be added to ensure compliance. On-site project manager must be responsible for recycling coordination and follow-through.

## LEED Impact on C&D Recycling in New Mexico

Green building rating systems, like the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED), are rapidly gaining momentum throughout the construction industry. Commercial and residential construction projects are encouraged or required to recycle and utilize recycled materials in order to receive certification. Construction recycling is among the most visible commitments a developer can make to sustainable building, visible to every worker on the site and to every passerby. On and off the job site,

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recycling is one of the most significant commitments that can be made to sustainable building.

In New Mexico, Governor Bill Richardson passed an executive order in 2006 requiring all state buildings that are larger than 15,000 square feet to be LEED-Silver certified. The City of Albuquerque passed an ordinance in 2005 that all city buildings larger than 5,000 square feet will be LEED-Silver certified as well. The Home Builders Association has created Build Green New Mexico to promote green building and to certify residential projects, and LEED has expanded its certification programs to include residential and retrofits. The LEED and other certification programs, the rapidly growing interest in green buildings, and the growing importance of energy conservation, have already directly impacted the increase in demand for jobsite recycling. Furthermore, in the 2007 Legislative session, a Sustainable Building Tax Credit was passed that provides tax incentives to commercial and residential building projects that are certified LEED and Green Build New Mexico.

Since the implementation of these incentives, 16 LEED-certified projects have been completed as of January 2010 and 180 have registered as LEED.

In the LEED program, where a minimum of 26 points must be earned to achieve basic certification, construction jobsite recycling can provide 1 to 2 points. Other recycling-related opportunities for points include re-use of materials in the project, use of recycled-content new products and materials and innovative solutions involving recycling. Other green-building certification programs offer similar credits.

## LEED-NC V3.0 Scoring In Regard to Recycling, Recycled-Content and Reuse

Prereq 1	Storage & Collection of Recyclables	Required
Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1 point
Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1 point
Credit 3.1	Materials Reuse, 5%	1 point
Credit 3.2	Materials Reuse, 10%	1 point
Credit 4.1	Recycled Content Materials, 10%	1 point
Credit 4.2	Recycled Content Materials, 20%	1 point
Credit 1	Innovation in Design	1-5 points

## **Reduce Greenhouse Gas Emissions**

Calculate resources conserved by your recycling efforts at the EPA Climate Change website: [www.epa.gov/climatechange/wyacd/waste/](http://www.epa.gov/climatechange/wyacd/waste/). On the "Tools" Link visit the WARM—Waste Reduction Model Calculator, a tool for solid waste professionals and organizations to measure and track their GHG reductions.

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## Federal/Large Facility Renovation/Deconstruction Projects

Several federal facilities and large commercial/institutional facilities have met to discuss the idea to cooperatively pool recyclable materials for shipment to the recycler, that otherwise would be too costly to recycle if done by individual sites. This is practical for such items as carpet, ceiling tiles, and other harder-to-recycle items that a national manufacturer may accept at low or no cost if a truckload of material is available for pick-up. If interested in becoming part of this "pool", please contact Ralph Wrons, the Pollution Prevention coordinator at Sandia National Labs in Albuquerque, by e-mail at [rjwrons@sandia.gov](mailto:rjwrons@sandia.gov).

## Identify Components of Waste Stream

A Construction and Demolition Waste Stream Composition Calculator is available online at <http://www.ciwmb.ca.gov/WasteChar/Calculator/Default.htm> to help you evaluate your specific project's waste stream.

There have been no specific studies of C&D waste for New Mexico. The best representation of recyclable material coming off of jobsites can be seen in Appendix B: NM Case Studies on page 21.

## Building-Related C&D Debris Generation Nationwide By Weight

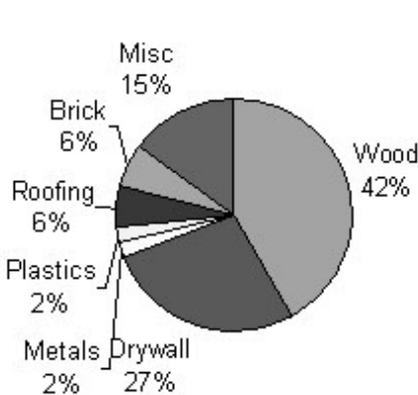
Material	Estimated Percentage
Concrete & Mixed Rubble	40-50%
Wood	20-30%
Drywall	5-15%
Asphalt Roofing	1-10%
Metals	1-5%
Bricks	1-5%
Plastics	1-5%

*Source: BioCycle, November 2003, "Analyzing What's Recyclable in C&D Debris"*

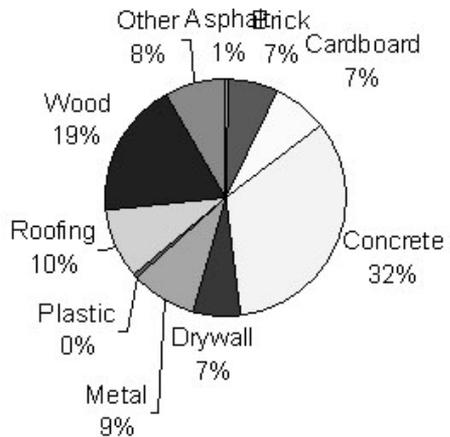
Evaluating disposal cost savings will be based on volume if the builder pays for each container "pulled", or weight if disposal costs are a "per ton" fee charged by the hauler/landfill. Generally, by weight or volume, concrete, wood and drywall make up 60-80% of jobsite waste. Please note that this is a national average for all construction projects. In the case of commercial projects, concrete, wood, metals and drywall will be the significant recyclable materials. **Drive-by contamination can be as much as 30%** of the total volume hauled from the site. Plan your roll-off container site so it can be protected from illegal drop-off dumping.

**Management Must Lead By Example for a Successful Project**

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**New Residential Construction Debris,  
National Average By Weight**  
Source: NAHB Research Center



**New Commercial Construction, Extracted  
from Des Moines, Iowa Data By Weight**

## Buy Recycled

Many construction materials, such as particle-board and concrete contain recycled material without advertising it. "Buying recycled" is an important component in making the collection of recyclables possible. If the demand for a product exists, then materials will be sought in order to manufacture the product. So, buying recycled creates the demand for recycling.

Procuring recycled-content materials may be done through conventional bidding or the standard specification process. Any recycled-content product can simply be included in drawings or specifications.

Possible recycled-content construction materials include: engineered lumber, concrete, tile, drywall, base course, asphalt, carpet, paint, structural steel, metal framing, miscellaneous metal, insulated concrete forms, aluminum frames, glass and ceiling tiles.

## Reducing Quantity of Materials and Waste

In the design phase, consider how materials can be most efficiently used. An excellent resource resides online at The National Association of Home Builders Green Building Guidelines website at [http://www.nahbrc.org/greenguidelines/userguide\\_resource\\_reduce.html](http://www.nahbrc.org/greenguidelines/userguide_resource_reduce.html) or go to the American Institute of Architects webpage at [www.aia.org](http://www.aia.org).

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## Identify Recyclable Materials

To identify a provider in your area, go to the New Mexico Recycling Directory at [www.recyclenewmexico.com/search](http://www.recyclenewmexico.com/search) and locate options by county, state-wide, by material type and by service provided. A condensed Resource Guide is included as part of the printed directory in Appendix E on page 42.

**In Albuquerque and Santa Fe Markets, the following can be recycled:**

Material	Remarks
<b>Metals</b>	The scrap metal market is strong. Local scrap markets are available as well as hauler collection.
<b>Wood</b>	Two businesses in Albuquerque accept waste wood. Another option for wood is to give away as firewood or to grind on site for use as mulch, erosion control or infill. A business can provide the grinder service or equipment can be rented.
<b>Concrete</b>	La Farge, Waycor, Vulcan, BTU and most other concrete companies accept clean concrete with rebar and metal removed. Haulers can collect this material as well for recycling.
<b>Drywall</b>	As of January 2010, Grind, Inc. accepts drywall for recycling.
<b>Cardboard</b>	The cardboard recycling market is strong. Haulers can collect or cardboard can be recycled in local recycling programs.
<b>Plastics</b>	Could range from just plastic beverage containers to shrink wrap, PVC and other types. Ask hauler about options.
<b>Glass</b>	In most cases if glass beverage containers are recycled onsite in a small collection bin, the material must be taken to local recycling program drop-off center. For other glass, the closest recycler is Dlubak Glass in Texas.
<b>Green Waste/ Organic Material</b>	Chipping cleared trees onsite provides an excellent mulch to protect soils, promote re-seeding and can be utilized as an erosion control best management practice. Resources at <a href="http://www.recyclenewmexico.com/cfrp_project.htm">www.recyclenewmexico.com/cfrp_project.htm</a> . The material may also be hauled to a municipal or private business for recycling.
<b>Asphalt or Road Base</b>	If pavement must be removed for a new project, an excavation or road building company will be able to either re-use the material onsite or haul away for other projects they work on.
<b>Reusable Materials</b>	Fixtures, roofing, electrical, plumbing, ceiling tiles, wood, insulation and any other renovation materials that are reusable can be received at Habitat of Humanity ReStores.

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## Drywall Recycling

Drywall has been a problem material for project recycling up until recently. The Albuquerque-based drywall production company, American Gypsum, has been approached numerous times and as gypsum is a readily available material in the state, the company has determined it is not economically feasible to accept. Grind, Inc., a statewide company, has opened a drywall recycling facility in Albuquerque and now accepts the material for use as an agricultural amendment.

### Possible Beneficial Uses for Drywall at the Project Site:

1. When designing the project, ensure that wall dimensions match standard wallboard dimensions to decrease amount of scrap.
2. As a non-toxic material comprised simply of gypsum and paper, clean drywall may be used as infill onsite.
3. Clean drywall may be chipped and added as a soil amendment. As this material is alkaline and our soils are generally alkaline, the material must be well spread and worked in. Gypsum provides a source of sulfur and calcium to crops. Gypsum can also improve the drainage and texture of clayey soils.

More information is at [www.drywallrecycling.org](http://www.drywallrecycling.org) regarding these concepts and for specific processing and case study information.

## Forecasting Recycling and Disposal Costs Basics

**Handling:** Handling expense is considered in a builder's total waste management cost. The only cost difference in waste vs. recycling is in preparing recyclables. Example: Time to cut all wood waste to 3x3 or smaller.

**Transporting:** By transporting and marketing recyclable materials yourself, direct revenues can be generated. When contracting with a private hauler, disposal savings may be realized through reduced container/service fees.

**Tipping:** Tipping fees are charged by facilities that receive the "waste" material. Landfills and recycling outlets can charge by volume (cubic yards) or by weight (tons or pounds). Therefore you may need to convert your weight to volume, or vice versa.

Refer to Appendix A: Recycling Worksheet on page 19.

# PLANNING FOR C&D RECYCLING

## Standard Volume-to-Weight Conversion Factors

Volume-to-weight conversions are helpful for estimating the weight of waste materials in a disposal or recycling container. It should be noted, however, that the actual conversions for C&D debris are highly variable. Note: To convert 1 cubic foot to 1 cubic yard, multiply your poundage by 27. Remember 1 ton = 2000 lbs.

Recyclable Material	Volume	Estimated Weight (lbs)
Asphalt/paving, crushed	1 cubic yard	1380
Carpet and padding, loose	1 cubic yard	84.4
Cardboard, flattened boxes, loose	1 cubic yard	50.08
Cardboard, whole boxes	1 cubic yard	16.64
Cardboard, compacted	1 cubic yard	400
Cement, bulk or Concrete, cinder	1 cubic yard	2700
Cement, mortar	1 cubic yard	3915
Concrete, scrap, loose	1 cubic yard	1855
Glass, broken	1 cubic yard	2160
Glass, window	1 cubic yard	4239
Glass, crushed	1 cubic yard	1215
Metal, scrap ferrous	1 cubic yard	906
Metal, scrap ferrous	55 gallons	226.5
Mortar, hardened	1 cubic yard	2700
Mortar, wet	1 cubic yard	4050
Plastic, film mixed loose	1 cubic yard	22.55
Plastic, film semi-compacted	1 cubic yard	72-76
Plastic, beverage containers	1 cubic yard	32
Polystyrene, rigid, whole	1 cubic yard	21.76
PVC, loose	1 cubic yard	341.12
Sheetrock scrap, loose	1 cubic yard	393.5
Wood, pallet, 48" x 48"	1 pallet, avg	40
Wood, particle board, loose	1 cubic yard	425.14
Wood, plywood, sheet 2' x 4'	1 cubic yard	776.3
Wood, scrap, loose	1 cubic yard	329.5

Sources: CA Integrated Waste Management Board Conversions: <http://www.ciwmb.ca.gov/Iglibrary/DSG/Append1.htm> and EPA Conversion Factors: <http://www.epa.gov/epaoswer/non-hw/recycle/recmeas/conversn.htm>

# PLANNING FOR C&D RECYCLING

## Planning for C&D Recycling

The Waste Management Plan is the document that lays out the start-to-finish strategy for job site recycling. It is prepared directly from the drawings and specifications for the job, and a good plan will closely follow these documents.

### The Waste Management Plan should:

- ◆ Estimate types and quantities of C&D wastes generated during each phase of the job;
- ◆ Identify waste minimization as a good strategy for all trades;
- ◆ Identify how each waste will be managed and marketed;
- ◆ Provide an estimate of the overall job recycling rate and recycling rate per material;
- ◆ Lay out plans for training, meetings, and other communications related to job-site waste management;
- ◆ Provide troubleshooting instructions and contact information.

All of this can (and should) be done before you break ground, so that recycling is incorporated seamlessly into overall performance of the job. It's best if the Waste Management Plan is written and signed off on by all parties (owner, architect, contractor) a month or more before groundbreaking or the first day of demolition.

Because of its central role in construction waste management, more detailed information and a sample waste management plan are provided as a web link in Appendix D.

On balance, **source separation is generally preferable** to commingled recycling. Recycling rates are typically higher. The basics of source separation are easy: each recyclable material should be segregated as it is generated, and placed in the appropriate container.

## **Tips to Make Recycling Separation Work**

### ***Keep as few containers as possible on site at any time.***

Containers take up space, and having too many containers increases the possibility of confusion and contamination.

***Match containers to the material.*** A wood container, for example, will typically hold 30 or 40 cubic yards. But scrap metal from wiring and plumbing may need only a 2- or 4-yard container. For something like concrete, you may need a roll-off.

***Place containers close to work locations.*** Look for opportunities to use intermediate containers like hampers or rolling hoppers that can be placed right next to the work, then wheeled to a larger waste container at the end of the shift. There may be surprising savings in labor and convenience.

# PLANNING FOR C&D RECYCLING

## Contractor, Owner and Architect Relationship

C&D recycling is no different from any other aspect of performance on a construction project: A good relationship and understanding between the owner, architect, and general contractor are the most important part of making it work.

Understandably, it's the contractor who's often most concerned about recycling. The General Contractor's (GC's) job is to deliver a project on time and within budget. For the GC, trash has historically been a minor issue, an afterthought. Call a hauler, get some bins on site, pull them when they're full. Waste has been among the last and least of the contractor's concerns.

To maintain the strength of the owner/architect/contractor relationship, it's important to have strong and clear communications between all parties on the job:

- ◆ It should be made clear that recycling is a critical and valued aspect of the GC's overall performance.
- ◆ It's important to communicate that the owner and architect understand the complexity of managing recyclable materials as commodities and not as wastes, and understand that this complexity has to be accounted for in project management.
- ◆ It's important to build a relationship in which it's clear that the owner, architect, and contractor share a common interest in waste management performance. The owner and/or architect should be familiar with recyclable materials, procedures, and markets, and should be able to suggest options and solutions. Therefore, it is important that the owner and architect have prior knowledge and reasonable expectations for what is practical to recycle for the project.
- ◆ It's important to build in appropriate performance goals and guarantees. Recycling goals and standards should be made explicit in Requests for Proposals and other contract documents, along with reporting and record-keeping requirements and expectations for recycling performance (see Appendix C). It should be made clear that the contractor will be recognized for solutions that go beyond minimum standards. And conversely, it should be made clear that sub-par performance will not be tolerated without clear explanation, with appropriate penalties included in contract language.

And finally, **remember and take advantage of the fact that recycling is probably the most visible of all steps that can be taken toward sustainable building.** Unlike energy efficient HVAC or certified forest products, recycling is something that everyone understands. On the job site, use this fact to generate teamwork and motivation among workers and subcontractors. For the local community, a placard on the perimeter fence that highlights recycling performance is a great public relations tool, and a press release on recycling will almost always get picked up by local media. If you turn recycling into a shared mission that heightens camaraderie and teamwork among everyone on the job – GC, subcontractors, workers, architect, and owner – you can gain benefits that go far beyond the calculation of a recycling rate.

# PLANNING FOR C&D RECYCLING

## Training On The Job Site

There's a simple rule in C&D recycling (which is the same as a simple rule in architecture and construction): If it doesn't meet specified requirements, it costs money to fix.

Recyclers are set up to handle specific materials: wood, metal, concrete, etc. If a load comes to their facility that's mixed with other materials, that's a problem that can increase recycling costs. Either the contaminating material has to be separated out, or the quality of the recycled product will be downgraded, or the entire load will be rejected and disposed of – all of which add cost that will be passed back to the contractor. It's much easier and less expensive to meet the specification in the first place. That means training.

Training need not be extensive, time consuming or complicated. For the most part, it consists of one lesson: "If it's X, it goes in the X box. If it's Y, it goes in the Y box. If you have questions, ask your supervisor."

There are just a couple of other things to be added to this lesson, like:

*"It is important to do this. This is one of our major environmental commitments on this job."*

*"It is important to do this. If you do not do this it will cost us a lot of money."*

*"It is important to do this. If you do not do this you will have to go into the dumpster and get it right."*

There are times when more instruction is needed. For example, if you're using hoppers or hampers close to work locations, workers will need to be instructed to use these containers, where to take them at the end of the shift, and where and how to empty them. If workers have to remove steel anchors/rebar from concrete, provide a demonstration of how it is done.

Training should be provided every time one subcontractor crew switches out for another. It's most important that every worker who is regularly on the site and handling a recyclable material should receive some training.

**Signage.** Another part of training is signage. Basically, each waste container should have a big sign that says: "RECYCLING. METAL ONLY" (with different material names as appropriate).

A problem with signs: they often disappear down the highway when a container gets pulled. This is particularly true with flat magnetic signs, which otherwise make a lot of sense on dumpsters and rolloffs. One alternative is free-standing signs on posts welded into tire rims (which work great until the wrong sign gets parked next to the wrong container). Another effective solution is to rig signs that hang over the rim of a container. Compared to magnetic signs, it's more obvious that they're temporary and not permanently fixed to the container, and it's hard for a driver to miss them when he's checking his load before pulling away.

# PLANNING FOR C&D RECYCLING

## Construction Waste Management Supervisor

Like anything on a construction site, everything goes fine when everything goes fine, but you need someone to call when something goes wrong to address:

- ◆ The container's full and the truck doesn't show up.
- ◆ The container has to be moved so the crane can get in behind it.
- ◆ There's cardboard in the wood box and the driver refuses to haul it.
- ◆ Can a glu-lam beam go in with dimensional lumber?
- ◆ It's going to rain tonight and the wallboard container is only half full.
- ◆ Workers keep throwing lunch wrappers in the metal box.

### **Every construction recycling site should have one person (with a backup) who knows everything that's going on, waste-wise, and has ultimate responsibility for making it go right.**

Just as the GC and each subcontractor have a supervisor, there should be a recycling supervisor as well. This can be a contractor employee, or someone hired by the contractor. This person need not be on site all the time, but he or she should come to the site regularly to check on progress and answer questions; he/she should also be present to listen and provide input at project oversight meetings. Generally, this should also be the person who's prepared the waste management plan and made the hauling and marketing arrangements for the job, who provides training when there's a change of subcontractor crews, and who's responsible for waste tracking and reporting. In other words, all these reins should come together in one set of hands, in a person who's able to understand and respond to every recycling contingency that comes up.

## Barriers and Solutions

Recycling proponents need to address each barrier that comes their way otherwise recycling will often be abandoned before it's tried. It's far better to address the barriers up front, with real information, than let them stand in the way, or linger and taint the whole recycling effort (see Barriers & Solutions Table on next page).

### **Encourage Participation**

Frequent reminders—both verbal and visual—are important.

Large signs designating recycling areas work well.

Participation awards, such as caps, T-shirts, pizza lunch or a BBQ using proceeds from recycling efforts, reinforce the importance of following the waste management plan.

Most important is communication. Talk about recycling and how important it is to follow the plan as often as possible.

**Help contractors realize that when you succeed, they succeed, and the environment benefits...it's a win-win-win situation!**

# PLANNING FOR C&D RECYCLING

BARRIER	SOLUTION
Recycling will slow down the job	Recycling asks workers to work a little bit smarter, not any harder or longer. Recycling containers should be clearly labeled. Because they're often smaller than the big rolloff boxes used for mixed debris, many recycling containers can be placed closer to the work locations where wastes are generated, saving time and efforts. There's also a safety connection. Because recyclable wastes are usually put into containers as soon as they're generated – not left on the ground to be picked up as mixed debris – recycling generally makes for a cleaner and safer job site.
There's no room on site to recycle	A key to successful recycling is to match containers to wastes, both in time and size. Match containers to each phase of the job if possible, and try to swap containers in or out so that only one to three containers are on location at any time, matched to specific wastes being generated.
With all these containers and materials, recycling is way too complicated	What recycling requires is intelligent up-front planning, most of which is already done as part of overall project management. When the framers are working, it's time for a wood box. When the wiring, plumbing, and HVAC are being installed, it's time for a metal box. When gypsum wallboard is being installed, it's time for a wallboard box.
We have no RFP or contract language for recycling	C&D recycling starts with a good specification that clearly states recycling goals, materials to be recycled, and planning, reporting, and record-keeping requirements. There are a lot of good samples of C&D recycling specs to choose from, that fit just about every recycling situation and specification format. Appendix C provides two model specifications.
Recycling costs too much	Currently in New Mexico there will be additional costs for multiple bins. Ask the hauler about rebates after the material is sold to help offset costs. Consider marketing the material yourself. As more demand for this service arises, more competitive pricing will be seen. If you are able to re-use material at the jobsite for other beneficial uses, you can calculate the cost saved from landfilling that material. Full cost accounting in solid waste usually considers land-fill space avoided and energy savings for material recycled.
I'll never get subcontractors to go along	Give clear priorities, instruction, procedures, financial penalties and incentives. Two things are most important: 1. Management-level interactions and 2. Training.
The union won't cooperate, and the labor cost will be too high	In almost all cases, the reverse will be true. Recycling promotes a neater, safer, and more productive jobsite. It is important to bring union reps into the planning process and solicit their input.

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# WASTE MANAGEMENT PLAN

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## The Waste Management Plan

The Waste Management Plan is the cornerstone for successful C&D recycling. It is a comprehensive document that provides all of the information needed by any individual on site to understand and achieve the waste management goals for the project.

**The Waste Management Plan should be started as early in the project as possible**, well before groundbreaking or the beginning of demolition. This allows time for all parties to participate in developing the plan, allows contractors and subcontractors to integrate recycling into their setup and work plans, and assures that training can be provided to supervisors and workers. If there will be issues like space for recycling containers or internal handling of recyclables (e.g., using hampers or self-dumping hoppers), these definitely should be addressed in the Plan well in advance of groundbreaking.

The Waste Management Plan is also a living document, used as a day-to-day reference just like blueprints and specifications. This fact cannot be over-emphasized. Handling procedures or markets may change during the course of a job; these changes should be noted in modifications to the plan. As waste materials move from the site you will gather information on waste and recycling tonnages and costs. These should be matched against initial projections, variances should be analyzed, and a running recycling rate should be calculated. This last is critical. If you're looking for LEED points or other certification, you need to track progress toward this goal (and take steps if it looks like you're running low). And you should publicize the recycling rate to laborers and trades; it's a good way to help boost morale, and keep workers striving to achieve your recycling goals.

The Waste Management Plan should include the following information, laid out in clearly identified sections. A web link to a sample waste management plan is included in the Appendix D.

### Step 1: Contact Information

Contacts for all persons with responsibility for waste management, including, at a minimum, architect, general contractor (project manager and site supervisor), and waste management specialist (if one is engaged for the project). Also, in some cases, owner's representative, waste hauler(s), and key subcontractors (e.g., demolition subcontractor).

### Step 2: Goals

This is a critical – if brief – section and should be placed front and center. It states in concise but explicit terms the waste management goals for the project. For example, "This project will recycle, reuse, or salvage at least 75% of the waste generated on site to earn 2 LEED points." Important sub-goals should also be stated clearly, such as, "Documentation of all wastes leaving the site shall be maintained by the site supervisor, including wastes removed from the site by subcontractors." The Goals section makes clear the importance of waste reduction and recycling, specific goals, and the most important activities and responsibilities that support achievement of these goals.

# WASTE MANAGEMENT PLAN

## Step 3: Training

It's important that all contractor and subcontractor employees receive training in jobsite recycling procedures. They are the individuals who will place wastes in either the right (that is, the recycling) or the wrong (the trash) container. The training section of the Waste Management Plan lays out the procedures to assure that all workers and supervisors receive training, and outlines the contents of training. *Typically, training will be keyed to two events:*

**Crew shifts.** When the job moves to a new phase with a new set of subcontractors on site, training should be provided to subcontractor supervisors and personnel. Whenever possible, training should be provided directly to all laborers. If not, the responsibility of subcontractor supervisors to provide training should be made clear, and they should be required to document that training has been provided to their crews.

**Weekly meetings.** Weekly construction project meetings should include a recycling "freshener", including updates on recycling rates, notes of any changes in recycling procedures, troubleshooting, and time for questions and answers.

## Step 4: Communications and Troubleshooting

**Meetings.** At what meetings will waste management and recycling be discussed? What is their schedule? Who will attend? What information will be discussed? Typically recycling is addressed in most pre-construction meetings and in meetings at subcontractor changeover or the introduction of a new subcontractor. **Some contractors, owners, or architects ask for a recycling update at all weekly meetings.**

**Questions and Decision-making.** The communications section also specifies who is responsible for decisions related to recycling, the chain of command for such decisions, and who should be contacted with recycling questions.

**Troubleshooting.** Like any process during construction, recycling can encounter problems – a container in the wrong location, a missed pickup, an engine block in the wood dumpster. The troubleshooting section specifies the steps to be taken and individuals to be contacted in the event of such situations. Most important is that persons using the plan – the site supervisor and key subcontractor personnel – know what steps to take (generally, "STOP") and whom to call if an unexpected problem comes up.

## Step 5: Reporting and RecordKeeping

It's impossible to prove the value of waste reduction and recycling – either financially or environmentally – without good documentation. This means (1) a comprehensive and verifiable record (by weight or volume, consistent for the duration of demolition or construction) of all materials that leave the site, either as trash or recyclables; (2) documentation of where these materials have been sent; and (3) information on the costs of hauling and disposing of all wastes and recyclables.

The Waste Management Plan should specify who is responsible for acquiring and storing this information, where information will be stored (e.g., on site, by the architect, by the contractor), who is responsible for using the information to

# WASTE MANAGEMENT PLAN

produce operating and financial reports (including LEED or other documentation), and how and when information will be transferred from one party to another (i.e. monthly reports vs final report at the end of construction).

The Waste Management Plan needs to spell out procedures to collect and manage this information. Four items are critical:

1. Weight or volume slips: Obtained from haulers or end markets, for each container that leaves the site.
2. Documentation of recycling (or disposal): Obtained from all end markets (in many cases, weight slips are adequate to provide this documentation).
3. Transportation invoices: Obtained from haulers or markets (in cases where transportation is provided by the market).
4. Recycling/disposal invoices/receipts: Obtained from end markets.

A few waste streams need special consideration. The Waste Management Plan should include instruction on how and when documentation of these wastes should be handled:

- ◆ Furniture and furnishings: These typically aren't recorded by weight. Conversion from a piece count to a weight estimate is required.
- ◆ Equipment that is resold: Items that are sold or donated to secondary markets are rarely weighed. These may include, for example, chillers, air conditioning or ventilation units, kitchen equipment or industrial machinery. Again, a reasonable weight estimate is required.
- ◆ Items recycled by subcontractors: Many scrap metals have significant market value, and subcontractors are used to carrying them off on their own. Contractors who may do this include plumbers, electricians, HVAC contractors, and roofers. It's not necessary to interfere with this practice; simply require that subcontractors report on the materials they take off site. (Unless there's a lot of tonnage involved, you don't have to require weight slips; subcontractors' estimates are sufficient.)

## Step 6: Waste Identification, Management and Marketing

This section is the core of the Waste Management Plan. Material by material, it catalogues what will be generated as waste from project start to finish, how each material will be handled (source-separated recycling, commingled recycling, or disposal), and where each material will be marketed (or disposed).

The section can be less or more comprehensive. A simple project that generates only a few waste materials may need only a few lines of information. The aim is to assure that anyone who comes on site and generates a waste can find that waste in the plan and find out what to do with it.

For each waste, the management plan should include the following information:

- ◆ **Material:** Described in enough detail so that each waste material can be identified without ambiguity. It's critical that the roster of materials is comprehensive; if you omit a significant waste stream, it may cause confusion on the job site, and may seriously affect your ultimate recycling rate and waste management costs. It's most important to list separately all materials that will be handled differently or will be sent to different markets. For example, if all

# WASTE MANAGEMENT PLAN

metals will be placed in a single container and marketed together, it may be sufficient to list "Metals" in the plan. But if, for example, ferrous and nonferrous metals are to be marketed independently, the waste management plan should specify this separation and independent handling procedures.

- ◆ **Procedure:** How will materials be handled? Many jobs may have only three categories: (1) source-separated recycling; (2) commingled recycling; and (3) disposal as waste. Other categories (not necessarily a comprehensive list) include recovery as salvage (e.g., furniture and furnishings), on-site or off-site grinding (e.g., landclearing debris) or crushing (e.g., concrete), or on-site stockpiling (e.g., soils).
- ◆ **Market:** This field lists the specific organization that will receive each recycled material. No waste is recycled until it's marketed, and no material should be targeted for recycling until (a) a market has been identified, (b) you've confirmed that the market will accept the material, and (c) confirmed that you can meet the market specification for the material.
- ◆ **Estimated Quantity:** As the plan is developed, quantities of each waste should be estimated and recorded as an aid in planning container number and size, estimating the project recycling rate, and estimating costs.

## Step 7: Recycling Rate Estimate

This calculation encapsulates your estimates of the total quantities of materials recycled and the total disposed. The recycling rate is simply the total quantity recycled divided by the sum of the quantity recycled plus the quantity thrown away. When the plan is first developed, this will be an estimate, used to forecast an ultimate recycling rate and to assess changes in waste management procedures that will affect this rate. As the project moves along, it becomes a living record used to track progress toward recycling goals. If the rate runs below projections, use the results documented in the plan to find out why, and (particularly if you need a specific rate for LEED or other certification) use the plan to evaluate alternatives to increase the rate.

## Step 8: Cost/Benefit Estimate

As noted elsewhere, it's a rare project where recycling is undertaken for strictly environmental reasons. Recycling needs to be justified financially, as well as environmentally. This section of the plan – typically a worksheet – is where you make this justification. See next page for Appendix A: Recycling Worksheet.

As you develop the plan and identify markets, you'll be able to estimate recycling costs, material by material, for transportation (including containers) and management. You should simultaneously estimate the cost to dispose of materials as wastes (transportation plus tipping fee), so that you can compare the cost of recycling versus disposal.

Once again, these are estimates that should be updated with real information as the project moves ahead, so you can compare actual against budgeted costs, and keep a running track of the savings for recycling compared to disposal. This is another good morale builder for workers on site, as well as a nice Good News item for contractor management, architect, and owner.

# APPENDIX A: RECYCLING WORKSHEET

## Recycling Costs/Savings Worksheet

Procedure	Quantity of Recyclables	Quantity of Disposables
<b>1. Estimate Total Waste</b>	_____ Tons	_____ Tons
<b>2. Determine Recyclable Materials</b>		
Wood	_____ Tons	_____ Tons
Cardboard	_____ Tons	_____ Tons
Metals	_____ Tons	_____ Tons
Concrete/Masonry	_____ Tons	_____ Tons
Asphalt	_____ Tons	_____ Tons
Drywall	_____ Tons	_____ Tons
Plastics/Films	_____ Tons	_____ Tons
Land-clearing debris	_____ Tons	_____ Tons
Other	_____ Tons	_____ Tons
Other	_____ Tons	_____ Tons
<b>TOTAL</b>	_____ <b>Tons</b>	_____ <b>Tons</b>
<b>3. Determine On-Site Labor Costs</b>		
Hours to separate 1 ton recyclables (a)	_____ Hrs/ton	
Hours to prepare 1 ton waste for disposal (b)		_____ Hrs/ton
Labor Rate (per hr) (c)	\$ _____ /hr	\$ _____ /hr
Total On-Site Labor Cost (Recyclables) (a X c)	\$ _____	
Total On-Site Labor Cost (Disposal) (b X c)		\$ _____
<b>4. Determine Recycling Fees</b>		
Travel Time to Recycler (1a)	_____ hrs	
Travel Time to Disposal (1b)		_____ hrs
Cost to operate hauling vehicle per hour (2)	\$ _____ /hr	\$ _____ /hr
Hauling charge per ton (3)	\$ _____	\$ _____
Number of tons (4)	_____ Tons	_____ Tons
Total Hauling Charge = (1x2) + (3X4)	\$ _____	\$ _____

# APPENDIX A: RECYCLING WORKSHEET

## Recycling Costs/Savings Worksheet Continued

Procedure	Quantity of Recyclables	Quantity of Disposables
<b>5. Determine Landfill Disposal Fees</b>		
Charge to tip 1 ton of materials (1)	\$ _____ Ton	\$ _____ Ton
Number of Tons (2)	_____ Tons	_____ Tons
Tippling Fee = (1x2)	\$ _____	\$ _____
<b>6. Determine Market Value of Recyclables</b>		
Wood	\$ _____ /Ton	
Cardboard	\$ _____ /Ton	
Metals	\$ _____ /Ton	
Concrete/Masonry	\$ _____ /Ton	
Asphalt	\$ _____ /Ton	
Drywall	\$ _____ /Ton	
Plastics/Films	\$ _____ /Ton	
Land-clearing debris	\$ _____ /Ton	
Other	\$ _____ /Ton	
Other	\$ _____ /Ton	
<i>Multiply market price by recyclable material amounts in Step #2 to gain total monetary value of recyclables</i>		
<b>TOTAL</b>	<b>\$ _____</b>	
<b>7. Cost Comparison</b>		
Net Cost for Recycling (Add Steps 3 + 4 + 5 - 6 in Recyclables Column)	\$ _____	
Net Cost for Disposal (Add Steps 3 + 4 + 5 in Disposables Column)		\$ _____

## APPENDIX B: NM CASE STUDIES

### Santa Fe Prep Library

#### Project Details

**Project Name:** Santa Fe Prep Library

**Client:** Santa Fe Preparatory School

**Location:** Santa Fe, NM

**Architect:** Spears Architects, Mark Natkin Project manager

**General Contractor:** John G. Rehders General Contractor

**Recycled Material Hauler:** RoadRunner Waste Services

**Approximate square feet:** 20,500

**Construction Recycling Rate:** 85%

**Current Status:** Completed May 2006

**Green Building:** LEED-Gold status received January 2007. This project earned 2 LEED points in the Construction Waste Management category.



*Photo courtesy of Julie Walleisa, D/P/S*

#### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Roadway	315 Tons	Eker Brothers
Concrete	72 Tons	Waycor
Metal	2 Tons	Albuquerque Metal Recycling
Cardboard	na	School recycling program
Wood	0 Tons	Recycled onsite
Total Tons Recycled	389 Tons	
Total Tons Landfilled	67 Tons	
<b>Percent Recycled</b>	<b>85.31%</b>	

#### Materials & Resources

The paving material from the roadway that was removed was recycled and ground up to be used in future projects. Likewise, the base course of the new road is made of recycled, ground-up concrete from other jobs.

#### Challenges

General contractor John Rehders stated, "Probably one of the most challenging things was getting our subs and employees to put the right waste products in the right dumpsters."

#### Innovative Recycling in Order to Achieve Diversion Rate

This project took advantage of the need to tear up roadway to develop the project site. Including this pre-construction activity essentially enabled this project to achieve such a high recycling rate.

## APPENDIX B: NM CASE STUDIES

### Loma Colorado Library

#### Project Details

**Project Name:** Loma Colorado Library

**Location:** Rio Rancho, NM

**Architect:** Wilson & Co.

**General Contractor:** Jaynes Corporation,  
Matt Ammerman (PM)

**Recycled Material Hauler:** RoadRunner  
Waste Services

**Approximate square feet:** 32,000

**Construction Recycling Rate:** 42.5%

**Current Status:** Completed October 2006

**Green Building:** LEED certification application in process.



Photo courtesy of Julie Walleisa, D/P/S

#### Waste Stream Recovery

*\*Specific material amounts were na at print time*

Material Recycled	Tonnage	Recycling End-Market
Concrete	na*	La Farge
Cardboard	na	RoadRunner Waste
Metal	na	RoadRunner Waste
Wood	na	Recycled onsite
Total Tons Recycled	80.5 Tons	
Total Tons Landfilled	108.5 Tons	
<b>Percent Recycled</b>	<b>42.5%</b>	

#### Challenges and Recommendations to Other Projects

The Project Manager was disappointed in not achieving the 50% diversion rate in order to receive 1 LEED point for material handling. Here are some lessons learned from this project:

- ◆ Superintendent was not properly trained to strictly enforce compliance of subcontractors with waste handling process and sorting and to check loads before shipment.
- ◆ A full load of concrete was rejected by LaFarge due to steel rebar content, causing that 15 tons of material to be landfilled. If that load had been accepted for recycling, the 50% rate would have been attained on this project.
- ◆ Subcontractors were verbally advised. No language in subcontractor contract required jobsite sorting or recycling. In future, Mr. Ammerman would include this language and would work weekly with subs to review and encourage proper recycling behavior.
- ◆ Did not develop a job cost plan for jobsite recycling nor tracked additional expense to recycle. In future will track these costs, as well as developing a recycling plan.

## APPENDIX B: NM CASE STUDIES

### Environmental Dynamics Inc. Building Renovation

#### Project Details

**Project Name:** ø

**Location:** Albuquerque, NM

**Architect:** Environmental Dynamics Inc.

**General Contractor:** A&T Construction

**Recycled Material Hauler:** Self-hauled

**Approximate square feet:** 7,200 commercial building

**Construction Recycling Rate:** 92%

**Current Status:** Completed May 2007

**Green Building:** Applying for v2.2 LEED-NC Gold



*Photo courtesy of EDI*

#### **Waste Stream Recovery**      *\*Measured in Cubic Yards*

Material Recycled	Total*	Re-used	Do-nated	Recy-cled	Land filled	End-Market
Metal	70	3	67	0	0	Acme Metal & ABQ Metal Recycling
Concrete	85	85	0	0	0	La Farge
Asphalt	16	0	0	16	0	La Farge
Wood	62	40	22	0	0	ReStore
Ceiling Tile	98	0	98	0	0	ReStore
Cardboard	4	0	0	4	0	Drop-off
Roofing	5	0	5	0	0	ReStore
Insulation	150	20	130	0	0	ReStore
Fixtures/ Electrical/ Plumbing	136	123	13	0	0	ReStore
Plaster/lathe	40	0	0	0	40	
Carpet	20	0	0	0	20	
Total	686					
Total Recycled	626					
<b>% Recycled</b>	<b>92%</b>					

#### **Material Management & Challenges**

For self-hauling, each vehicle was measured for standard cubic yardage, then again when filled with material. Photo documentation and tickets from end-users provide documentation. Besides use of gas for transport, there were no premiums to recycle. Due to size of project, permanent collection bins were not set up. Instead, 3-4 trips were made per week to deliver materials.

## APPENDIX B: NM CASE STUDIES

### Jefferson Green

#### Project Details

**Project Name:** Jefferson Green

**Client:** JCC-One, LLC

**Location:** Albuquerque, NM

**Architect:** Dekker/Perich/Sabatini.

Julie Walleisa

**General Contractor:** Enterprise Builders

**Recycled Material Hauler:** Enterprise Builders does their own hauling

**Approximate square feet:** 85,000

**Construction Recycling Rate:** 80%

**Current Status:** Completed September 2006

**Green Building:** LEED Gold achieved March 2007



*Photo courtesy of Julie Walleisa, D/P/S*

Material Recycled	Volume	Recycling End-Market
Landclearing/green waste	3,572 cy	Hilltop Landscaping
Concrete	207 cy	LaFarge, Albuquerque
Cardboard	50 cy	Petty Cash Depot or Durango McKinley Paper Company
Metal	14 cy	Acme Iron & Metal
<b>Total Recycled</b>	<b>3843 cy</b>	
Total Landfilled	985 cy	
<b>Percent Recycled</b>	<b>80%</b>	

### Waste Stream Recovery

#### Materials & Resources

Recycled-content materials on job included: structural steel, concrete, metal studs, aluminum storefront, access floor, rebar, gypsum board, and acoustical panel ceilings.

#### Challenges

This was the first time Enterprise and most of the subcontractors had attempted to recycle construction waste, so effort was needed to find recycling companies and end users for materials.

#### Innovative Recycling in Order to Achieve Diversion Rate

For land-clearing, the contractors pursued a combination of chipping for onsite use as mulch, and splitting larger pieces into firewood, which was given away. (Note: Land-clearing debris is no longer accepted by LEED into the recycling

## APPENDIX B: NM CASE STUDIES

### D/P/S Tenant Improvements

#### Project Details

**Project Name:** D/P/S Tenant Improvements

**Client:** Dekker/Perich/Sabatini

**Location:** Albuquerque, NM

**Architect:** Dekker/Perich/Sabatini. Julie Walleisa

**General Contractor:** Enterprise Builders

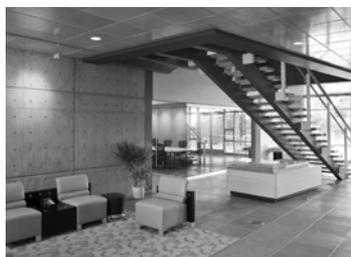
**Recycled Material Hauler:** Enterprise Builders does their own hauling

**Approximate square feet:** 35,000

**Construction Recycling Rate:** 23%

**Current Status:** Completed September 2006

**Green Building:** Application for LEED certification is under review, expected to achieve LEED-CI Gold.



*Photo courtesy of Julie Walleisa, D/P/S*

### Waste Stream Recovery

#### Materials & Resources

Material Recycled	Volume	Recycling End-Market
Cardboard	35 cy	Master Fibers or Durango McKinley Paper Co.
Metal	1.44 cy	Acme Iron & Metal
Total Recycled	36.44 cy	
Total Landfilled	123.5 cy	
<b>Percent Recycled</b>	<b>23%</b>	

Recycled-content materials on job include: structural steel, composite wood, metal studs, gypsum board, marmoleum flooring and tackboard, carpet, furnishings and acoustical panel ceilings.

#### Challenges

This was the first time anyone on the core team had pursued LEED certification and construction waste recycling on a tenant improvement project. Since the scope of the project was limited to finish materials and minimal buildout, most of the waste generated was from finish materials such as scraps of carpet, gypsum board, and acoustical ceiling tiles. These materials proved much more difficult to recycle than shell construction materials, due to the lack of local outlets. The materials were not generated in usable sizes for reuse, or sufficient bulk to recycle out of state or back to the manufacturer.

#### Innovative Recycling in Order to Achieve Diversion Rate

The furniture installers – Contract Associates installing Herman Miller furniture – collected all of the furniture packaging, took it offsite to a cardboard recycling facility, and provided records to the team.

## APPENDIX B: NM CASE STUDIES

### Advent Solar

#### Project Details

**Project Name:** Advent Solar

**Client:** Forest City/Mesa del Sol

**Location:** Albuquerque, NM

**Architect:** Dekker/Perich/

Sabatini. Julie Walleisa

**General Contractor:** Klinger Constructors



*Photo courtesy of Julie Walleisa, D/P/S*

**Recycled Material Hauler:** RoadRunner Waste Services

**Approximate square feet:** 87,000

**Construction Recycling Rate:** 78%

**Current Status:** Completed September 2006

**Green Building:** Application for LEED certification is under review. Expected to be the first LEED-certified industrial building in New Mexico.

#### Waste Stream Recovery

Material Recycled	Volume	Recycling End-Market
Concrete	180 cy	LaFarge
Paper and Cardboard	38 cy	Master Fibers and Earthday Recycling
Metal	16.5 cy	West Silver Recycling or Earthday
Plastic	38 cy	Earth Day Recycling
Wood	48 cy	Soilutions
TOTAL Recycled	320.5 cy	
Total Landfilled	90 cy	
<b>Percent Recycled</b>	<b>78%</b>	

#### Materials & Resources

Materials that have recycled content were specified for construction. Some of these materials include: structural steel, concrete, metal panel, aluminum storefront, rebar, and glazing.

#### Challenges

This was the first time many of the subcontractors had attempted to recycle construction waste, so effort was needed to find recycling companies and end users for materials.

## APPENDIX B: NM CASE STUDIES

### Hotel Andaluz

#### Project Details

**Project Name:** Hotel Andaluz

**Owner:** Goodman Realty Group

**Location:** Albuquerque, NM

**Architect:** Kells & Craig; Studio Southwest Architects

**LEED Consultant:** Darin Sand and Halcom Consulting

**General Contractor:** Integrated Property Services Construction

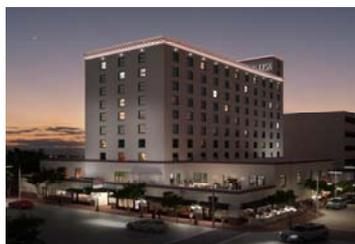
**Recycled Material Hauler:** Various

**Square feet:** 109,698

**Construction Recycling Rate:** 76.6%

**Total Building Renovation Cost:** \$30 million

**Green Building:** LEED-Gold status anticipated early 2010. This project earned 2 LEED points in the Construction Waste Management category.



*Photo courtesy of Darin Sand, Goodman*

#### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Cardboard	9.32	Unicor
Carpet	19.63	L.A. Fiber, Los Angeles, CA
Cast Iron	12.82	Mesalands Community College
Concrete	12.49	Coronado Wrecking
Furniture	50.90	Resale
Metal	177.57	W. Silver Recycling, Inc.
Misc.	2.38	Various
Porcelain	4.54	Base course for private road
Plaster	497.66	Engineered fill material
Wood	60.31	Wood You Recycle/Mt. Taylor
TOTAL Tons Recycled	845.39	
Total Tons Landfilled	258.48	
<b>Percent Recycled</b>	<b>76.6%</b>	

#### Challenges

The porcelain covered cast iron tubs and sinks were donated to Mesalands Community College in Tucumcari. The fine arts program melted the cast iron and transformed into sculptures. Transport of the cast iron and carpet was creatively solved by the college's trucking school. The 4.5 tons of porcelain toilets and sinks were ground by a local rock crushing business producing base course for a private road. Large wooden ceiling beams were reworked to produce the custom vanities in the public restrooms. The project set up a wood shop in order to reuse wood. Unneeded wood was stripped of its finish and recycled into wood pellets.

## APPENDIX B: NM CASE STUDIES

### Artyard at the Railyard

#### Project Details

**Project Name:** The ArtYard Project, Parkside Building

**Client:** Wiv Co

**Location:** Santa Fe, NM

**Architect:** Praxis Architects, Inc.

**LEED Consultant:** Environmental Dynamics, Inc.

**General Contractor:** The Lofts, LLC

**Recycled Material Hauler:** RoadRunner Waste

**Approximate square feet:** 30,674

**Construction Recycling Rate:** 90%

**Total Building Cost:** not available

**Current Status:** Estimated completion November 2009

*Photo courtesy of EDI*

**Green Building:** LEED-Platinum status anticipated March 2010. This project earned 2 LEED points in the Construction Waste Management category.



### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Masonry	312.000	Eker Brothers Recycling Facility
Cardboard	0.838	Santa Fe County
Steel	3.785	Capital Scrap Metals, Inc.
Misc Metals	0.065	Capital Scrap Metals, Inc.
Aluminum Cans	0.014	Santa Fe County
Plastic	0.011	Santa Fe County
Glass	0.925	Santa Fe County
Scrap Lumber	3.238	Salvaged by workers for home use
Engineered Lumber	11.620	Chipped & reused as mulch onsite
TOTAL Tons Recycled	332.50	
Total Tons Landfilled	33.19	
<b>Percent Recycled</b>	<b>90.92%</b>	

### Lessons Learned

Careful record-keeping helps to streamline the documentation of LEED credits. Organizing information about approved construction materials allows a project team to maximize the use of recycled content and regional materials.

## APPENDIX B: NM CASE STUDIES

### Aperture Center at Mesa del Sol

#### Project Details

**Project Name:** Aperture Center

**Client:** Forest City Covington NM, LLC

**Location:** Albuquerque, NM

**Architect:** Antoine Predock

**LEED Consultant:** Environmental Dynamics, Inc.

**General Contractor:** Klinger Constructors, LLC

**Recycled Material Hauler:** RoadRunner Waste Services

**Approximate square feet:** 80,000

**Construction Recycling Rate:** 86.2%

**Green Building:** LEED-Silver status anticipated December 2009. This project earned 2 LEED points in the Construction Waste Management category.



*Photo courtesy of EDI*

#### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Concrete	297.00	LaFarge NA, Vulcan Materials
Metals	4.13	Albuquerque Metals
Wood	23.75	Soilutions, Inc.
TOTAL Tons Recycled	324.88	
Total Tons Landfilled	52.00	
<b>Percent Recycled</b>	<b>86.2%</b>	

#### Lessons Learned

Ensure that all project team members share in green building goals and understand their roles in achieving them. The additional tasks associated with documenting LEED credits take time and should be incorporated into the fees of consultants and subcontractors.

## APPENDIX B: NM CASE STUDIES

### Los Alamos Eco Station

#### Project Details

**Project Name:** Los Alamos County Eco Station

**Client:** Los Alamos County

**Location:** Los Alamos, NM

**Architect:** Environmental Dynamics, Inc.

**LEED Consultant:** Environmental Dynamics, Inc.

**General Contractor:** RMCI, Inc.

**Recycled Material Hauler:** Waste Management

**Approximate square feet:** 14,000

**Construction Recycling Rate:** 92%

**Total Building Cost:** not available

**Current Status:** Occupancy

**Green Building:** LEED-Gold status anticipated December 2009. This project earned 2 LEED points in the Construction Waste Management category.



*Photo courtesy of EDI*

#### **Waste Stream Recovery**

Material Recycled	Tonnage	Recycling End-Market
Concrete	492.77	Los Alamos County Landfill
Cardboard	1.0	Master Fibers
Metals	2.24	Ace Metals
TOTAL Tons Recycled	496.01	
Total Tons Landfilled	42.46	
<b>Percent Recycled</b>	<b>92.115%</b>	

#### **Lessons Learned**

“The high percentage of recycled construction waste was made possible by the fact that the Eco Station IS the recycling facility and by the supreme scavenging culture in Northern New Mexico.” -Regina Wheeler, Los Alamos County Solid Waste Department and Sustainability Director

The site was set up to facilitate recycling, with separate dumpsters for different material types. The superintendent paid strict attention to the contamination of loads, and when contamination occurred, he charged the person responsible with jumping in the dumpster and cleaning it out.

## APPENDIX B: NM CASE STUDIES

### Desert Willow Family School

#### Project Details

**Client:** Albuquerque Public Schools

**Location:** Albuquerque, NM

**Architect:** The Hartman Majewski Design Group

**LEED Consultant:** Environmental Dynamics, Inc.

**General Contractor:** TA Cole & Sons General Contractors, Inc.

**Recycled Material Hauler:** Waste Management

**Approximate square feet:** 27,120

**Construction Recycling Rate:** 68.5%

**Total Building Cost:** \$3.1M

**Current Status:** Occupancy

**Green Building:** LEED-Silver status anticipated December 2009. This project earned 1 LEED point in the Construction Waste Management category.



*Photo courtesy of EDI*

#### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Concrete	50	
Asphalt	350	PG Enterprises
Other	320	
TOTAL Tons Recycled	720	
Total Tons Landfilled	330	
<b>Percent Recycled</b>	<b>68.571%</b>	

#### Materials & Resources

The Family School is a “community of learners.” Classes are composed of multiple ages and parents are active in the classroom. Each student’s day is split between home schooling and coursework led by professional APS staff. To develop the campus, the design team pursued the following: Create classroom buildings formed around a central courtyard that create a learning community while providing for children’s safety, health, and environment; Develop and design two distinct, yet integrated construction phases for the Family School elementary (K-8) and the future high school programs.

#### Lessons Learned

A construction waste management plan was developed at the beginning of the project and waste materials were tracked on a monthly basis. All tickets were recorded and uploaded to LEED online, which gave the project team a good sense of where they were at with achieving CWM goals.

## APPENDIX B: NM CASE STUDIES

### Step Up Childcare Recycling Project (UNM CE Master's Project)

#### Project Details

**Project Name:** Step Up Childcare  
**Client:** Step Up Childcare  
**Location:** Edgewood, NM  
**Architect:** Darren Sowell Architects  
**General Contractor:** CJ Mead  
**Recycled Material Hauler:** Jerome Aigner  
 (UNM Student, Dept. of Civil Engineering)



Photo courtesy of Mary Dammann, SCC

**Approximate Square Feet:** 3700  
**Construction Recycling Rate:** 44%  
**Current Status:** Final Acceptance Dec. 2009

#### Waste Stream Recovery

Material Recycled	Volume	Recycling End-Market
Mixed Plastics	4.4 cy	City of Albuquerque Drop-Off
Mixed Metals	3.0 cy	Acme Iron & Metal
Wood	51.4 cy	Bernalillo Transfer Station: 68% Recycled & 32% Re-Usable**
Paper/Cardboard	12 cy	City of Albuquerque Drop-Off
Wood Pallets	18 Pallets	Riteway Pallets
<b>TOTAL Volume Recycled</b>	<b>71 cy</b>	
<b>Total Volume Landfilled</b>	<b>90 cy</b>	
<b>Percent Recycled</b>	<b>44%</b>	
<b>Direct Money Saved</b>	\$1090 or 47% savings	\$2310 (assumed) - \$1220 (actual) = \$1090 (47% savings)
<b>Cost to UNM Student</b>	\$0	\$32 (dump fees – mulch) - \$32 (paid for metal) = \$0

#### Additional Information

The structure of the building came in numerous pre-constructed sections and trusses, which cut down on onsite scrap wood. \*\*Recycled wood was separated into wood that could be later processed for firewood (dimensional lumber given to Owner) and wood that would be processed into mulch at the Bernalillo County Tijeras Transfer Station. Reusable wood was given to the Owner for future projects.

The full version of the **Onsite Recycling Plan for the Step Up Childcare Project**, as well as the accompanying presentation, will be made available on the New Mexico Recycling Coalition Construction Recycling website [www.recyclenewmexico.com](http://www.recyclenewmexico.com) after June 2010.

'Direct Money Saved' was based on the Contractor's typical average of using one 30cy dumpster/ mo. The reduced frequency in dumpster hauling, as well as the reduced dumpster size, had a direct monetary savings for the Contractor.

## APPENDIX B: NM CASE STUDIES

### Step Up Childcare Recycling Project (UNM CE Master's Project) Continued

#### Challenges/ Lessons Learned

The location of the dumpster directly affected the progress of the recycling project. The first dumpster was located beyond the recycling center, so recycling was increased. The second dumpster was placed closer to the building than the recycling center, so recycling decreased substantially.

The recycling project recycled all plastics, but it turns out that the only plastics that are of value to the City of Albuquerque recycling program are type 1 and type 2 plastics, meaning that all other plastics recycled by this project will be discarded, and may become nuisance material when processed by the Albuquerque Intermediate Processing Facility.

Given the absence of training the field-crews, laborers were unsure what to do with materials that were composites (for instance a wire spool constructed of a cardboard center, wooden edges, and metal bolts to hold it together). Also, materials like Styrofoam, wax paper, and other unobvious materials became a challenge. Furthermore, boxes full of mixed garbage were frequently placed in the cardboard recycling area, instead of being dumped in the dumpster first.

Separating metals into steel/ copper/ aluminum & tin, using 55 gallon buckets, would have prevented having to separate the materials in the back of a truck at the metal recycling facility.

This project was not prepared to recycle reinforced concrete, so when a handicap parking slab was to be removed and replaced, one dump-truck load of concrete had to be land-filled because there was no plan in-place to recycle the reinforced concrete.

#### Original Estimates

Material Recycled	Actual	Estimate	Percent
Wood	51.4 cy	12 cy	420% more of estimate
Metals	3 cy	2 cy	150% more of estimate
Plastics	4.4 cy	7 cy	63% less of estimate
Paper/Cardboard	12 cy	7 cy	170% more of estimate

## APPENDIX B: NM CASE STUDIES

### V. Sue Cleveland High School

#### Project Details

**Project Name:** V. Sue Cleveland High School

**Client:** Rio Rancho Public Schools

**Location:** Rio Rancho, NM

**Architect:** Joe Muhlberger

**LEED Consultant:** Environmental Dynamics, Inc.

**General Contractor:** Jaynes Corporation

**Recycled Material Hauler:** RoadRunner Waste Services

**Approximate square feet:** 459,222 SF combined

**Construction Recycling Rate:** 81.1%

**Green Building:** LEED certification application in process.



*Photo courtesy of Jaynes Corporation*

#### **Waste Stream Recovery**

Material Recycled	Tonnage	Recycling End-Market
Concrete	2420	Waycor, LaFarge, Vulcan
Metals	169.36	Albuquerque Metals, Acme Metals
Wood	532	Soilutions, Inc.
Asphalt	88	LaFarge
Cardboard	55.39	Master Fibers, Earth Day Recycling
Plastic	2.5	Master Fibers
Styrofoam	2	Rastra
TOTAL Tons Recycled	3269.25	
Total Tons Landfilled	761.56	
<b>Percent Recycled</b>	<b>81.1%</b>	

#### **Lessons Learned**

It helps having someone to check on the recycling a few times a day. This controls contamination and helps make sure the wrong items do not get buried in the wrong dumpsters and result in a fine.

#### **Challenges**

It's a challenge to get the subs to take recycling seriously in the beginning, and even at the end when things are wrapping up. We remind the subs weekly that this is an important part of a LEED project.

#### **Innovations**

When subs first show up onsite we introduce recycling and our LEED goals in conjunction with our safety orientation to illustrate the importance of both to the project. A handout has been created to help the workers better understand what LEED is and what type of items are accepted for recycling.

## APPENDIX B: NM CASE STUDIES

### National Hispanic Cultural Center – Pete V. Domenici Building

#### Project Details

**Project Name:** National Hispanic Cultural Center – Pete V. Domenici Building

**Client:** State of New Mexico Cultural Affairs

**Location:** Albuquerque, NM

**Architect:** Studio Southwest Architects

**LEED Consultant:** Halcom Consulting Ltd.

**General Contractor:** Jaynes Corporation

**Recycled Material Hauler:** RoadRunner Waste Services

**Approximate square feet:** 25,280

**Construction Recycling Rate:** 84.65%

**Total Building Cost:** not available

**Current Status:** Occupancy

**Green Building:** LEED-Gold status achieved. This project earned 2 LEED points in the Construction Waste Management category.



*Photo courtesy of Jaynes Corp.*

#### Waste Stream Recovery

Material Recycled	Tonnage	Recycling End-Market
Concrete	812.50	LaFarge, Vulcan Materials
Metals	45	Albuquerque Metals
Wood	27.5	Soilutions, Inc.
TOTAL Tons Recycled	888.50	
Total Tons Landfilled	161	
<b>Percent Recycled</b>	<b>84.65%</b>	

#### Lessons Learned

In order to accomplish successful job site recycling, establishing early on a set form of practices for all to follow and then provide constant reinforcement to ensure the follow through.

# APPENDIX C: CONTRACT LANGUAGE

## RFP/Contract Language Specifying C&D Recycling

The following sample specifications can be obtained in electronic word processing format from the Institution Recycling Network at [www.wastemiser.com](http://www.wastemiser.com). Additional examples may be found and downloaded from web sites listed in Appendix E in that National Resources section on page 47-48.

### Example 1

*This is a comprehensive and detailed specification that lays out very specific procedures for preparation of the Waste Management Plan, material tracking, recordkeeping, and reporting.*

## CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

### PART 1 - GENERAL

#### **1.1 Related Sections (edit as appropriate for consistency)**

- A. Section 01031 - Waste Management / Recycling Alternates
- B. Section 01060 - Regulatory Requirements
- C. Section 01094 - Definitions
- D. Section 01300 - Submittals
- E. Section 01600 - Materials and Equipment

#### **1.2 Description of Work**

- A. This section describes the requirements for the Contractor and all subcontractors to minimize construction waste and debris and to reuse, salvage, and recycle to the greatest extent feasible.
- B. This section includes a statement of [OWNER]'s Waste Management Goals, requirements for the development of a draft and final Waste Management Plan, a reference to resources to assist in recycling, and steps for Management Plan Implementation.
- C. This section specifies certain wastes that are required to be recycled.
- D. This section specifies obligations for Reporting to the [OWNER] weights of materials recycled and materials not recycled or reused throughout the project.

#### **1.3 Intent and Waste Management Goals**

- A. OWNER]'s waste management goals include increased recycling and conservation of materials. Construction and Demolition Wastes have been identified as a particular target for reuse and recycling, for several reasons: C&D debris typically represents a large volume of material; Many of the waste streams generated during building demolition and construction projects are highly recyclable at reasonable prices;
- B. [OWNER] has determined that reducing, to the maximum extent practicable, the amount of waste disposed of in this project is a high priority. The Contractor and subcontractors shall take steps to generate the least amount of waste possible by minimizing waste due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be segregated for reuse, salvage, or recycling, or recycled as mixed debris. In no case shall material be disposed of in a landfill or incinerator where an approved and less costly recycling or reuse

## APPENDIX C: CONTRACT LANGUAGE

alternative exists. Waste disposal in landfills and incinerators shall be minimized and shall be considered the alternative of last resort.

- D. With regard to these goals the Contractor shall develop, for the Owner's review and approval, a Waste Management Plan for this Project as described in Section 1.4.

### 1.4 Draft Waste Management Plan

- A. Within 14 calendar days after receipt of Notice of Award of Bid, and prior to any waste removal, the Contractor shall submit a Draft Waste Management Plan to [OWNER OR PROJECT MANAGER OR ARCHITECT, AS APPROPRIATE]. The Draft Waste Management Plan shall contain, as a minimum:
1. A written analysis of the project wastes expected to be generated, by type and approximate quantity.
  2. Disposal options: The name of all landfill(s) proposed for trash disposal, the respective tipping fee(s) for each of these disposal options including transportation costs, and the projected cost of disposing of all Project waste in the landfill(s).
  3. Alternatives to Landfill Disposal/Incineration: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed end use or market for each material, the respective tipping fees for each end use or market (including transportation costs), and the estimated net cost savings or cost increase resulting from recycling each material (versus landfilling or other disposal), taking into account revenue from the sale of recycled or salvaged materials and tipping fees saved due to diversion of materials.
  4. The Draft Waste Management Plan shall include, at a minimum, the materials included in Section 1.5 that are required to be reused or recycled.
- B. Following the submittal of the Draft Waste Management Plan, [OWNER] and Architect will review the plan and consider the proposed recycling and waste disposal alternatives. The Owner and/or Architect may suggest alternatives to the proposed disposal options in order to increase recycling, reduce costs, or both.

### 1.5 Materials for Which Recycling Is Required

- A. [OWNER] requires that, as a minimum, the following materials must be considered for recycling, salvage, or reuse during this project:

[ADD OR ELIMINATE MATERIALS AS APPROPRIATE TO PROJECT]

Asphalt

Concrete, concrete block, concrete masonry units (CMU), slump stone (decorative concrete block), and rocks

Asphalt Concrete

Brick

Paper, including bond, newsprint, cardboard, mixed paper, packing materials

Cardboard

Cement Fiber Products, including shingles, panels, siding

Paint

Rigid Foam

Glass

Plastics

## APPENDIX C: CONTRACT LANGUAGE

Carpet and Pad

Beverage Containers

Insulation

Gypsum Wallboard

Porcelain Plumbing Fixtures

Fluorescent Light Tubes

Green materials (i.e. tree trimmings and land clearing debris).

Metals including, but not limited to, stud trim, ductwork, piping, reinforcing steel (rebar), roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze. (ferrous and non-ferrous).

Soils

Wood, including clean dimensional wood, pallet wood, plywood, oriented strand board (OSB), particle board

B. The Contractor should be aware that the state of New Mexico has banned the following waste streams from landfill disposal. These items may not be included in waste destined for landfills:

1. Lead-acid batteries
2. Motor Oil

### 1.6 Resources for Development of Waste Management Plan

The following sources may be useful in developing the Draft Waste Management Plan:

1. Recycling Haulers and Markets. A list is included in this guide and is also available in the New Mexico Recycling Directory at [www.recyclenewmexico.com/search](http://www.recyclenewmexico.com/search).

### 1.7 Final Waste Management Plan

A. Once [OWNER] has considered the draft Waste Management Plan and made appropriate suggested modifications, the Contractor shall submit, within 14 Calendar days of receiving such suggested modifications, a Final Waste Management Plan, incorporating [OWNER]'s input. The Final Waste Management Plan shall contain the following:

1. Analysis of the proposed jobsite wastes to be generated, including types and approximate quantities.
2. Disposal options: The name of all landfill(s) proposed for trash disposal, the respective tipping fee(s) for each of these disposal options including transportation costs, and the projected cost of disposing of all Project waste in the landfill(s)
3. Alternatives to Landfilling: A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.
4. Markets: A list of the market(s) or other on-site or off-site end use(s) that will be used for each material that will be separated for reuse, salvage, or recycling.
5. Materials Handling Procedures: A description of the means to be employed in separating and recycling the materials identified in item (3) above consistent with requirements for acceptance by designated facilities, including the means by which such materials will be protected from contamination.

## APPENDIX C: CONTRACT LANGUAGE

6. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and hauled to designated markets, or whether mixed materials will be collected by a hauler and removed from the site and later separated for recycling).
7. Cost of Reuse, Salvage, or Recycling. An estimate of the cost, including separation, transportation, and marketing, to reuse, salvage, or recycle the materials identified in item (3) above.
8. Meetings: A description of the regular meetings to be held to address waste management.

### 1.8 Waste Management Plan Implementation

- A. Manager: The Contractor shall designate a specific party (or parties) responsible for instructing workers in recycling and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.
- C. Instruction: The Contractor or his designated waste manager shall provide on-site instruction regarding appropriate separation, handling, and recycling, salvage, reuse, and/or return methods to be used by all involved parties at the appropriate stages of the Project.
- D. Separation facilities: As appropriate during each stage of the Project, the Contractor shall lay out and label a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- E. Hazardous wastes: Hazardous wastes shall be separated and disposed of according to state law.

### 1.9 Reporting Required at Time of Invoicing

- A. Application for Progress Payments: The Contractor shall submit with each Application for Progress Payment a Summary of Waste generated by the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Summary shall be submitted on a form acceptable to the Owner and shall contain the following information:
  1. The amount (in tons) of material landfilled from the Project, the identity of the landfill, the total amount of tipping fees paid, transportation costs (if separate) and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
  2. For each material recycled, reused, or salvaged from the Project, the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling each material. Attach manifests, weight tickets, receipts, and invoices.

## APPENDIX C: CONTRACT LANGUAGE

### Example 2 of the C&D Recycling Specification

This is a simpler specification that includes requirements for recycling, record-keeping, and reporting, but is less prescriptive in providing detailed instructions and requirements on the contractor.

#### Waste Disposal and Recycling

[OWNER] has implemented strict recycling and waste management policies for all waste materials removed from its campus as a result of construction and demolition activity. These include:

[ADD OR ELIMINATE MATERIALS AS APPROPRIATE TO PROJECT]

Asphalt

Concrete, concrete block, concrete masonry units (CMU), slump stone (decorative concrete block), and rocks

Asphalt Concrete

Brick

Paper, including bond, newsprint, cardboard, mixed paper, packing materials, and packaging

Cement Fiber Products, including shingles, panels, siding

Paint

Rigid Foam

Glass

Plastics

Carpet and Pad

Beverage Containers

Insulation

Gypsum Wallboard

Porcelain Plumbing Fixtures

Fluorescent Light Tubes, per [REGULATORY AGENCY] regulations

Green materials (i.e. tree trimmings and land clearing debris).

Metals including, but not limited to, stud trim, ductwork, piping, reinforcing steel (rebar), roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze. (ferrous and non-ferrous).

Soils

Wood, including clean dimensional wood, pallet wood, plywood, oriented strand board (OSB), particle board

The successful bidder will be required to account for all waste materials removed from the Project, and to recycle, salvage, or reuse, to the maximum practicable extent, all of the materials listed above. If the successful bidder believes that recycling, salvage, or reuse of any of these materials is impracticable, the bidder must so inform [OWNER] before initiation of the Project, and secure [OWNER]'s written authorization for an alternative means of disposal.

The successful bidder will be required to develop and maintain a plan which documents procedures to recycle, salvage, or reuse the materials listed above, including separation and recycling procedures and markets for each material recovered. This plan must also address training and communications, record-

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## **APPENDIX C: CONTRACT LANGUAGE**

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keeping, and reporting requirements to assure that all waste materials are accounted for. As the project proceeds, this plan is to be updated with the quantities of each waste that are actually reused, salvaged, recycled, or disposed of, and the markets to which these materials are directed, so that it provides documentation in a single source of waste management performance on the Project.

[OWNER] retains the right to inspect, and subsequently approve or disapprove any and all recycling end markets, reuse or salvage outlets, and/or waste disposal facilities that are involved in the receipt of recyclables and/or waste materials generated from the Project. Disapproval of such a market or outlet may be based on past or current violations of federal or state environmental, health, or safety laws, improper disposal activities, risk or liability exposure, or any other reason deemed sufficient by [OWNER].

The successful bidder shall maintain records for each type of material removed from the job site (including materials that are not recycled), provide the name (s) of specific end destinations for all materials removed (whether recycled or disposed of), and provide weights and measures of all materials removed. Every load of waste material must be weighed and these scale weights must be reported to [OWNER] on a monthly basis, detailing material types and net weights. [OWNER] retains the right to certify weights of sample loads of materials leaving the project site, and compare these to the weights submitted by the successful bidder. [OWNER] retains the right to request copies of original scale tickets for any and all materials removed from the Project up to two (2) years following project completion.

Upon request, [OWNER] will provide assistance to the successful bidder in identifying markets for recyclable materials. If any bidder is unfamiliar with recycling procedures and/or markets for the materials listed above, information is available from the following sources:

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## **APPENDIX D: RECYCLING PLAN SAMPLE**

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A sample Solid Waste and Recycling Plan is available online at [www.recyclenewmexico.com/Construction\\_Recycling.htm](http://www.recyclenewmexico.com/Construction_Recycling.htm)

# APPENDIX E: RECYCLING RESOURCES

## NEW MEXICO CONSTRUCTION RECYCLING RESOURCES

Please note this is a limited listing of resources focused mostly on the Albuquerque area. Please go online to our searchable Recycling Directory at [www.recyclenewmexico.com/search](http://www.recyclenewmexico.com/search) to research more resources in your area. The New Mexico Recycling Directory was created by the NMRC with support from the New Mexico Environment Department: Solid Waste Bureau.

### RECYCLED MATERIAL COLLECTION SERVICES

#### All-American Waste Removal/ Bedford Enterprises

505-345-7997

[www.allamericanwastenm.com](http://www.allamericanwastenm.com)

**Notes:** Waste hauler that can provide multiple roll-off and front-load containers for construction job-site recycling. Offers rebates for recyclables sold. Services and sells compactors and front-load containers.

**Service Area:** Albuquerque, Rio Rancho, Sandoval County and Santa Fe

**Accepted Materials:** Clean concrete, All metals, Cardboard, Paper, Plastic

#### Earth Day Recycling Company

Albuquerque

505-232-9211 or 505-615-7069

**Notes:** Provides recycling collection services to businesses/construction sites

**Service Area:** Albuquerque

**Accepted Materials:** All metals, Cardboard, Mixed paper, Most plastics, Plastic films

#### Grind, Inc.

Serves state of New Mexico & W Texas

575-644-9778

[www.grindlc.com](http://www.grindlc.com)

**Notes:** Construction waste specialists offering complete construction waste management and materials processing. Services include waste management planning, program implementation, and complete waste diversion documentation. Complete assistance provided with LEED, BGNM, and other sustainable construction programs. Providing both ON and OFF site material processing services.

**Accepted Materials:** Lumber, drywall, block, brick, tile, concrete, asphalt, and land clearing debris. Cardboard, metals, and plastics are transported to their appropriate local recycling facility.

**Recycled-Content Product Sales:** Manufacturer of erosion control sediment logs (wattles).

#### Master Fibers, Inc.

5109-B Edith Blvd. NE, Albuquerque

505-345-6413

[www.masterfibers.com](http://www.masterfibers.com)

**Notes:** End-market recycler as well as collection service

**Service Area:** Statewide

**Accepted Materials:** All metals, Cardboard, Paper, Carpet padding, Most plastics

#### RoadRunner Waste Service

(505) 867-9000

**Notes:** Provides roll-off containers for construction recycling projects

**Service Area:** Albuquerque to Santa Fe

**Accepted Materials:** Clean concrete, Metals, Wood, Cardboard

#### SBM Site Services, LLC

505-975-3845

[www.sbmsiteservices.com](http://www.sbmsiteservices.com)

**Notes:** Provides comprehensive recycling program development, management and operations while focusing on diversion, waste reduction, reuse, and sustainability. SBM Site Services can manage the collection, sorting, processing & shipping of materials from site to the best end-destination.

**Service Area:** Albuquerque/Rio Rancho

**Accepted Clean Materials:** Cardboard, Plastics, Metals, Concrete, Wood, Paper

## APPENDIX E: RECYCLING RESOURCES

### Waste Management

Albuquerque contact: Dan Wilson, (505) 975-5354; Farmington contact; Janie Kimbell, (505) 486-1070/327-6284; and Hobbs contact Mars or Jenny at (505) 392-6571

**Notes:** Can provide recycling roll-offs for any material. Must know where you want material delivered to for recycling.

**Service Area:** Albuquerque, Santa Fe, Hobbs and Farmington

**Accepted Materials:** Metals, cardboard, plastics, scrap wood/brush clearing, & any other materials with recycling end-markets (depends on location).

### Wood You Recycle! / Mt. Taylor Machine

4201 Williams SE, Albuquerque  
505-287-9469

[www.wood-you-recycle.com](http://www.wood-you-recycle.com)

**Notes:** Drop-off and collection available. Can offer collection containers for large quantity producers. Chips material for wood stove pellets.

**Service Area:** Albuquerque, with potential expansion to Santa Fe. Also works in Milan region

**Accepted Materials:** Clean wood scrap, OSB, plywood and particle board.

## DECONSTRUCTION COMPANIES

### Albuquerque Car Crushers DBA BP Construction

505-452-1025

**Notes:** Provides deconstruction services for recycling.

**Service Area:** Statewide

### Coronado Wrecking & Salvage

4200 Broadway Blvd. SE, Albuquerque  
505-877-2821

[www.coronadowrecking.com](http://www.coronadowrecking.com)

**Notes:** Provides building demolition and recycling of concrete and asphalt into base course. Retail M-F 8-5, Sat 8-3

**Service Area:** Entire Southwest

**Accepted Materials:** Reusable C&D items from homeowners

### GranCor Enterprises

2121 Menaul Blvd NE, Albuquerque  
505-872-0005

[www.grancor.com](http://www.grancor.com)

**Notes:** Offers demolition and construction services. Handles onsite recycling.

**Service Area:** Statewide

### Rios Excavating and Wrecking

1851 Rodeo Rd, Santa Fe  
505-471-7772

**Notes:** Retail salvage yard with reusable building materials. Also performs building demolition.

**Service Area:** Santa Fe and surrounding areas

**Accepted Materials:** Reusable construction and demolition items from homeowners (call first)

## ARCHITECTURE FIRMS WITH LEED AND CONSTRUCTION RECYCLING EXPERIENCE

### Dekker/Perich/Sabbatini

Julie Walleisa

7601 Jefferson NE, Suite 100, Albuquerque

(505) 761-9700

[www.dpsdesign.org](http://www.dpsdesign.org)

**Notes:** Architecture firm specializing in LEED projects. Provides construction-recycling management for their projects.

### Environmental Dynamics, Inc.

Kris Callori

142 Truman NE Suite A-1, Albuquerque  
(505) 242-2851

[www.edi-arch.com](http://www.edi-arch.com)

**Notes:** Architecture firm specializing in LEED projects. Provides construction-recycling management for their projects.

### SMPC Architects

Lisa Logan

115 Amherst Drive, SE, Albuquerque  
505.255.8668

## APPENDIX E: RECYCLING RESOURCES

www.smpcarch.com

**Notes:** Architecture firm specializing in LEED projects. Provides construction-recycling management for their projects.

### Valerie Walsh Construction Management

Lafayette, CO

303-444-8114

www.leadmanagement.com

**Notes:** Independent LEED Manager and owner's representative in Colorado and New Mexico

### LEED AP Consultant Directory

Search [www.usgbc.org/LEED](http://www.usgbc.org/LEED) for "LEED AP Directory" for more certified firms and consultants in New Mexico and region

## ON-SITE MULCHING SERVICES

### Grind, Inc.

See listing in on page 42

### Hilltop Landscaping

7909 Edith Blvd NE, Albuquerque

505-898-9690

www.hilltoplandscaping.com

**Notes:** Provides land-clearing and onsite mulching

### New Leaf Resources LLC

Anthony Zamora

505-506-3085/505-850-2549

**Notes:** Can chip green waste onsite for infill or to haul away

**Service Area:** Albuquerque & Santa Fe

**Accepted Materials:** Wood scrap, brush clearing

### Soilutions, Inc.

9008 Bates Rd. SE, Albuquerque

505-877-0220 (Composting); 505-281-8425

(Landscape/consulting)

www.soilutions.net

Tue.-Sat., 8:00 - 4:30

**Notes:** Offers compost and other soil amendments for sale to the public and commercial industry. Offers erosion control, onsite mulch usage and landscaping

consulting. Offers on-site mulching and application services to gain LEED points. Also drop-off facility for wood waste (incl OSB) and tree/brush waste.

**Service Area:** Albuquerque & Region

**Accepted Materials:** Construction wood waste (crates, pallets, skids, lumber, OSB and compressed wood OK) and branches/brush.

## NEW MEXICO BUILDING ASSOCIATIONS AND CONSTRUCTION RECYCLING RESOURCES

### Associated General Contractors, New Mexico Building Branch

1615 University Blvd NE, Albuquerque

505-842-1462

www.agc-nm.org

### Build Green New Mexico

4100 Wolcott Ave, NE Suite B, ABQ

505-344-3294 x124

www.thegbi.org/newmexico

### Construction Industries Division

2550 Cerrillos Rd, Santa Fe

505-476-4700

rd.state.nm.us/cid/

**Notes:** Offices in ABQ & Las Cruces

### Home Builders Association of Central NM

4100 Wolcott Ave. NE Ste B,

Albuquerque

505-344-3294

www.hbacnm.org

### NM Energy, Minerals, & Natural Resources Department

Susie Marbury, Energy Efficiency &

Green Building Administrator

1220 S. St. Francis Dr., Santa Fe

505-476-3254

www.cleanenergynm.org

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### **New Mexico Environment Department: Solid Waste Bureau**

Tim Gray  
505-827-0129  
[www.nmenv.state.nm.us/SWB](http://www.nmenv.state.nm.us/SWB)

### **New Mexico Home Builders Assoc.**

5931 Office Blvd NE, Suite 1, Albuquerque  
505-344-7072  
[www.nmhba.org](http://www.nmhba.org)

### **New Mexico Recycling Coalition**

505-983-4470  
[www.recyclenewmexico.com/  
Construction\\_Recycling.htm](http://www.recyclenewmexico.com/Construction_Recycling.htm)

### **US Green Building Council – New Mexico Chapter**

505-227-0474  
[www.usgbcnm.org](http://www.usgbcnm.org)

## **RE-USE BUSINESSES AND ORGANIZATIONS**

### **Beck Office Systems**

5300 Eagle Rock Ave., Albuquerque  
505-883-6471  
[www.bosinc.com](http://www.bosinc.com)

**Accepted Materials:** Buys and sells recycled office furniture systems

### **Bentley Auction Service**

1915 Commercial St NE, Albuquerque  
505-344-1812  
[www.bentleysauction.com](http://www.bentleysauction.com)

**Accepted Materials:** Most commercial/business infrastructure items

### **Greater Albuquerque Habitat for Humanity ReStore**

204 San Mateo SE Suite E, Albuquerque  
505-265-0057  
[www.habitatabq.org](http://www.habitatabq.org)

**Notes:** Wed-Fri 10AM-6PM, Sat 9-5

**Accepted Materials:** Used doors, windows, cabinets, appliances, lighting, lumber, plumbing, and any other usable building material or items usable in a

house, including appliances and office/residential furniture

### **RDB Office Furniture**

1629 4th St SW, Albuquerque  
505-343-9979

**Accepted Materials:** Office furniture recycler, sells recycled furniture

## **RECYCLING EQUIPMENT SALES**

### **Ditch Witch of New Mexico**

4310 Edith Blvd NE, Albuquerque  
[bill@ditchwitchnewmexico.com](mailto:bill@ditchwitchnewmexico.com)  
(800) 954-1889

[www.ditchwitchnewmexico.com](http://www.ditchwitchnewmexico.com)

**Notes:** Sells Bandit chippers

### **Ellen Equipment**

6613 Edith NE, Albuquerque  
505-342-2566 x310

[www.ellenequipment.com](http://www.ellenequipment.com)

**Notes:** Recycling Equipment Sales

### **Hydraulic Systems of NM**

4851 Ellison NE Unit L, Albuquerque  
505-345-6767

**Notes:** Recycling Equipment Sales

### **Jackson Compaction**

6420 2nd St NW, Albuquerque  
505-345-3900

**Notes:** Sells and maintains compactors, balers, roll-off, collection containers and innovative recycling machinery.

### **Southwest Abatement**

4609 Kinney St. SE, Albuquerque  
505-873-2967  
[www.southwestabatement.com](http://www.southwestabatement.com)

**Notes:** Sells Roll-Off containers, Offers Abatement Services

### **Tom Growney Equipment**

2301 Candelaria Rd. NE, Albuquerque  
505-884-2900

[www.growneyinc.com](http://www.growneyinc.com)

**Notes:** Recycling Equipment Sales

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### MUNICIPAL PROGRAMS

#### Albuquerque Solid Waste Department

505-761-8100

[www.cabq.gov/solidwaste/recycle.html](http://www.cabq.gov/solidwaste/recycle.html)

**Notes:** The City provides curbside pick-up for residential and drop-off locations for commercial. 3 Convenience locations with set hours. 19 Drop-off locations always available.

**Accepted Materials:** Aluminum, tin cans, cardboard, paper, glass, electronics, brush/branches, all plastics with neck.

#### Bernalillo County Transfer Station

505-224-1640

[www.bernco.gov](http://www.bernco.gov)

**Notes:** 7 days week 7am to 5:15 p.m. at 711 Old Hwy 66 & State Road 333

**Accepted Materials:** Aluminum, Tin Cans, Cardboard, Newspaper, Plastics #1 and #2, Branches/Brush

### RECYCLING BUSINESSES AND OTHER END MARKETS

#### Big D's Flooring

4019 Edith NE, Albuquerque

505-345-1002

**Accepted Materials:** Carpet padding

#### Durango McKinley Paper Company

4600 Williams SE, Albuquerque

505-873-0440

[www.mckinleypaper.com](http://www.mckinleypaper.com)

**Notes:** Primarily services commercial accounts. Manufactures cardboard from cardboard and brown paper bags in Prewitt, NM.

**Service Area:** Statewide. Drop-Off in Albuquerque.

**Accepted Materials:** Cardboard, Paper

#### Ghost Town Trading

111 Carlisle Blvd NE, Albuquerque

505-255-5656; workshop 991-3097

[www.ghosttowntrading.com](http://www.ghosttowntrading.com)

**Notes:** Carlisle store carries line of locally-

made Rustic Furniture from Recycled Wood. Workshop: 2418 2nd St. SW,  
**Accepted Materials:** Old/used dimensional lumber (painted/stained OK), fence pickets, rusty tin roofing, corrugated metal, ceiling tin, rusty window screens, old doors/windows at 2<sup>nd</sup> St. location only. Call first. Not accepted: pallets, wafer board, particle board, plywood

#### Greenplanet Recycling

2604 Princeton NE Bldg C, Albuquerque  
505-837-1950

**Accepted Materials:** Carpet

#### Grind, Inc.

Serves state of New Mexico & W Texas  
575-644-9778

[www.grindlc.com](http://www.grindlc.com)

**Notes:** Construction waste specialists offering complete construction waste management and materials processing. Services include waste management planning, program implementation, and complete waste diversion documentation. Complete assistance provided with LEED, BGNM, and other sustainable construction programs. Providing both ON and OFF site material processing services.

**Accepted Materials:** Lumber, drywall, block, brick, tile, concrete, asphalt, and land clearing debris. Cardboard, metals, and plastics are transported to their appropriate local recycling facility.

**Recycled-Content Product Sales:**

Manufacturer of erosion control sediment logs (wattles).

#### LaFarge

(505) 343-7800

[www.lafargecorp.com](http://www.lafargecorp.com)

**Accepted Materials:** Clean concrete from Albuquerque/Santa Fe areas

#### Rinchem Company

6133 Edith Blvd., Albuquerque

505-341-4173

[www.rinchem.com](http://www.rinchem.com)

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### Waycor Materials

4400 Tower Rd SW, Albuquerque  
(505) 246-2474 or 243-1333  
[www.waycor.com](http://www.waycor.com)

**Accepted Materials:** Clean concrete

Roswell: 505-622-5780

[www.wiserecycling.com](http://www.wiserecycling.com)

**Notes:** Several locations around state.  
Call for exact locations.

**Accepted Materials:** All metals

### METAL RECYCLERS

#### Acme Iron & Metal Company

6144 Second St. NW, Albuquerque  
505-345-2457

**Notes:** M-F 8-4:30 p.m. Sat 8-11:45 am

**Accepted Materials:** All metals, no  
appliances

#### Albuquerque Metal Recycling

3339 2nd Street, Albuquerque  
505-877-6110

**Accepted Materials:** All metals

#### Metal Monger

610 Haines Ave NW, Albuquerque  
505-459-2080

**Accepted Materials:** All metals

#### R&M Metal

2227 Mayflower Rd SW, Albuquerque  
505-877-2192

**Notes:** M-F 8-4:30 p.m.

**Accepted Materials:** All metals

#### Rudy's Downtown Recycling

1224 2nd St NW, Albuquerque  
505-247-4576

**Notes:** M-F 8-4:30, Sat 8-12

**Accepted Materials:** All metals

#### W Silver Recycling of NM

1800 1st Street NW, Albuquerque  
505-244-1508

**Notes:** Roll-offs available for large accounts

**Accepted Materials:** All metals

#### Wise Recycling

Albuquerque: 505-345-2405  
Belen, 505-345-2405

Las Vegas, 702 Railroad, 505-425-8344

Los Lunas, 505-345-2405

Rio Rancho: 505-345-2405

### NATIONAL RESOURCES

#### California Integrated Waste Management Board

<http://www.ciwmb.ca.gov/ConDemo/>

**Notes:** An amazing online C&D  
Recycling resource

#### C&D Recycler

800-456-0707

[www.cdrecycler.com](http://www.cdrecycler.com)

#### Carpet Recovery

[www.carpetrecovery.org](http://www.carpetrecovery.org)

#### Concrete Recycling

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

#### Construction Material Recycling Association

312-609-4241

[www.cdrecycling.org](http://www.cdrecycling.org)

#### Drywall Recycling

[www.drywallrecycling.org](http://www.drywallrecycling.org)

#### DuPont Flooring Recovery

[www.flooring.dupont.com](http://www.flooring.dupont.com)

#### Environmental Building News

[www.greenbuilding.com](http://www.greenbuilding.com)

#### The Institute for Local Self- Reliance [http://www.ilsr.org/ recycling/buildingdebris.pdf](http://www.ilsr.org/recycling/buildingdebris.pdf)

#### National Association of Home Builder's Research Center, Inc.,

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### Residential Construction Waste

<http://www.epa.gov/epaoswer/non-hw/debris/mgmt.htm>

### For information on designing to reduce quantities of materials and resources

[http://www.nahbrc.org/greenguidelines/userguide\\_resource\\_reduce.html](http://www.nahbrc.org/greenguidelines/userguide_resource_reduce.html)

### National Recycling Coalition

[www.nrc-recycle.org](http://www.nrc-recycle.org)

### Steel Recycling Institute

[www.steel.org](http://www.steel.org)

### Tyvek TackBack Recycling Program

1-800-44-TYVEK

<http://industrialpackaging.dupont.com/5techtips/index.html>

### US EPA C&D Recycling Home Page

<http://www.epa.gov/epaoswer/non-hw/debris-new/index.htm>

### U.S. Environmental Protection Agency Solid Waste and Emergency Response, *Building Savings, Strategies for Waste Reduction of Construction and Demolition Debris from Buildings* (EPA-530-F-00-001) (June 2000),

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

### U.S. Environmental Protection Agency Municipal and Industrial Solid Waste Division Office of Solid Waste, *Characterization of Building-Related Construction and Demolition Debris in the United States* (EPA530-R-98-010) (June 1998),

<http://www.epa.gov/epaoswer/hazwaste/sqg/c&d-rpt.pdf>

### The U.S. General Services Administration (GSA) has recently updated its online Construction Waste Management Database to assist the building industry in reducing construction and demolition waste. Recyclers of construction and demolition waste may advertise their services free on this site. Access the database at <http://cwm.wbdg.org>.

<http://cwm.wbdg.org>

### US Green Building Council – LEED Building Information

[www.usgbc.org/LEED](http://www.usgbc.org/LEED)



Join the NM Recycling Coalition! If you've appreciated the information compiled in this guide, show your appreciation by making a tax-deductible donation at [www.recyclenewmexico.com/join.htm](http://www.recyclenewmexico.com/join.htm)