ID	LL	SS	WE	EA	MR	EQ	AE
					3		

MR 3: Waste Management

Intent

Reduce waste generation to a level below the industry norm.

Requirements

Prerequisites

3.1 **Construction Waste Management Planning.** Complete the following tasks related to management of construction waste:

a) Investigate and document local options for diversion (e.g., recycling, reuse) of all anticipated major constituents of the project waste stream, including cardboard packaging and household recyclables (e.g., beverage containers).

b) Document the diversion rate for construction waste. Record the diversion rate for land clearing and/or demolition, if applicable (e.g., on gut rehab project), separately from the rate for the new construction phase of the project.

Credits

3.2 **Construction Waste Reduction** (maximum 3 points). Reduce or divert waste generated from new construction activities from landfills and incinerators to a level below the industry norm. Use either of two options:

a) Reduced construction waste. Generate 2.5 pounds (or 0.016 cubic yards) or less of net waste (not including waste diverted for reclamation or recycling) per square foot of conditioned floor area. Use column 1 or 2 and column 5 of **Table 1** to determine the score.[2]

b) Increased waste diversion. Divert 25% or more of the total materials taken off the construction site from landfills and incinerators. Use column 3 or 4 and column 5 of **Table 1** to determine the score; calculate the percentage using either weight or volume.

Note: Land clearing and demolition waste (e.g., from removal of preexisting structures on the site) should not be counted in this calculation.

Synergies and Trade-Offs

Waste can be minimized by creating a detailed framing plan and using advanced framing techniques or off-site fabrication (MR 1).

The use of products with reclaimed or recycled content (MR 2.2) reduces both the production of new materials and the burden on landfills.

2 The industry average is 4.2 pounds (0.0265 cubic yards) of waste per square foot of conditioned floor area, based on data provided by the National Association of Home Builders' Research Center.

Table 1. Waste Diversion

Amount to landfills and incinerators				
Reduced construction waste		Increased waste diversion		
Pounds / ft²	Cubic yards / 1,000 ft²	Percentage waste	Percentage diverted	Points
4.0	25.5	100%	0%	0.0
3.5	22.3	88%	13%	0.0
3.0	19.1	75%	25%	0.5
2.5	15.9	63%	38%	1.0
2.0	12.8	50%	50%	1.5
1.5	9.6	38%	63%	2.0
1.0	6.4	25%	75%	2.5
0.5	3.2	13%	88%	3.0

MR 3.1: Construction Waste Management Planning
MR 3.2: Construction Waste Reduction

ID	LL	SS	WE	EA	MR	EQ	AE
3.1 & 3.2							

Because landfill space is rapidly diminishing, incineration produces pollutants, and waste of materials in itself carries negative environmental impacts, waste should be avoided to the extent possible.

The National Association of Home Builders estimates that the construction of a "typical" 2,000-square-foot home generates about 8,000 pounds of waste that occupies roughly 51 cubic yards of landfill space. This equates to an average of about 4 pounds of waste per square foot of conditioned space and a cost of roughly $500 per house for construction waste disposal.

Although recycling requires collecting, sorting, and converting the waste to a useful product, it is frequently more efficient than throwing away money in disposal costs. Recycling and reusing construction waste can help the economy by creating jobs related to salvaging and recycling of construction waste.

These credits reward projects for reducing construction waste and diverting unavoidable waste into the recycling stream.

Approach and Implementation

Two primary strategies can help project teams earn credit for waste reduction and diversion: Design the home and manage materials purchasing and construction to reduce the production of waste; and identify and utilize methods for diverting waste.

To minimize waste, develop detailed framing documents, create an accurate cut list and framing order, adopt efficient framing techniques, use prefabricated components, and generally purchase only as much material as needed for the job.

To divert waste from landfills, develop and document a construction waste management plan by assessing waste types, quantities, and disposal costs. Identify licensed haulers and processors of recyclables. Identify markets for salvaged materials. Employ deconstruction, salvage, reuse, and recycling strategies and processes, including waste auditing. Document the cost for recycling, salvaging, and reusing materials.

Partner with local businesses and community groups, such as local salvage centers and used material exchanges (used building supply outlets) and others, to sell or donate lumber, fixtures, appliances, masonry, and roofing. Donate large pieces of scraps or other usable materials to housing programs (e.g., Habitat for Humanity) and community groups (e.g., local theaters).

Outline procedures, expectations, and results for monitoring, collecting, and promoting waste management planning. Make sure construction crews understand and participate, with updates throughout the building process.

Measure waste by either weight or volume. Documenting weight is more likely to produce reliable estimates because compaction can alter volume dramatically when a waste container is loaded. Require that the weight of the waste be calculated and documented.

Research recycling options and evaluate the cost-effectiveness of recycling or reusing rigid insulation, engineered wood products, and other materials. Reuse or recycle materials found at the job site, including any demolition materials from preexisting structures (e.g., wood scraps for bracing, drywall scraps as fillers in closets). Recycle corrugated cardboard, metals, concrete, brick, asphalt, land-

clearing debris, clean dimensional wood, plastic, glass, gypsum board, and carpet. Collect beverage containers from crews.

Identify construction haulers and recyclers to handle the designated materials; they can serve as valuable partners in this effort.

Mark and designate containers. Have the waste management company provide separate containers for different types of waste based on its destination (reclamation, recycling, or landfill) or arrange for the waste management company to separate the waste after hauling.

Avoid contaminating recyclable materials with other construction debris and food waste products. Beverages and other liquids can be particularly harmful to porous materials, eliminating their potential to be recycled.

Sort and set aside, in a marked and designated area, lumber, plywood, and oriented-strand board cut-offs that can be used as fire blocking, as spacers in header construction, and in other ways. Separate clean sawdust and lumber cut-offs to be chipped for use in compost piles or around planting areas.

Track the quantities and cost savings of diverted materials. Obtain and retain verification records (waste haul receipts, waste management reports, spreadsheets) to confirm that materials have been recycled or salvaged as planned.

Minimize and properly dispose of any hazardous materials.

Calculations

Do not include demolition or land-clearing debris. Document the waste totals with receipts from the waste hauling company, or keep track of waste hauling totals using a simple inventory like that provided in **Table 2**.

Calculate waste reduction and waste diversion as follows.

Reduced Construction Waste

Step 1. Calculate the net construction waste (in weight or volume):

Net Waste = Waste Sent to Landfill + Waste Incinerated

OR

Net Waste = Total Waste Hauled – (Material Reclaimed + Material Recycled)

Step 2. Calculate the waste rate from construction:

Waste Rate (lbs/ft^2) = Net Waste / Home Size

OR

Waste Rate (yds^3/1000 ft^2) = Net Waste / Home Size ÷ 1000

Increased Waste Diversion

Step 1. Calculate the amount of waste diverted from the landfill or incinerator:

Waste Diverted = Total Waste Hauled – Waste Sent to Landfill + Waste Incinerated

Or

Waste Diverted = Material Reclaimed + Material Recycled

Table 2. Waste Reduction Record

Load tag date	Volume hauled (cubic yards)	Weight hauled (pounds)
TOTAL		
Home size (SF)		
Weight hauled / SF		

Step 2. Calculate the percentage of waste diverted from the landfill or incinerator:

Waste Diverted (%) = Waste Diverted / Total Waste Hauled

Exemplary Performance

Projects that can demonstrate that no waste was created or that 100% of the waste was diverted can earn an additional 0.5 point, to be counted under Innovation & Design 3.

Verification and Submittals

Builder / Project Team:

MR 3.1: Construction Waste Management Planning

- ❑ Present documentation to the Green Rater of local waste diversion options.
- ❑ Present calculations to the Green Rater demonstrating construction waste diversion rates, using documentation from the waste management company.

MR 3.2: Construction Waste Reduction

- ❑ Present calculations to the Green Rater demonstrating average waste (in pounds or cubic yards per square foot) for the project, using documentation from the waste management company.
- ❑ Present calculations to the Green Rater demonstrating construction waste diversion rates, using documentation from the waste management company.

Green Rater:

MR 3.1: Construction Waste Management Planning

- ❑ Verify documentation of local waste diversion options.
- ❑ Verify calculations of construction waste diversion rate.

MR 3.2: Construction Waste Reduction

- ❑ Verify calculations of average construction waste.
- ❑ Verify calculations of construction waste diversion rate.

Considerations

Environmental Issues

Efforts to reduce, reuse, and recycle construction waste may save money, reduce liability, keep job sites cleaner and safer, and conserve valuable landfill space. Preventing waste also reduces demand for natural resources, such as trees, oil, and minerals.

Reclamation or recycling of construction waste reduces demand for virgin resources and, in turn, reduces the environmental impacts associated with resource extraction, processing, and transportation. Landfills pollute groundwater and encroach upon green space. Construction waste management makes it possible to extend the lifetime of existing landfills.

Economic Issues

Strategies to minimize waste through improved design and planning will save money from reduced material use and reduced waste-hauling fees.

In the past, when landfill capacity was readily available and disposal fees were low, reclamation or recycling of construction was an extra cost burden. The economics of recycling continue to improve, especially as disposal costs have increased and disposal regulations have tightened.

Today, the costs associated with waste management vary considerably by location. In some cases, recycling—particularly metals, concrete, asphalt, and cardboard—can reduce project costs by significantly reducing landfill tipping fees. Commingled recycling may simplify the waste management effort on-site but increase recycling costs.

Regional Variances

The availability of recycling opportunities varies by region. In urban areas, recycling resources are typically more developed, and builders can choose between separating waste on-site and hiring commingled waste recyclers.

Recycling opportunities are expanding rapidly in many communities. Metal, vegetation, concrete, and asphalt recycling opportunities have long been available and economical in most communities. Paper, corrugated cardboard, plastics, and clean wood markets vary by regional and local recycling infrastructure but are recycled in most communities.

Some materials, such as gypsum wallboard, can be recycled only in communities where reprocessing plants exist or where soil can handle the material as a stabilizing agent.

Resources

Web Sites

Toolbase.org, Best Practices for Construction Waste Management

NAHB Research Center

www.toolbase.org/Best-Practices/Construction-Waste/waste-mgmt-field-guide

This page includes frequently asked questions, case studies, reports, and various links. It also includes "A Builder's Field Guide," which includes guidance for creating a step-by-step construction waste management and recovery plan.

Cardboard Packaging Council

www.corrugated.org

The Corrugated Packaging Council can help locate local outlets for cardboard.

American Forest & Paper Association

www.afandpa.org/recycling

AF&PA publishes a directory of wastepaper dealers and recycling centers.

U.S. EPA WasteWise Program

www.epa.gov/wastewise/targeted/challenge/cbres.htm

1-800-EPA-WISE

This site has information about the WasteWise Building Challenge program, including articles, publications, and various links and resources for more information.

California Integrated Waste Management Board

www.ciwmb.ca.gov/publications

This site provides links to numerous publications on topics related to waste management.

Construction and Demolition Debris

U.S. Environmental Protection Agency

www.epa.gov/epaoswer/non-hw/debris-new/index.htm

This site includes basic information on construction and demolition debris disposal practices, regional and state programs, publications, and links.

Construction Materials Recycling Association

www.cdrecycling.org

Includes links to Web sites on recycling concrete, asphalt roof shingles, and drywall, as well as a state-by-state listing of construction waste reusers and recyclers.

Building Materials Reuse Association

www.ubma.org

Formerly the Used Building Materials Association, BMRA is a nonprofit, membership-based organization that represents companies and organizations involved in the acquisition and/or redistribution of used building materials.

California Materials Exchange

California Integrated Waste Management Board

www.ciwmb.ca.gov/CalMAX

A program of the California Integrated Waste Management Board, this site allows users to exchange nonhazardous discarded materials online.

Reuse Development Organization

www.redo.org

ReDO is a national nonprofit in Indianapolis that promotes reuse as an environmentally sound, socially beneficial, and economical means of managing surplus and discarded materials. See the "Find a ReUse Center" link for state-by-state lists of reuse and recycling centers.

Print Media

On-Site Grinding of Residential Construction Debris: The Indiana Grinder Pilot. NAHB Research Center, 1999. Available online, at www.epa.gov/epaoswer/non-hw/debris-new/pubs/indiana.pdf.

Residential Construction Waste Management: A Builder's Field Guide. NAHB Research Center, 1997. This guide may be used to create a step-by-step construction waste management and recovery plan. Go to www.nahbrc.org/bookstore/cw0503w.aspx.

Efficient Wood Use in Residential Construction. Natural Resources Defense Council, 1998. This NRDC handbook describes the advantages of several wood-efficient approaches to design, material selection, and construction for residential applications and includes extensive practical and resource information for builders, architects, engineers, and developers. It may be purchased online, at www.nrdc.org/cities/building/rwoodus.asp.