



Massachusetts  
Department  
of  
ENVIRONMENTAL  
PROTECTION

## case study

# Construction and Demolition Waste Reduction

This case study is one in a series developed by the Massachusetts Department of Environmental Protection (DEP) to highlight techniques for saving money and protecting the environment through reuse and recycling of construction and demolition debris.

### Project Description: Clarke Distribution Corporation, Milford, Massachusetts

Clarke, a wholesale distributor for several lines of luxury kitchen appliances, renovated and expanded its distribution center in 2004. The Center is located in a rural area in central Massachusetts. Consigli Construction Inc. was the lead contractor for the project. The Institutional Recycling Network (IRN), a commercial recycling cooperative, provided waste reduction planning assistance and managed recycling logistics.



### Summary

**Cost Savings:**  
**\$259,043**

**Project:**  
Commercial  
*Renovation:*  
60,000 square feet; 25,000 sf office, studio, showroom; and,  
*Addition:* 40,000 sf warehouse

**Total Waste Reduction:**  
**98% of materials generated on site recycled or reused**

- 2,263 tons recycled: ceiling tiles, asphalt, concrete, metal, cardboard
- 7,225 tons of ledge reused
- 233 tons disposed

**Contract:**  
\$6.9 million  
Gross Maximum Price  
Private owner

**Work Site:** Rural

**Completion:**  
June 2004

### Spotlight: Ceiling Tiles and Doors

The project recycled six tons of ceiling tiles through the Armstrong Ceiling Recycling Program. Armstrong recovers the mineral fibers from discarded ceiling tiles to use in making new tiles. Armstrong's program is available to demolition projects and to building owners who choose Armstrong ceiling systems in their renovation projects. Consigli removed the ceiling tiles, stacked them and IRN provided the transportation. Armstrong provides a "Recycling cost comparison worksheet" on its web site that allows users to compare the cost of recycling versus disposal.

Clarke also donated 20 wood doors and 20 metal doors to a non-profit organization, the Building Materials Resource Center (BMRC), a reused building materials retailer. Clarke received a tax credit for the donation, Consigli saved disposal costs and BMRC sold these products at a reduced cost to low-income homeowners for use in their homes.

### Cost Savings

Following is a breakdown of the cost savings due to source separation and recycling:

Material	Tons	Recycling Cost	Avoided Disposal Cost*	Savings
Ceiling Tiles	6	\$625	\$708	\$83
Asphalt	970	\$2,367	\$114,460	\$112,093
Concrete	1,267	\$4,092	\$149,506	\$145,414
Metal	19	\$785	\$2,242	\$1,457
Cardboard	0.86	\$105	\$101	(-\$4)
<b>TOTAL</b>	<b>2,263</b>	<b>\$7,974</b>	<b>\$267,017</b>	<b>\$259,043</b>

\*Cost that would have been paid if material were disposed, asphalt & concrete are typically recycled.

Cost savings does not include reuse of 7,225 tons of ledge.

Disposal costs based on local rates.

## Keys to Success: Team Approach to Waste Reduction Planning

Before construction started, staff from Clarke, Consigli and the Institutional Recycling Network walked through the facility to identify potential waste reduction opportunities. They developed a waste reduction plan that guided the entire waste reduction process from planning to development and construction. The plan identified several recycling opportunities, including:

- Clarke's CEO used his business contacts to identify a new home for a 9,000 square foot refrigeration unit that would have otherwise been disposed.
- Rather than purchasing new loading dock leveling units, weighing two tons each, Clarke authorized Consigli to reuse 6 out of 10 of the existing units.

## Project Team

- **Building Owner**  
Clarke Distribution Corporation, 397 Fortune Boulevard, Milford, MA 01757  
CEO: Tom Clarke (508) 435-6226
- **Contractor**  
Consigli Construction Inc., 197 Main Street, Milford, MA 01757, Telephone: (508) 473-2580  
Contacts: Tom Burns, Project Manager, and John Laperle, Superintendent
- **Recycling Services**  
Institutional Recycling Network, 7 South State Street, Suite 2, Concord NH, 03301  
Telephone: (603) 229-1962
- **Building Material Reuse**  
Building Materials Reuse Center, 100 Terrace Street, Boston, MA 02120,  
Telephone: 617-442-8917
- **Armstrong Ceiling Tiles Recycling Program:**  
<http://www.armstrong.com/commceilingsna/environmental.html>

## Additional Resources:

- Massachusetts Department of Environmental Protection (DEP) Web site on Construction and Demolition Materials: Reuse and recycling resources for building and demolition contractors includes case studies, model specifications, recycling companies and information on best practices.  
<http://www.state.ma.us/dep/recycle/recycle.htm>

Massachusetts Department of  
Environmental Protection  
One Winter Street  
Boston, MA 02108-4746

Commonwealth of  
Massachusetts  
Mitt Romney, Governor

Executive Office of  
Environmental Affairs  
Ellen Roy Herzfelder, Secretary

Department of  
Environmental Protection  
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