



Eco-Efficiency Centre

Committed to Excellence and Efficiency

Fact Sheet: Eco-Efficiency and Construction/Renovation/Demolition

Introduction

The construction, renovation and demolition industry is the largest producer of wood waste. In North America it makes up between 25% and 45% of all solid waste generatedⁱ. Waste generated from construction, renovation and demolition (CRD) can consist of asphalt, concrete, fill materials (earth, gravel, sand, etc.), bricks, ceramics, plumbing, insulation, wood, glass (windows, etc), and metal (girders, rebar siding, doors, etc.). Many of these materials can be reused or recycled instead of being sent to the landfill. CRD operations can also create air quality issues in and around the worksite and can result in the generation of hazardous materials that require special disposal.

Eco-Efficiency

What is Eco-Efficiency?

Eco-efficiency is a practical and systematic approach that businesses can adopt in setting and achieving environmental and business performance objectives. It is very closely associated with and complementary to other concepts such as Occupational, Health and Safety (OHS), Total Quality Management (TQM), and Pollution Prevention (also known as source reduction). It involves changing processes, finding alternatives, and reducing or eliminating the generation of toxic wastes instead of dealing with problems of cleanup or disposal after the fact. It also includes extending product liability, enhancing material recyclability and maximizing the use of renewable resources. Eco-efficiency means doing more with less, creating and providing quality products and services while reducing resource use, waste and pollution along the entire value chain. It is not only about managing waste after it is created, but strives towards preventing and minimizing waste in the first place.

This fact sheet was prepared by the *Eco-Efficiency Centre* - a non-profit, non-government educational and environmental management support centre for small and medium-sized enterprises in Nova Scotia. The Eco-Efficiency Centre was established in 1998 as a partnership between Dalhousie University and Nova Scotia Power Inc., and is supported by private corporations, governments and foundations. The Centre assists companies to achieve better environmental and economic performance through resource conservation, pollution prevention, recycling, reuse, and general good environmental practices.

Before You Build: Design Green

Waste reduction can begin right at the beginning of a construction project. By choosing appropriate materials at the start of a project, one can ensure the quality and longevity of the structure as well as minimize waste when renovations or demolition occur. Green Design can mean savings on energy, heating, and water costs. Some ideas for green design include:

- Optimize the building orientation for heat gain, shading, day lighting, and natural ventilationⁱⁱ
- Use native plants for landscaping, to reduce the need for pest control using pesticides
- Harvest rainwater e.g. for landscaping; flushing toilets
- Reuse a building by renovating it rather than tearing it down and rebuilding
- Choose window sizes, framing materials, and glass coatings to optimize energy performance, and use caulking to stop leaks around windows
- Design lighting levels for actual use, and use task lighting to reduce general lighting levels
- Use lighting controls, such as occupancy sensors, in your design to save on energy
- Insulate hot and cold water pipes
- Use high efficiency equipment, including furnaces, boilers, fans and pumps
- Plan windows and skylights, light shelves, and window treatments to provide daylight and reduce lighting requirements
- Use spacing, sizes, and modular dimensions that minimize lumber use
- Builders should also consider future disassembling. Instead of using adhesives, tongue and groove can be used.
- Consider using recycled or re-fabricated materials in the initial building processⁱⁱ



The ideas above are only some of the many strategies that can be used during construction to create a green building. If waste and reuse are considerations right from the beginning, a project can be better managed for future renovations and demolitions. For more information on green building practices, please visit www.recycleworks.org/greenbuilding

LEED Design for Greener Buildings

The Leadership in Energy and Environmental Design (LEED) is a Green Building Rating System developed by the U.S Green Building Council in 1994. It provides a set of standards for environmentally sustainable construction. The Canadian Green Building Council (CaGBC) was established in Canada to encourage the design and construction of Green Buildings across the country by implementing the LEED Green Building Rating System in Canada. In order for a building to become LEED certified, there are several requirements that must be achieved, including Resource Reuse and Construction Waste Management. Both of these requirements involve diverting construction, demolition and clearing debris from the landfill. If possible materials must be recycled and reused to reduce landfill waste and the demand for virgin materials. More information on the CaGBC can be found at:

http://www.cagbc.org/uploads/FINAL_LEED%20CANADA-NC%201.0_Green%20Building%20Rating%20System.pdf

Environmental Issues in CRD

Solid Waste

Waste from CRD can be reduced or eliminated by diverting materials for recycling and reuse. Here are some of the most common construction wastes that can be recycled or reused:



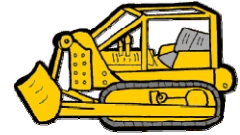
Reuse

Materials can often be used for another project. In planning stage of a demolition project the demolition crew can draft a list of available materials. This list can then be sent to other construction companies or posted on material exchanges. For example, the Nova Scotia Materials Exchange (NSMEx) is a web-based database for residents and businesses to submit and browse listings of unwanted materials and post notices of materials needed. It provides Nova Scotia businesses, residents, and municipalities with another option for materials that are banned from disposal and have the potential for reuse. Materials listings are free of charge. The NSMEx can be found at: www.nsmaterials.com

- **Wood:** Used and leftover wood can be reused in other construction projects, or for kindling, chips, mulch, sawdust, landscaping supplies, or even boiler fuel, as long as it has no coatings or laminatesⁱⁱⁱ. If it does contain coatings or laminates it may be used for liners and filters in landfills. Other uses for old wood include products such as panel board, animal wood shavings, absorbent for oil spills, and more. CRD recycling facilities in HRM will accept used woodⁱⁱⁱ, but if you choose to burn wood scraps for any purpose, be sure to check provincial and municipal laws to ensure you comply with all burning regulations.
- **Metals:** Scrap dealers often recycle old metal, and may even pay for it. Aluminum is often a very popular metal with scrap dealers, and there are several recycling facilities in HRM. Some metal components of a building that can be recycled include metal door and window frames, girders, supports, damaged siding, and roofing. Items such as circuit breaker boxes, hot water tanks,

HVAC equipment and metal studs could be reused depending on their condition.^{iv}

- **Asphalt:** Recovered asphalt is being used in many road and trail building applications, whether it comes from shingles or pavement. As long as road asphalt contains no hydrocarbons (spilled gas or oil products) it can be reprocessed for use in landfill infrastructure. Asphalt shingles are currently processed into an aggregate form and used for road paving and in landfill infrastructure. Halifax CRD Recycling facilities will accept both asphalt shingles, and road asphalt.^v
- **Cardboard:** Most CRD cardboard waste is generated from packaging materials, and shouldn't be disposed of with regular garbage. Buying products in bulk can often reduce the amount of packaging needed. Cardboard boxes can also be reused to store tools or small building materials (e.g. nails). If the cardboard can't be reused, virtually all areas have cardboard recycling facilities that will allow cardboard to be picked up or dropped off for recycling. Contaminated cardboard such as caulking tubes can't be recycled. In Metro, Scotia Recycling (468-5650) and Great Northern Recycling Ltd. (468-8128) will accept cardboard for recycling, as will the Enviro Depots.
- **Drywall:** Next to wood, drywall is the second largest component of the CRD waste stream. There are only a few locations in Canada which have drywall recycling facilities. Although the CRD recycling facilities in HRM do not recycle drywall, they will accept this material, and reuse portions of it. Clean drywall can be reprocessed into new products, or used as a soil stabilizer or pet litter^{vi}. Paint, wallpaper, and mold make it more difficult to handle scrap drywall, so clean material is preferred. If you cannot locate a drywall recycler in your area, contact your municipality for instructions on proper disposal.
- **Concrete and Brick:** Clean bricks can be reused in new construction products, whether it is at the existing demolition location or not. Often, in older cities, vintage bricks can be valuable to those doing historical reconstructions. Crushed bricks, concrete and mortar can be used in the process of road building, backfilling, and other construction application. Concrete and brick sent to CRD recycling facilities must not be coated with materials containing substances such as mercury or zinc, and must not contain rebar. Used concrete and brick are accepted at most CRD recycling facilities, including those in HRM.
- **Plastics:** Some plastics, such as vinyl siding, may be reused in future construction projects if they're in good condition. CRD sites can produce plastic waste such as siding, polyethylene sheets, water supply and drain lines, and foam insulations. Most plastics are recyclable, as long as it is properly sorted. Much of the plastic waste comes from packaging, so buying materials in bulk helps reduce the amount of plastic waste.



Landfill Bans

Nova Scotia has some of the strictest landfill bans in the country, and this allowed us to reach 50% diversion in 2000. Bans are in place for many items including corrugated cardboard, newsprint, beverage, steel/tin and glass food containers, automotive batteries and antifreeze, used tires, waste paint, compostable organic material and several types of plastics, including shrink wrap. Speak to local waste haulers, recyclers and organizations like the Eco-Efficiency Centre about options available to your business.

Air Quality

Air Quality in and around a construction site can often be poor due to dust and debris that gets stirred up by the CRD and is blown around by the wind. The air can become contaminated with Volatile Organic Compounds, nitrogen oxides, sulphur dioxide, or particulate matter. The most common issue with air quality during CRD activities is particulate matter, usually dust from wood or dirt which is more of a nuisance than an environmental problem. This dust can irritate respiratory conditions in many individuals. Anything involving health hazards must be dealt with for the safety of the workers and surrounding public. Some methods of blocking or stopping air contaminants are:

- Use a mist of water around the source of the dust to stop it from spreading. Chemical dust suppressants may also be used. When using water or dust suppressants, it is important to remember they may trigger other consequences, such as contaminated runoff water, soil instability, spreading of contaminants into the environment, and erosion.
- Choose building materials, and plan the construction process in such a way that will reduce the amount of dust being created.
- Grade different areas of the construction site separately, timed to coincide with the actual construction activities. The vegetation and cover then stay intact for a longer period of time, minimizing the dust that would be disturbed.
- If the CRD zone is in an area prone to high winds, use wind fencing in order to control wind erosion.
- Reduce certain CRD activities during windy conditions, where possible.
- Utilize storage/coverings for storage piles, to prevent any loss of materials or the contamination of other sites.
- Reduce or eliminate idling time for vehicles and equipment.
- Avoid blasting when feasible. Blasting has the potential for generating a large amount of dust in a very short period of time.^{vii}



Water Quality

It is important to monitor water disposal at CRD sites. When water is used to control dust dispersion, it can be

contaminated and leach into groundwater or other bodies of water that are used for human consumption. It is also possible for chemicals that are used on site to spill and not be cleaned properly, leading to possible water contamination. Some ideas for maintaining water quality around your CRD site include:

- Keep absorbent materials on site for quick response to chemical spills.
- Know the location of wells near your construction area, and design the terrain to keep drainage away from wellheads^{viii}.
- Note the qualities of the materials you are spraying water on: are they hazardous? Biodegradable? Water-soluble?
- Wastewater streams should be identified and collected to be properly disposed of.



Disposal Companies

There are several companies in Nova Scotia that can dispose of CRD wastes. They include:

- Halifax C&D Recycling Ltd, Goodwood and Westphal, NS
- RDM Recycling, Harrietsfield NS
- Marinus Verhagen C&D Disposal Site, Pictou NS
- T.R Petroleum Enterprises Ltd, Truro, NS
- Colchester Containers, Middle Stewiacke NS
- Truro Sanitation, Kemptown NS
- Tourbrook C&D Disposal and Recovery, Tourbrook NS
- Digby Salvage and Disposal, Digby NS
- Barrington C&D Disposal Site, Barrington NS

For more information on Construction, Renovation and Demolition Disposal Companies, please visit the Nova Scotia Department of Environment and Labour Website at:

<http://www.gov.ns.ca/enla/waste/constructiondisposal.asp>

Telephone and Website Guide

Eco-Efficiency Centre

Tel - 902-461-6704

Website - www.dal.ca/eco-efficiency

Atlantic Canada Opportunities Agency (ACOA)

Tel - 902-426-6743

Website - www.acoa-apeca.gc.ca/e/index.shtml

Atlantic Region, Environment Canada, P2

Tel - 902-426-7231

Website - www.atl.ec.gc.ca/epb/pollprev/

NS Dept of Environment and Labour

Tel - 902-424-5300

Website - www.gov.ns.ca/enla

NS Materials Exchange

Website - www.nsmaterials.com

RRFB Nova Scotia

Tel - 1-877-313-7732 (toll-free)

Website - www.rafb.com

Directory of Solid Waste, Reuse, Recycling and Composting Contacts in Nova Scotia

<http://www.gov.ns.ca/enla/emc/wasteman/contents.htm>

For more information, contact:

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Dartmouth, NS B3B 1P9

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<http://www.dal.ca/eco-burnside> (website)



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References and Resources

We have used and referred to publications, fact sheets and web sites from a number of sources to compile this fact sheet. We would like to acknowledge these companies, organizations, and agencies, and refer you to them for additional information:

ⁱ **Saskatchewan Waste Reduction Council**

<http://www.saskwastereduction.ca/crd/index.html>

ⁱⁱ **San Mateo County Recycle Works**

http://www.recycleworks.org/greenbuilding/gbg_checklist.html

ⁱⁱⁱ **Guide to Waste Management for the Commercial Sector Tenants, Businesses and Institutions**

<http://www.halifax.ca/wrms/documents/ICIGuide.pdf>

^{iv} **Construction/Demolition Waste Recycling and Disposal**

<http://www.se.gov.sk.ca/environment/protection/land/Construction%20and%20Demolition%20PDF.pdf>

^v **“In it for the Green” – Halifax Daily News**

<http://www.hfxnews.ca/index.cfm?sid=24522&sc=89>

^{vi} **The Environmentally Responsible Construction and Demolition Handbook**

http://www.pwgsc.gc.ca/realproperty/text/pubs_ercr/appendix_e-e.html#e3

^{vii} **Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities**

http://www.bieapfrempp.org/toolbox/index.cfm?group_ID=3851

^{viii} **Utah Department of Environmental Quality**

http://www.deq.utah.gov/Construction/mobilization_and_site_preparation.htm

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