

# Sustainable Landscape Construction:

## *Materials and Products — Life Cycle Assessments<sup>1</sup>*

Gail Hansen, MLA, PhD<sup>2</sup>

**LIFE CYCLE ASSESSMENTS (LCAS)** include all of the environmental impacts of a material or product, from extraction to disposal or “end of life.”

Construction materials have six stages in which different environmental impacts can be measured to determine overall sustainability, including 1) acquisition, 2) fabrication, 3) transportation, 4) installation, 5) in-place performance, and 6) demolition and disposal.

Potential environmental impacts during the six stages of a material’s life cycle include energy expenditure, human health impacts, air pollution, landfill impacts, recycle impacts, landscape disruption, and impact on local ecosystems and climate.

The following practices take into account sustainability at all stages of the material’s life-cycle:

- **Use green-certified products.** For example, wood that comes from a managed forest and is sustainably harvested can be certified as a green product. Lumber should be certified green by an independent party approved by the Forest Stewardship Council (FSC). To be green-certified, companies must protect old-growth forests, minimize wasteful harvesting, and avoid clear cutting.
- **Use minimally processed materials.** Materials that are not processed are used in their natural form. Such landscape materials include uncut stone, such as boulders and river rock, and small wood pieces, such as twigs and branches for structures or mulch. Naturally occurring materials — such as stone, aggregate, and timber — have lower costs for manufacturing and installment than processed materials, such as metals, plastics, and concrete and bricks.
- **Use local materials.** Support the local economy and reduce transportation costs by using regionally extracted and manufactured materials. Also look for opportunities to use local materials that can be relocated, such as boulders and stones excavated from a construction site or trees that can be spaded and transplanted.
- **Use low-VOC (volatile organic compounds) products.** VOC compounds are of concern because these compounds evaporate into the air when finishes, such as stains and paints, dry or cure. The primary health hazard is respiratory illness, including asthma. Most states have enacted legislation to limit VOC levels for paints and stains, and many companies now offer low-VOC or no-VOC products.
- **Adopt “lean construction” practices.** Use materials efficiently, avoid waste, and use construction techniques that protect materials from the elements, so the materials will last as long as possible.
- **Use material safety data sheets (MSDSs).** Review the sheet to learn human health and toxicity impacts before using the product. The sheets can be cross referenced with toxic inventory lists from the National Institute for Occupational Safety and Health (NIOSH) and the U.S. EPA Agency for Toxic Substances and Disease Registry (ATSDR).

Adapted from:

Calkins, M. (2009). *Materials for sustainable sites: A complete guide to the evaluation, selection, and use of sustainable construction materials*. Hoboken, NJ: John Wiley & Sons, Inc.

Smith, C., Clayden, A. & Dunnett, N. (2008). *Residential landscape sustainability: A checklist tool*. Oxford, UK: Blackwell Publishing Ltd.

<sup>1</sup> This document is ENH 1141, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date, October 2009. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

<sup>2</sup> Gail Hansen, assistant professor, Environmental Horticulture Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.