

Building
Green with
Wood in B.C.

MODULE 1

Key Elements of Green Design

What is Green Design?

“Green building is the practice of increasing the efficiency with which buildings use resources - energy, water, and materials - while reducing building impacts on human health and the environment during the building’s lifecycle, through better siting, design, construction, operation, maintenance, and removal.”¹

The ultimate goal of a green design is to achieve sustainability and open up new opportunities to design and build structures that use less energy, water and materials, and minimize impacts on human health and the environment.

Green design incorporates environmental considerations into every stage of a building’s life – from the earliest planning through site development, design, construction, operation and maintenance and, eventually, decommissioning, reuse or disposal. It involves countless decisions about materials, systems and methods.

¹ Frej, Anne B., editor. Green Office Buildings: A Practical Guide to Development. Washington, D.C.: ULI–The Urban Land Institute, 2005. Pp 4-8.

Green design embodies a holistic, integrated and multidisciplinary approach in which every decision is evaluated against multiple criteria to find the best solution. As the understanding of green design has increased in sophistication over the last two decades, the strategies adopted have evolved, and the quantitative performance of buildings has improved.

*Nicola Region Residence, B.C.
Architect: Coast Architectural Group
Photo: Peter Powles*

Basics of Sustainable Development

Green design fits within the overarching objective of global sustainable development, as defined by the 1992 World Commission on Environment and Development (the Brundtland commission):

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

To achieve this objective, it is necessary to practise environmental stewardship and manage renewable resources responsibly to meet the growing needs of the planet. Sometimes this means using less, and often it means choosing naturally renewable products that have a lighter footprint and come from responsibly managed and sustainable sources.

Also fundamental to sustainable development is the consideration and evaluation of all the potential impacts of buildings, whether economic, social or environmental.



The Role of Green Design

Constructing and operating buildings has an immense environmental impact. Globally, buildings are responsible for 20 per cent of all water consumption, 40 per cent of all energy use, up to 30 per cent of greenhouse gas emissions and 30 per cent of solid waste generation.²

The extraction and processing of raw materials for use in buildings is also a significant cause of environmental degradation, and these materials can be a major source of the environmental contaminants that contribute to health problems for building occupants.

Building professionals can reduce impacts on the environment and human health in key areas, including:

- **Site design:** Green design encourages the use of building sites that maximize passive solar heating and cooling, conserve natural resources such as trees and wildlife habitat, and minimize soil disturbance and erosion. Both location and design can encourage the use of alternate transportation methods such as mass transit, cycling and walking.
- **Water quality, conservation and efficiency:** Green design uses on-site mechanisms such as rainwater harvesting, water-conserving fixtures, waste water treatment and recycling, green roofs and controlled storm water discharge. This ensures water is used efficiently, and reduces the burden on municipal or other infrastructure to supply potable water, collect and discharge storm water, and treat and dispose of waste water.
- **Energy efficiency and renewable energy:** Green design addresses building massing and orientation, and may incorporate high levels of insulation, capture of heating and cooling energy from geothermal or other natural sources, renewable energy installations (such as photovoltaics, biomass, wind turbines or solar hot water heating systems), energy-efficient equipment and appliances, careful envelope design to harvest daylight, and the use of solar shading devices, daylight and occupancy sensors.
- **Conservation of materials and resources:** Green design considers the environmental impacts of materials and products across their entire life cycle. It gives preference to those with low environmental impact and embodied energy in their extraction or manufacture; that are self finished, non-toxic, multi-functional, durable, and easily salvaged and recycled at the end of a building's service life.
- **Indoor environmental quality:** Green design aims for high levels of natural ventilation and daylight in all occupied areas of the building. It also strives for high indoor air quality through construction protocols aimed at eliminating airborne and surface contaminants, and through the specification of materials that contain no chemicals or compounds harmful to human health.

² United Nations Environment Programme, Sustainable Buildings and Climate Initiative, Cities and Buildings UNEP Initiatives and Projects. (undated)
<http://www.unep.org/resourceefficiency/Policy/ResourceEfficientCities/tabid/55541/Default.aspx>.



Regenerative Design is an emerging alternative to current design and construction practices. While green buildings try to reduce harmful environmental impacts, regenerative buildings seek to go beyond that by improving both the natural environment and the lives of their human inhabitants.

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Photo: Don Erhardt*



Green Building Standards and Rating Systems

Let government regulators, building professionals and consumers embrace green building with confidence. In some cases, codes are written so local governments can adopt them as bylaws to reduce the local environmental impact of buildings.

Green building codes are legal requirements that mandate prescriptive or performance requirements as part of building codes. Two examples are:

- CALGreen (California's Green Building Standards Code)
- International Green Construction Code (USA)

Green building rating systems are voluntary certification programs that award points for prescriptive or performance requirements. Two examples are:

- LEED (Canada, USA)
- Green Globes (Canada, USA)

Green buildings

- Mitigate climate change
- Use less energy and water
- Use fewer materials
- Reduce waste
- Are healthy for people and the planet

Cover Page:

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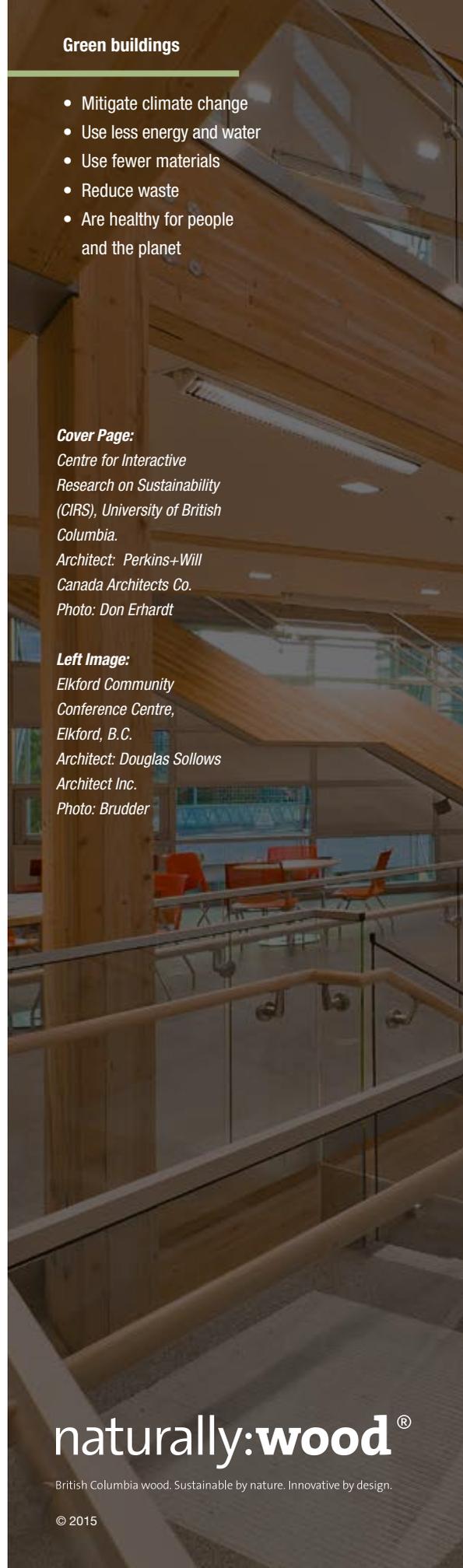
Photo: Don Erhardt

Left Image:

Elkford Community Conference Centre, Elkford, B.C.

*Architect: Douglas Sollows
Architect Inc.*

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