ecocafe

Green Communities Initiative: REPORT

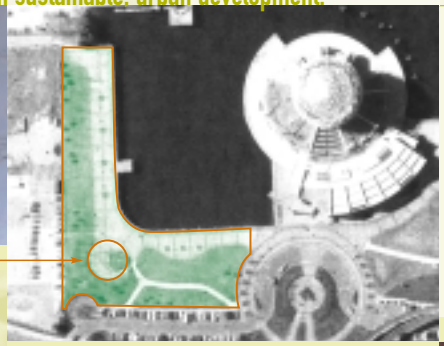
Connecting the way we live to natural systems

In mid-2001, EcoCafe was accepted
for the Green Communities Initiative,
partnering with the Ministry of Community, Women's and Aboriginal Services

The process of designing a sustainable building was put into high gear.
This detailed design/build process has included
the involvement, education and input of the community.

This is a case study in sustainable, urban development.

Existing gazebo will be converted into EcoCafe.



A resting place on the False Creek seawall, next to Science World and Sky Train.

Right: EcoCafe staff and volunteers working at a seed planting party

The process is documented in this report ...

Contents

A unique cafe with healthy food.

photo courtesy Eco-City Kids

tel. 604.216.7203 www.ecocafe.bc.ca
printed on tree-free paper

Overview of EcoCafe

Mission Statement

Background of the organization

Plan of EcoCafe

Purpose of EcoCafe

EcoCafe Mission Statement:

A Model of Sustainable Community and Catalyst for Ecological Awareness

"...to foster a culture of ecologically aware people

whose lifestyle choices create a sustainable local economy

environment and social fabric".

BACKGROUND

The EcoCafe Sustainability Society grew out of several projects conducted in 1995 by a group of youth associated with an alternative secondary school operated by Wondertree Learning Centre in Vancouver, British Columbia, Canada. The goal of the projects was to explore community sustainability in an urban setting. The EcoCafe Sustainability Society was incorporated in 1998 to continue to follow through with one of those projects; one that would promote a model of sustainability and be a catalyst for ecological awareness.

THE PLAN

To design and build an ecology centre using an Integrated Design Process, that will demonstrate to developers, designers, planners and the public, tangible ways of building sustainably. The building, to be known as EcoCafe, will house a small café and meeting area as well as office space for compatible non profit organizations. EcoCafe will be built on parkland near Science World in Vancouver. It will become a model for other developments in Vancouver's Southeast False Creek Area, other places in British Columbia and elsewhere in the world.

PURPOSE

The purpose of EcoCafe is to demonstrate to developers, designers, planners, and the public tangible and practical ways of building sustainably.

above: cyclist riding by our EcoCafe Outreach Centre at the Seawall

The EcoCafe will integrate advanced green building science,

green technology,

a community resource centre.

urban agriculture and public art..

PRINCIPLES

Integrated Design Process
The integrated design process (IDP) will be used. It allows for synergy to occur amongst the whole design team at the outset of a project. This ensures that the site, massing and orientation issues of the project are incorporated by the group into the design. Maximum sustainability benefits accrue from this approach.

Resource Conscious
The project must exemplify the best practices with regard to the use of recycled waste products and building materials. The design must minimize overall build material use (e.g. advanced framing).


photo: Magnus Bein

above: the tomato man at Trout Lake Farmers market, showing the abundance and varieties of tomatoes.

right: an early EcoCafe scale model by Magnus Bein

The materials selection must also consider embodied energy and future recyclability.

Zero Energy
The goal is to achieve a "zero" energy balance in the facility. The focus will be on the following: demand side management systems for energy and water; use of natural systems such as daylighting, shading, and natural ventilation; green technologies such as energy efficient glazing systems, alternative energy technologies (e.g. building integrated photovoltaics).

Healthy Indoor Environment
The use of non-toxic and healthy materials is required by this project in order to preserve occupant health.

Bioregional Material Sources
As much as possible the sourcing of materials and equipment should focus on local sources to contribute to the local economy and social conditions of the local community.

Ethical Choices
The ethical criteria imposed on material and equipment selection has serious local and global social implications. Materials must be shown to have a positive effect, or their use and their proponent's involvement in the project shall be curtailed.

MAIN ACTIVITIES OF THE ECOCAFE

Public Art
The public art of the site begins with the *collective echoes'* native herb garden, tree elder sculpture and continues with other public art related to First Nations, historical contexts and current environmental solutions.

Green Architecture Education
The entire facility becomes a "green building" example designed to be monitored and used as a teaching tool and green technology cluster, accessible to the public (architects, engineers, developers, government staff and real estate agents). Suppliers and designers gain opportunities to show their best.

Organic Bioregional Café
An organic foods, bioregional café will use ethical choices to supply food to its patrons. The Café may function as a training ground for youth.

Organic Permaculture Gardens
The educational gardens of the project reflect the multicultural nature of Vancouver, encourage local food security, backyard habitat creation, be organic and follow permaculture principles.

Greenhouse Propagation
Organic seedling propagation within the EcoCafe facility will provide organic garden plants to the surrounding neighbourhoods. As an incubator of biodiversity and agency of regeneration, the EcoCafe will spread health and wellbeing through its Seedling Programs.

Sustainable Living Seminars
A full schedule of seminars on sustainable community issues will be hosted to assist lifestyle transformations. These will include such topics as eco-philosophy, organic gardening, green building technologies and design, greenhouse gas reduction made easy, technology topics, recycling and composting.

Sustainable Community Resource Centre
Through onsite component demonstrations, hard copy and web-based information, EcoCafe will link the public to the most advanced examples of sustainable practices and technologies.

Local Cultural Performances
The EcoCafe could support local entertainers in an effort to give its patrons a spirited and eco-conscious approach to life that includes cultural and spiritual sustainability.

Community Gallery Space
Environmental art, evolving plans for the community's sustainable future and other green building projects could be displayed in the EcoCafe.

NGO Incubator
EcoCafe office space will incubate other environmental and community group initiatives.


photo: Jeff Verkley

INITIAL BUILDING PARAMETERS*

- Size: 350-500 M2
- Incremental Development: thought needs to be applied to possible staging of the construction based on funding acquired.
- Passive Environmental Control: heating, cooling, ventilation
- Massing: 2.0 floors & rooftop garden
- Uses: main floor café; second floor offices
- Solar Aquatics System- black water & composting toilet
- Outdoor Works Yard
- Outdoor Patio/Deck
- Circular Site: as much as possible remain compact, leaving Park undisturbed
- Budget: $1000-1200/M2; $350k-$600k Total Cost
- Zero Energy Building: demand side management, passive solar, BIPV
- LEED Designation Goal: Platinum (i.e. the best)

* subject to change

Green Communities Initiative Goals

Overview of Green Communities Initiative Goals

Green building principles and the EcoCafe

The Integrated Design Process (IDP)

Overview of GCI Goals

The purpose of this study is to develop an educational tool for community groups (or any group) engaged in the design of a building and interested in reducing greenhouse gas impacts. The focus is to encourage the use of green building principles to reduce greenhouse gas production at the early stages of conception and design of buildings. This study documents an Integrated Design Process where green building design principles are used to develop a model "Green" building. The integrated design process brings together a diverse group of design experts and building proponents to develop green building targets, a group commitment to a sustainable outcome, and an effective green building design.

Green buildings are assemblies of building systems integrated in such a way as to use less resources, create optimal occupant health and significantly reduce their impact on the environment. The EcoCafe Project design was chosen as the case study of a green building to better illustrate green building design principles. This educational package was created for proponents to plan green buildings and thus contribute to greenhouse gas reductions.

The education package consists of two main components:

- green building design principles (Build Green Build Healthy) with EcoCafe case study examples
- integrated design process description with EcoCafe chronicles as example events

Additional components are included to provide further depth to the community education package.

Green Building Principles: The EcoCafe Case Study

The primary goal is to demonstrate green building principles. To do this and provide inspiration and facts to the user of a green building educational package we needed to provide the following:

- descriptions of green building principles
- targets based on the best practices of green building design
- illustrations of the integration of various systems to achieve better performance
- illustrations of green building principles with the EcoCafe design as a case study
- construction materials based on a material selection protocol
- a financial feasibility of green materials and technologies
- a test of the green building systems with an energy model
- resources for additional research by groups

Integrated Design Process (IDP)

The second goal is to explore and document the Integrated Design Process (IDP) as a method of achieving higher target levels for green building projects through the following stages:

- comprehensive design team description
- iterative early design process description and documentation
- list energy efficiency features for the schematic design

To develop an educational tool

To encourage the use of green building principles

To bring together a diverse group of design experts

Case Study: Build Green, Build Healthy

Overview of EcoCafe Case Study and BGBH principles

Stages in the Integrated Design Process

Fact sheets of the BGBH principles (and how they are applied to the EcoCafe)

Overview of Build Green Build Healthy Series

Green Building Principles: The EcoCafe Case Study

In establishing principles to guide the design of EcoCafe, our design team decided in the early stages to adopt a vision of "the greenest building in North America". There seemed to be many ways of organizing and grouping principles and objectives to achieve this. After consideration, it was decided to work within a framework that is recognized across North America for establishing and rating the principles of green buildings. Thus the LEED (Leadership in Energy and Environmental Design) rating system was selected to harmonize the EcoCafe's green building design goals with the current North American standards for green buildings.

LEED builds the concept of full cost accounting into its categories, which respects the triple bottom line: social, environmental and economic.

As a relatively new concept, LEED also provides opportunities for green building proponents to add "innovation" categories to the rating system. Each LEED major category has a number of subcategories.

A series of Build Green Build Healthy (BGBH) fact sheets (found in this chapter) methodically covers the LEED Program's categories for assessing green buildings. Each fact sheet has both theory and case study example integrated to better illustrate each concept. Categories not appropriate to EcoCafe's situation have been left out as would happen during a real assessment of the building.

Each BGBH fact sheet contains the following information

- LEED category & its subcategories
- Reference to a precedent
- A system flow schematic or a schematic illustration of the component
- A general, lifecycle assessment aspect description
- Key lessons learned

above: The EcoCafe Outreach Centre, sponsored by EcoTek, at the SeaWall site. This Centre has been used for community outreach and education.

Integrated Design Process (IDP)

The Integrated design process (IDP) is the non-technical component of designing green buildings that harnesses the creativity of a diverse group in a synergistic design setting. The research shows that the application of the IDP early in a design process has the potential to increase the "green" impacts of a building substantially compared to the conventional process of architect and client.

EcoCafe has utilized the IDP to generate its key green building and climate change strategies.

Each stage of the process is explained with the following information

- A description of the stage
- EcoCafe case study response

Additional Components

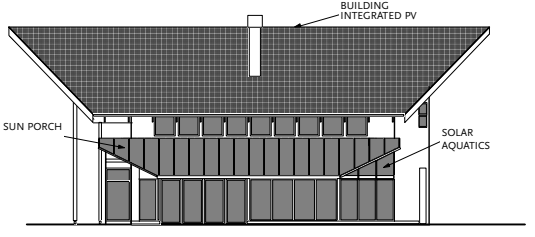
Additional components that add further depth to the case study examples are listed below and can be found in the various Appendices as noted. These additional components, contextually, have the most relevance to the Cascadia Bioregion. Some components have more universality and therefore can be utilized in other bioregions.

LEED Scorecard
Details on the LEED Scorecard are available at www.usgbc.org/programs/leed.htm.

EcoCafe Schematic Design (See next chapter)
Portions of schematic sketches of the EcoCafe design used to illustrate green design principles. The full schematic design illustrates the system as a whole and shows integration and synergies created through good design.

above: Bikers viewing the *collective echoes* public art project (next to the EcoCafe site)

South elevation schematic



Stages in the Integrated Design Process

Integrated Design Process (IDP)

The Integrated design process (IDP) encompasses cross-disciplinary teamwork enabling the improved integration of building, community, natural and economic systems and therefore is a key to sustainable design. Without this process of integration, systems are over-designed and commonly function in conflict with one another and at the very least do not take advantage of opportunities for synergies.

The process consists of the following elements:

1. selecting a comprehensive design team
2. using an iterative early design process and
3. committing to a focus on efficiency and performance targets.

1 Integrated (Comprehensive) Design Team (IDT)

The purpose of selecting a "comprehensive" or cross-disciplinary design team is to ensure that all aspects of a building design are covered in the human resources of the team. When the whole cross-disciplinary team participates in an integrated design process the exchange of ideas delivers a more integrated design, faster. This is because the answers to questions can usually be found within the diverse group and the lag time to find answers becomes considerably shorter. For the purposes of this report we refer to the "comprehensive" or cross-disciplinary design team as the integrated design team (IDT) which usually includes the following:

- project owners
- facility users
- building manager
- cost consultant
- architects
- engineers
- energy engineer (computer simulation)
- green building consultant
- contractors and subcontractors
- materials and equipment suppliers (as required)
- specific technical sub-consultants (e.g. education specialist)
- mortgage banker

Once the IDT is in place the next step is to apply the integrated design process through full participation in iterative, early, conceptual and schematic design charrettes (meetings).

above: Integrated Design Team and EcoCafe Staff at building design meeting

EcoCafe case study response:
In selecting the integrated design team, the project manager used his extensive connections in the design and building industry to select consultants who had high levels of experience, commitment to the cause of green building and ethics. The experience with green buildings and the integrated design process was particularly important regarding the architect, green building consultant and the energy engineer.

The forming of the team was done in two phases: The core consultants (project manager, architect, green building consultant and the energy engineer) were chosen and met with the client group to brainstorm the other selections of team members to ensure a level of compatibility and to select people with the direct references of the core design team.

EcoCafe case study response:
Details of our Integrated Design Team

The Integrated Design Team was selected based on the following criteria:

- Experience with green building concepts;
- A web of working relationships with other team members;
- Ability to openly share their knowledge as part of the team;
- A career commitment to a conservation ethic and green buildings.

Biographies of IDT
Core Team

Eva Matsuzaki
Eva's firm, Matsuzaki Architects Inc., designed one of the first "green" institutional buildings in Canada, the CK Choi building at the University of British Columbia. The building uses 50% recycled building materials, composting toilets, natural light, natural ventilation and a gray water marsh as main features. As a past president of the Royal Architecture Institute of Canada, Eva has had a critical role in bringing green architecture to the profession.

David Rousseau
David is a green building consultant, author of several books on healthy buildings (Environmental by Design and Healthy by Design), and co-author of the first "green" building code in North America for the City of Santa Monica, California. David has built his own "sustainable" home on Cortes Island that features wind power, wood heat, advanced building design and non-toxic materials. David is also engaged in projects in Asia to assist the sustainable development of cities in China.

Ian Theaker
Ian is an energy engineer specializing in green buildings. He has pioneered the green building programs of numerous government agencies and is currently at work with David Rousseau on detailed green building guidelines for the City of Seattle to implement widespread changes to the City's building strategies.

Kim Rink
Kim is an environmental building design/build consultant whose wide ranging experience has prepared him for the role of project manager. With training in architecture, project management and construction his projects vary from First Nations earth shelters and ecologically engineered sewage treatment systems to integrated organic farms and green retrofits of traditional homes.

Biographies of
Sub-consultants Team

Eric Man
Eric is a professional structural engineer with competence in many construction systems and a commitment to sustainability through the use of used building materials, advanced framing methods and efficient structural elements.

Cameron Haines
Cameron is a professional building scientist with a commitment to high efficiency building envelopes. His inspiration is to integrate monitoring into the building's systems to better understand the systems interaction and how they may be optimized.

Brent Cameron
Brent is an educational consultant, founder of Wondertree Learning Foundation, Virtual High "School" and the Self-Design course. His group of students embarked on a multi-year mission called Village Quest to research better ways of making communities sustainable. Their work sparked the commitment of the City of Vancouver to a sustainable community in Southeast False Creek.

2 The Charrette: an iterative, early design process

The charrette process fosters team-building to establish consensus on project specific performance targets. The charrettes provide an opportunity for the comprehensive design team to respond to the facilities program, the unique site context and the skills of the other team members. These early (in the process) meetings focus on front-loading the design whereby the crucial decisions are made at the beginning of the project with the full participation and power of the group's synergy.

To make charrettes work, baseline information must be made available. The following list covers some of the required information:

1 an organizational mission statement
2 an approximate schedule for the project
3 a budget
4 a site analysis that includes:
- location
- views of context
- infrastructure (roads, sewers, power, gas, telephones, etc.)
- legal property maps
- zoning bylaws
- geotechnical reports
- environmental impact reports
- climatic data (precipitation, temperature, solar radiation, wind data)
- vegetation inventory
- topography
- drainage systems (streams, swales, pipes)
- access (automobiles, walking & bicycle paths)
- context (past present and future)

The first Charrette established key questions such as status of the site, funding anticipated, political barriers and degree of accessibility of the building.

EcoCafe case study response:
In developing the Charrettes the focus was assembling the IDT for the start of the schematic phase in two parts. The first phase Charrette attempted to update the design team on the organization, its business plan and long term goals and all the baseline information of the predesign work. This first meeting established key questions needing answers such as status of the site, funding anticipated, political barriers and degree of accessibility of the building.

In addition to the charrettes, design meetings of smaller working groups have developed the schematic plans and researched local and bioregional materials and researched systems integration concepts.

The full IDT was not completely filled out. The size of the building project resulted in a scaled down charrette process that included only the key consultants. As a modification of the process that might assist smaller scale projects, we have decided to keep all the consultants up to date on the progress of the design and solicit questions along the way. Once the schematic design is in place then more consultants can come to bear on the project to develop the design further into its details. To increase the communication effectiveness, all the consultants will be linked via an intranet server site that allows conferences of some or all consultants, integrated schedules and stores the latest drawing or research paper.

In addition to the IDT, a diverse advisory group will be presented with our principles, targets and schematic plans for feedback and development.

3 Commitment to conservation

To make the whole process work better, it is advised that the comprehensive team make a stated commitment to a conservation ethic. This can also be ensured through careful selection of the team initially to select people who have shown their commitment through their practice. The commitment to conservation requires that members of the team educate themselves about the whole building as a system and how their components contributes to the whole.

The other important aspect of commitment is sharing. The design of new green buildings involves a responsibility to share the findings and innovations through developing the educational opportunities of each building. This will enable those seeking to make the same choices an opportunity to be educated through access (guided tours), signage or self tour brochures or simply through a design that promotes systems transparency.

above: EcoCafe building scale model of first design

EcoCafe Case Study Response:

The commitment to conservation was anticipated by the client through the team selection process. At the first meeting the idea of committing to a cutting edge, "greenest building in North America" became the focus of the team. The feeling was to push the limit and thereby set new precedents that others can move from. The other side of the commitment came from many of the consultants to exert themselves toward more research as part of their contribution to the educational aspects of this endeavour.

4 Commitment to Performance Targets

A Project Specific Performance Targets

Establishing these targets early in the process creates a reference to guide the design team. It is important to revise the targets, regularly, as the team proceeds through its process. Examples of these targets come from the LEED rating system which forms the basis of the Build Green Build Healthy principles

EcoCafe Case Study Response

At our first integrated Design Meeting, the team established a general goal of creating the "Greenest Building in North America". The team has a high level of experience and to design a building anything less than previous projects represents a step backward. This is considered valid in that one always learns from projects and the desire is to use feedback to evolve the best practices.

Some of the general performance targets include:

- zero energy building
- zero waste building
- minimal water use building
- 100 year building
- low toxicity materials
- bioregional materials and skills
- incubate biodiversity
- edible landscape
- high % recycled materials

B Energy Modeling

Computerized energy modeling supplies quantifiable performance feedback to the design proposals. This allows the design team to focus on certain areas or modify the design to address an opportunity revealed by the energy model. The other aspect of having an energy model is to allow the design team to compare the operational cost savings of different design solutions. When operational costs (mostly energy) are compared to the first cost (capital) of a building the lifecycle energy costs far outweigh the initial costs.

EcoCafe Case Study Response (next steps)

Our Energy engineer will be running computer simulations for several design options and then on each iteration (internal modifications of the systems) of the chosen design to assist choices being made where all other factors remain equal.

C Keystone vs. Recommended Targets

Keystone targets are ones that address key building issues such as environmental performance, resource conservation, occupant health and economic performance.

EcoCafe Case Study Response

In developing the EcoCafe business plan and design goals, consideration of the key building issues was made in the form of narrative goals.

D Key Building Issues and Goals

Environmental Performance

The project is intended to have only a positive impact on the local and global environment. During construction, protection will be provided for specimen trees on the site, filtration and minimization of drainage waters, minimization and complete recycling of all building waste.

Resource Conservation

The first rule of any supply system is demand side management (conservation) of energy, water, etc. through the use of technology and systems to increase efficiency and eliminate waste. Resource Conservation can also refer to reusing byproducts to make building materials, recycled building components and to use building systems that use less material to achieve the desired effect.

Occupant Health

The targets for increased occupant health are non-toxic building materials, proper ventilation and filtration of air, comfort from balanced radiant surfaces. Others include maximizing daylight, views to outdoors, and electromagnetic shielding are also key targets for occupant health.

Economic Performance

The target for economics is lifecycle cost and cost of ownership. Lifecycle costs compare first cost and operating costs of the options: conventional vs green. With conventional building design first cost is primary and operating cost is someone else's problem. With green buildings the capital and the operating costs are considered over the life of the building in a cradle to cradle philosophy.

Other targets for occupant health include maximizing daylight, views to outdoors, and electromagnetic shielding

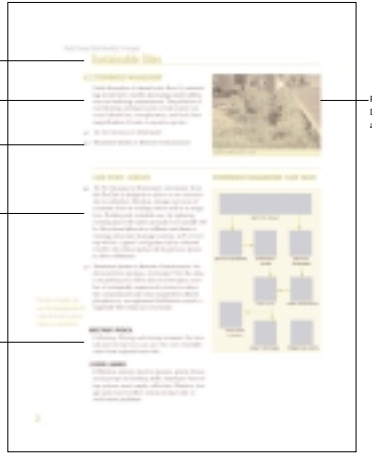
Fact Sheets of the Build Green Build Healthy Principles

How EcoCafe applied the Principles

During the Integrated Design Process, the Build Green Build Healthy Principles (BGBH) were used as parameters. The following fact sheets were developed to provide detailed information on key BGBH principles, and to demonstrate how EcoCafe has worked within those constraints. As other organizations plan their green building, they can refer to these pages for details on specific issues.

Information provided on the Fact Sheet Pages

- A detailed description of the Green Building principle, broken into specific points that must be addressed in the design process
- The Case Study result when the principle is applied to the EcoCafe
- Photos or diagrams where applicable
- An "Investment Payback" description; to show the cost benefit of using the Green Principle or technology)
- A "Lessons Learned" description where applicable; to pass on tips or advice from what we have learned from our experience



Sustainable Sites

1.0 SITE SELECTION

Select sites that are appropriate to the building use and minimize the impact of the location of the new building on the environment . Building on existing sites maintains CO_2 absorbing landscapes.

1.1 Build on Infertile Land

1.2 Build on Sites 1.5 M Above 100-year Flood

1.3 Build on Existing Building Footprints

1.4 Stacking the Building Program


above:EcoCafe site on deck above ocean

CASE STUDY: ECOCAFE

1.1 Build on Infertile Land: The site is actually located on an existing piling supported concrete deck.

1.2 Sites 1.5 M Above 100-year Flood: The site is protected by a 1.75 M rise above high tide.

1.3 Build on Existing Building Footprints: although located in civic parkland the site of the project is legally contained within an existing concrete & paver pad.

1.4 Stacking the Building Program: The EcoCafe is designed as retail cafe on main floor, society offices and greenhouse on second and roof garden and additional offices on top

INVESTMENT PAYBACK:
Maintaining fertile soils for food production in perpetuity; building to avoid flooding preserves the value and embodied energy of the structures; using existing sites and buildings reduces the impact on GH gas absorbing landscapes and finally additional biomass introduced to a site reduces GH gas as well.

LESSONS LEARNED:
The EcoCafe site on pilings presents challenges with regard to overall weight and point loading of the building. Since the site was a given it made sense to use it versus using fertile land areas.


above: the EcoCafe's future garden and native landscape

The EcoCafe will maintain a tight footprint and reuse the existing park gazebo as part of the structural system of the new building

2.0 ALTERNATIVE TRANSPORTATION

Reduce pollution and land development impacts from automobile use.

2.1 Commuter Transportation Options

2.2 Enable Cyclists

2.3 Alternative-fuel Refueling Station (shared)

2.4 Preferred Parking for Vanpools

above: EcoCafe will cater to cyclists and pedestrians

CASE STUDY: ECOCAFE

2.1 Commuter Transportation Options: EcoCafe is located 250 meters from a light rail station (SkyTrain) and major bus links. Also located 500 M from train and intercity bus depot.

2.2 Enable Cyclists: Cyclists are provided with covered, secure bike parking. The design includes staff showers and locker facilities for 100% of the staff.

2.3 Preferred Parking for Vanpools: handicap, vanpool and delivery vehicle parking is designated and reserved for dropoff and delivery use

above: proximity to alternative transportation

Ecocafe will make it easier for staff to walk, bike or ride transit than to drive a car.

INVESTMENT PAYBACK:
Proximity to alternative transportation pays in less costs for moving and parking cars. Enabling cyclists reduces GH gases to almost nil for each cyclist. Preferred parking spots encourage vanpools to utilize the facility, thus reducing the economic and environmental costs to society. The benefits to society and the environment are reduced pollution, less costly road infrastructure, and individual fitness.

LESSONS LEARNED:
To provide showers, lockers and safe bicycle storage for staff is a design and budget challenge for individual building owners but a plus for the organization.

3.0 REDUCED SITE DISTURBANCE

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity. These measures can double the CO_2 absorption capacity of the site development from current levels.

3.1 Limit Clearing & Earthwork

3.2 Reduce Development Footprint

3.3 Restore Native Vegetation

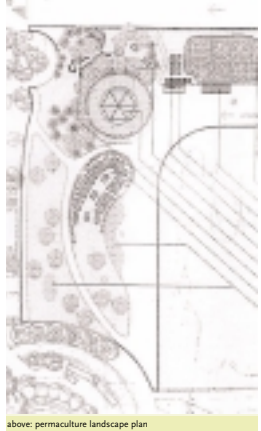
above: existing small development footprint

CASE STUDY: ECOCAFE

3.1 Limit Clearing & Earthwork: the EcoCafe site is defined by an existing concrete pad accessible from a wide pedestrian walkway. Tree barricades, light machinery excavators, defined access corridors and manual demolition will eliminate impacts on existing park vegetation, previous paver areas, utilities, curbs and walkways

3.2 Reduce Development Footprint: by program stacking (2.5 storeys); using existing pathways and parking lots as is.

3.3 Restore Native Vegetation: The current site is planted with grass and specimen ornamental trees. EcoCafe's landscape plan intends to replace the monoculture landscape with native ground covers, and adapted food forest species.



above: permaculture landscape plan

EcoCafe's site interventions will transform the monoculture of green grass to a biodiverse native landscape that provides habitat, flood control, air filtration, cooling and food.

INVESTMENT PAYBACK:
"Surgical" interventions on sites can reduce the destruction of existing infrastructure and eliminate the cost of replacement (for example: mature trees) Stacking the building program increases the density and creates commons for perpetual amenities such as park and gardens that have value as local food production and as accessible nature. Native vegetation requires little or no fertilizing or maintenance and thus saves costs.

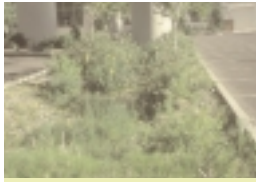
LESSONS LEARNED:
Constraining the footprint of the building caused the design team to work out its accessibility strategy (lift) and the space plan requirements.

4.0 STORMWATER MANAGEMENT

Limit disruption of natural water flows by minimizing stormwater runoff increasing onsite infiltration and reducing contaminants.
The pollution of non-flushing, embayed ocean or lake waters can cause habitat loss, eutrophication, and food chain magnification of toxins in aquatics species.

4.1 No Net Increase in Stormwater

4.2 Treatment System to Remove Contaminants



above: biofiltration marsh

CASE STUDY: ECOCAFE

4.1 No Net Increase in Stormwater: stormwater from the EcoCafe is designed to achieve a net reduction due to collection, filtration, storage and reuse of rainwater from its rooftops. Reuse will be to irrigation, flushing and custodial uses. By replacing existing grass with native groundcovers rainfall will be filtered and allowed to infiltrate and drain to existing subsurface drainage systems. 50% of roof top will be a "green" roof garden fed by collected rainfall. All outdoor patios will be pervious pavers to allow infiltration.

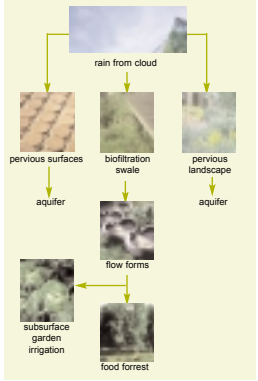
4.2 Treatment System to Remove Contaminants: For demonstration purpose, stormwater from the adjacent parking area will be directed through a number of ecologically engineered systems to reduce the contaminant loads (total suspended solids & phosphorus): an engineered biofiltration marsh; a vegetated filter strip and a bioswales.

The flow of water governs the development of land if the full cycle in nature is considered. EcoCafe uses ecological engineering to purify urban runoff.

INVESTMENT PAYBACK:
Collecting, filtering and storing rainwater for internal and external uses can save the costs of potable water from regional reservoirs.

LESSONS LEARNED:
Infiltration systems must be passive, gravity driven, avoid pumps and holding tanks. Rainwater harvesting systems must employ collection, filtration, storage and reuse/overflow system in that order to avoid odour problems

STORMWATER MANAGEMENT FLOW CHART



5.0 DESIGN TO REDUCE HEAT ISLANDS

Reduce heat islands which are thermal gradient differences between developed and undeveloped areas in order to minimize impact on microclimate and human and wildlife habitat. These uncontrolled microclimates can be a major source of energy use for cooling, vegetation damage and excessive water use.

5.1 Shade Impervious Surfaces >30%

5.2 High Reflectance/Emissivity Roofing

5.3 Green Roof (<50%)

above: existing site deciduous shade to the east and south

CASE STUDY: ECOCAFE

5.1 Shade Impervious Surfaces >30%: building provides shade to concrete pathways on north side and south side deciduous trees provide summer shade to southside hard surfaces.

5.2 High Reflectance/Emissivity Roofing: a glass, building integrated photovoltaic (BIPV) array is mounted on a spaceframe roof. Overall, a small footprint, stacked building reduces the exposed roof.

5.3 Green Roof (<50%): Other roofs to the north are "green" roofs layered with lightweight soil and native ground covers.

INVESTMENT PAYBACK:
Heat island reductions come in the form of reduced cooling requirements and thus less energy. Green roofs filter rainwater, evapotranspirate to cool the building, absorb UV radiation protecting roofing membranes and absorb CO_2.

LESSONS LEARNED:
The creation of a dynamic plant/building synergy that follows the seasons has deciduous plants greening up in spring and summer just as cooling loads increase, providing a passive slow response to the seasonal requirements of buildings

above: example of building integrated planting

EcoCafe transforms sunlight into electricity, hot water and biomass. The landscape purifies stormwater & shades the site and parts of the building.

6.0 LIGHT POLLUTION REDUCTION

Eliminate the light trepass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

6.1 Reduce Exterior Lighting Footcandle Levels

6.2 Zero Direct Beam Illumination from Site

above: downlit building

CASE STUDY: ECOCAFE

6.1 Reduce Exterior Lighting Footcandle Levels: safe light levels are to be designed without lighting offsite objects and creating night sky pollution. Use a a computer model to verify.

6.2 Zero Direct Beam Illumination from Site: EcoCafe will use downlit, wall washing spot lights, full cutoff luminaries, low reflectance surfaces to reduce glare and light pollution.

INVESTMENT PAYBACK:
Night lighting is a North American phenomenon. besides the obvious saving of energy, appropriately lit buildings increase the appreciation of stars, and allow other (nocturnal) species to thrive.

LESSONS LEARNED:
Just light the exterior pathways focussing on stairs and turns and the edges of the building so that glare and beams of light are eliminated.

LIGHTING PLAN

1.0 WATER EFFICIENT LANDSCAPING

Lowering demands on potable water used for irrigation reduces the size of dams which require energy and materials to build, create gases from flooded vegetation that decomposes and eliminates forests that would absorb CO_2.

1.1 High Efficiency Irrigation

1.2 Rain Water Collection, Filtration & Storage

1.3 No Irrigation Landscaping

1.4 Water Reclamation

above: example of a rainbarrel collection system

CASE STUDY: ECOCAFE

1.1 High Efficiency Irrigation: a subsurface drip irrigation system is designed to use minimal amounts of water

1.2 Rain Water Collection, Filtration & Storage all the facility roofs collect water and direct it to a filter before storing rainwater in a series of steel storage columns set in the landscape.

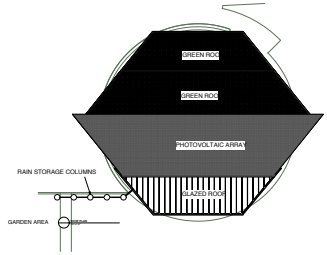
1.3 No Irrigation Landscaping: following soil analysis, indigenous landscape species are used for a portion of the permaculture landscape to avoid the requirement for irrigation systems.

1.4 Water Reclamation: an advanced tertiary sewage treatment system allows near potable, disinfected water to be reused for unrestricted, fertile irrigation of landscapes.

INVESTMENT PAYBACK:
By reducing the site demands for water we save the cost of water, the expansion of reservoirs and the tapping of aquifers for precious reserves. A water efficient landscape is also one that saves on maintenance thus cost.

LESSONS LEARNED:
Each type or grade of water has matching uses. Rainwater makes good water for landscaping when stored. In winter though it may work best to flush toilets and wash cars, people and clothing (after filtration). Reclaimed sewage works best to irrigate subsurface and to flush toilets.

EcoCafe will capture all the rain falling upon its roofs and filter it for year-round use, reducing the demands on the City potable water supply.



above: EcoCafe roof plan showing rain water collection/storage

2.0 INNOVATIVE WASTEWATER TECHNOLOGIES

Reduce the generation of wastewater and potable water demand, while increasing the local aquifer recharge.

2.1 Demand Side Management

2.2 Composting Toilets

2.3 Reuse Stormwater or Greywater for Flushing

2.4 Onsite Water Reclamation System

above: Solar Aquatics greenhouse

CASE STUDY: ECOCAFE

2.1 Demand Side Management: reduce water use and sewage production by using ultra low flush vacuum assisted toilets and water saving devices on sinks and showers. Urine will be collected separately for use as a fertilizer.

2.2 Composting Toilets: EcoCafe plans to reduce some of its water used in flushing by incorporating a composting toilet.

2.3 Reuse Stormwater or Greywater for Flushing: grey-water from upper showers will reduce the overall water use and the overall liquids becoming sewage.

2.4 Onsite Water Reclamation System: a Solar Aquatics System will treat raw sewage into clean water for reuse on the landscaping and gardens. A backup to the system for an anticipated occasional overuse will connect to the sewer.

Fresh water is the most precious resource on the planet. Water is a key resource to support plant life which is key to sequestering CO2 from the atmosphere.

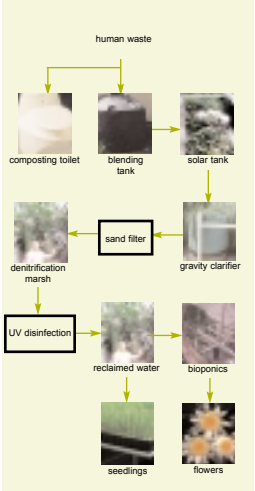
INVESTMENT PAYBACK:

Reducing our water demands saves on creating new supply reservoirs and sewage treatment as our region grows in population. These factors affect tax levels. If Sewage is a resource as in nutrients, then growing value-added plants in a greenhouse wastewater facility is one way to get value from sewage. Sewage to flowers!

LESSONS LEARNED:

Ecosystems have the unique ability to be self-designing according to the level and type of nutrients entering the system. Simplicity of fixed technologies and focus on a diverse ecosystem controlling itself will yield the best results.

WASTEWATER TECHNOLOGY FLOW CHART



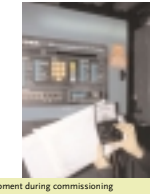
PREREQUISITES:

Prerequisites are base strategies that are required for LEED and do not receive credits at all.

1.0 Fundamental Building Systems Commissioning

2.0 Minimum Energy Performance

3.0 CFC Reduction in HVAC & R Equipment



above: calibration of equipment during commissioning

CASE STUDY: ECOCAFE

1.0 Fundamental Building Systems Commissioning: EcoCafe's tender process will include requirements for third party verification of design, installation, calibration of building elements and systems and performance and training as intended.

2.0 Minimum Energy Performance: establish a minimum level of energy efficiency and design building envelope and systems to maximize energy performance. EcoCafe will verify best systems and compare to baseline building with computer simulation.

3.0 CFC Reduction in HVAR & R Equipment: to reduce ozone depletion EcoCafe is specifying CFC free refrigerants.

INVESTMENT PAYBACK:

The basic premise is to get the best value and energy saving from a building's systems, they need to function optimally. Maximizing energy performance reduces operating costs, providing more funds for sustainable technology.

LESSONS LEARNED:

Research suggests that many green buildings do not function as intended because no one set them up to function optimally or monitors their performance.

above: green buildings: commissioned and operated properly

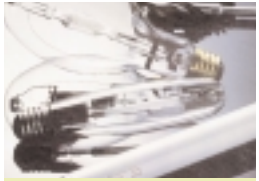
A typical North American building will spend approximately 10 times as much to heat and cool itself as cost to build the building in the first place.

1.0 OPTIMIZE ENERGY PERFORMANCE

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use. Less energy used, less greenhouse gases produced.

1.1 Reduce Design Energy Cost by 20-60%

1.2 Computer Simulation to Verify Energy Performance



above: energy efficient compact flourescents

CASE STUDY: ECOCAFE

1.1 Reduce Design Energy Cost by 20-60%: compared to the energy cost budget for regulated energy components such as HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE. EcoCafe plans to use vertical ground loop heat pumps, straw bale and superinsulated walls, solar assisted water heating, low watt lighting, etc.

1.2 Computer Simulation to Verify Energy Performance: EcoCafe will use a computer simulation model to assess the energy performance and identify the most cost effective energy efficiency measures. The computer model will also quantify energy performance as compared to a baseline building.

EcoCafe will computer model every system to assist the design process in creating synergies between systems.

INVESTMENT PAYBACK:
A reduction of all energy costs for a building by 60% would result in a 60% reduction in monthly energy bills that can be used to finance the extra energy features of the building. This in turn provides more comfort, higher occupant productivity and a highly marketable building space.

LESSONS LEARNED:
Easier to do it on paper. The computer simulation allows multiple factors to be analyzed in terms of their synergies. Demand side management in the form of better architectural solutions will reduce and eliminate energy consuming hardware.

ENERGY FLOW CHART

above: high performance glazings (Wall Centre, Vancouver)

2.0 RENEWABLE ENERGY

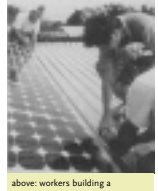
Encourage and recognize increasing levels of self-supply through renewable technologies to reduce the environmental impacts with fossil fuel energy use.

2.1 Renewable Energy Contribution: 5-20%

above: batch solar water heater (Taylor MunroEnergy Systems)

CASE STUDY: ECOCAFE

2.1 Renewable Energy Contribution: 5-20%: EcoCafe initial target was to be a zero energy building with 100% of its electricity supplied by a grid-connected building integrated photovoltaics (BIPV) array. EcoCafe has assessed the site for solar, wind, geothermal, biomass, hydro and bio-gas strategies. Only solar hot water, verticle ground loop geothermal and solar BIPV seem viable. A large, grid connected BIPV will be installed as the roof of EcoCafe.

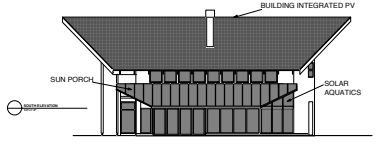


above: workers building a photovoltaic array

EcoCafe will supply a high percentage of its water heating and electrical needs from the sun.

INVESTMENT PAYBACK:
As BIPV becomes cheaper due to mass production and new techniques, buildings like EcoCafe will be able to financially justify the BIPV approach. The PV array in this arrangement becomes the roof and thus saves costs of additional roofing.

LESSONS LEARNED:
Current technology requires so much more roof than would typically be available. Efficiencies of photocells and reducing demands on electrical equipment is what is required to make the full transition.



above: EcoCafe roof plan for a grid-connected PV array

3.0 ADDITIONAL COMMISSIONING

Verify and ensure that the entire building is designed constructed and calibrated to operate as intended.

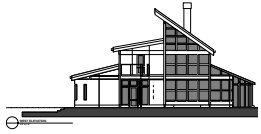
3.1 Focused Review of Design Development

3.2 Focused Review of 90% Construction Documents

3.3 Selective Review of Commissioned Equipment

3.4 Recommissioning Management Manual

3.5 Contract for Post Occupancy Review



above: analyzing the effects on a facade of a west exposure

CASE STUDY: ECOCAFE

3.1 Focused Review of Design Development: will catch erroneous energy management concepts before construction drawing phase.

3.2 Focused Review of 90% Construction Documents: just prior to completion will allow for adjustments.

3.3 Selective Review of Commissioned Equipment:

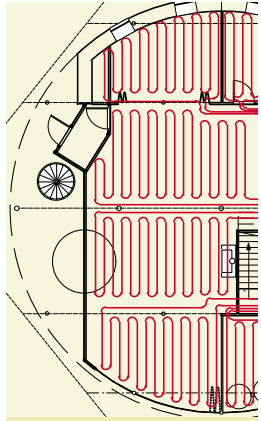
3.4 Recommissioning Management Manual: this manual will be used to recommission the building as the systems begin losing efficiency

3.5 Contract for Post Occupancy Review: allows the commissioning agent to review the project at the near-warranty end so that changes can be implemented as required.

EcoCafe seeks consensus from many specialist advisors at critical stages of the project design development

INVESTMENT PAYBACK:
A focussed review of the design stages will ensure the desired integration of human operations, architectural fixtures and mechanical systems for optimal energy performance. From this comes savings as they were intended.

LESSONS LEARNED:
Good buildings come from good theory put to the test. This testing of concepts and finally, of equipment has to occur all along the design/ build process to ensure that good practice is followed throughout.



above: Infloor heat pipe layout - heats the building.

4.0 ELIMINATION OF HCFCs & HALONS

Reduce ozone depletion and support early compliance with the Montreal Protocol

4.1 No HCFCs or Halons

above: standard non-halon fire extinguishers

CASE STUDY: ECOCAFE

4.1 No HCFCs or Halons: EcoCafe will specify refrigeration, heat pump and fire suppression systems that use no HCFCs or halons.

INVESTMENT PAYBACK:
With HCFCs and Halons gone from all refrigeration and fire protection systems the ozone layer will have one less chemical affect it, thus slowing the progress of global warming and the degradation of soils, plant immune systems, and climate changes that affect all species.

LESSONS LEARNED:
There are new refrigerants that easily replace HCFC's to perform just as well.

above: non-HCFC heat pump

EcoCafe will eliminate its use of ozone depleting substances.

5.0 MEASUREMENT & VERIFICATION

Provide measurement equipment for the ongoing accountability and optimization of building energy and water consumption performance over time.

5.1 Computer Model Energy & Water Systems

5.2 Equipment to Measure Energy and Water Use

5.3 Measurement and Verification Plan

above: inline water meters

CASE STUDY: ECOCAFE

5.1 Computer Model Energy & Water Systems: this is run to predict savings prior to construction and during design.

5.2 Equipment to Measure Energy and Water Use: This equipment will assist the long term evaluation of various systems as data sets become available. Examples of possible systems for Ecocafe are the following lighting systems & controls; constant & variable motor loads; air and water economizer and heat recovery cycles; air distribution static pressures and ventilation air volumes; boiler or heat pump efficiencies; building specific process energy efficiency systems and equipment; and indoor water risers and outdoor irrigation.

5.3 Measurement and Verification Plan: will apply to the building during full operation and will compare predicted savings to those actually achieved in the field.

above: ongoing computer monitoring for long term evaluation

INVESTMENT PAYBACK:
The main investment is in a building system's monitoring computer and sensors and meters. The payback comes from the longterm ability to optimize a system given ongoing, up to date and comprehensive information.

LESSONS LEARNED:
Even small changes to operating procedures or equipment calibration can add up, when spread across many years. Numbers are great to quantify the differences between systems and thus give us one more decision making tool.

The fusion of cybernetics, ecologically engineered systems and buildings will produce a responsive and ever-evolving knowledge base for reducing energy use.

PREREQUISITE: COLLECTION OF RECYCLABLES

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

1.1 Area for Recyclables

1.2 Identify Waste Handlers for Recyclables

1.3 Recycling Training for Occupants

1.4 Rethink, Reduce-Plan for Less Material

above: a blue box

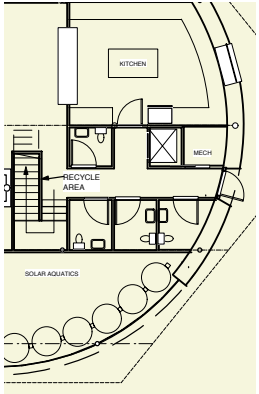
CASE STUDY: ECOCAFE

1.1 Area for Recyclables: EcoCafe will provide a designated area for recyclable collection and storage that is appropriately sized and conveniently located

1.2 Identify Waste Handlers for Recyclables: Ecocafe will contribute or sell all of its recyclables to prearranged receivers.

1.3 Recycling Training for Occupants: all staff and volunteers will be trained in the intricacies of recycling and more importantly to recognize opportunities to reduce.

1.4 Rethink, Reduce-Plan for Less Material: EcoCafe will reduce its recyclable requirements by employing the following: reusable food vessels, shipping containers and boxes; bulk supplies purchases in biodegradable containers, etc.



above: EcocAfe's plan of designated, permanent recycling area

INVESTMENT PAYBACK:
Recycling materials helps reduce landfill dumping costs and cycles materials back into products that we continue to use. Many materials can actually be returned for a small deposit. Long term vision is to reduce disposable materials to a minimum or to materials that can be reused or composted directly.

LESSONS LEARNED:
A combination of bulk purchases, reusable containers and recyclables presents the best scenario for onsite recycling. Paperless office communications and online news may also reduce solid wastes needing to be recycled.

EcoCafe will recycle 100% of the materials flowing into the facility.

1.0 BUILDING REUSE

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

1.1 Reuse Building Structure & Shell

above: roof portion of gazebo

CASE STUDY: ECOCAFE

1.1 Reuse Building Structure & Shell: EcoCafe reuses the existing steel frame on the site or integrates the materials into the new building's structural system. The wire glass roof panels will be recycled into railing elements, fire stair glass, etc.

INVESTMENT PAYBACK:
Usually, older, out of use buildings have little or no value on land. Heritage or sound constructed buildings always have value if the design program can be made to work within the confines of the building. This will save costs when integrated creatively.

LESSONS LEARNED:
Any structure can be utilized, as a whole or in parts to create a new building and use. Designers should always start with that assumption as many buildings have a degree of flexibility in their use and a history of responsiveness to their context.

above: EcoCafe site with steel gazebo structure

EcoCafe will attempt to renovate incorporating existing structural elements of the onsite building

2.0 CONSTRUCTION WASTE MANAGEMENT

Divert construction, demolition and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

2.1 Construction Waste Management Plan

2.2 Recycle or Salvage 50-75%(by weight) of Waste

2.3 Designated Recycling Area

2.4 Identify Recyclers

above: sorted materials preserve quality and access for use

CASE STUDY: ECOCAFE

2.1 Construction Waste Management Plan: EcoCafe will establish a goal to recycle or salvage 100% of the construction waste which will require planning

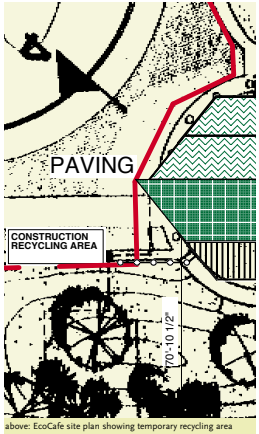
2.2 Recycle or Salvage 50-75%(by weight) of Waste: EcoCafe's goal of 100% recycle or salvage will include, recycling, salvage and sell or return unused materials to supplier.

2.3 Designated Recycling Area: EcoCafe will be designated a recycling area on the construction site and will track the recycling process.

2.4 Identify Recyclers: EcoCafe will establish contact with specific recyclers and salvagers to ensure the smooth transition of materials back into the materials streams of the region.

INVESTMENT PAYBACK:
This aspect places value in the materials and costs to eliminate. Onsite sorting can yield saving to landfill, materials can be sold and materials can be returned to sellers if kept in good condition, all saving money and space in the landfill.

LESSONS LEARNED:
A clean, well ordered site with all materials in their place reduces confusion, tends to fully use the materials at hand including the so-called waste pieces as there are always uses for smaller pieces if they remain accessible to the subtrades.



above: EcoCafe site plan showing temporary recycling area

EcoCafe will sort, store and recycle its construction wastes to minimize the impacts of landfilled, lost materials that took energy, pollution and habitat loss to create.

3.0 RESOURCE REUSE

Extend the lifecycle of targeted building materials by reducing environmental impacts related to materials manufacturing and transport

3.1 Specify Salvaged/Refurbished Materials 5-10%

3.2 Research Local & Bioregional Sources

above: reusable wood timbers salvaged from demolition site

CASE STUDY: ECOCAFE

3.1 Specify Salvaged/Refurbished Materials 5-10%: EcoCafe will consider the use of salvaged or refurbished beams, posts, framing lumber, steel decking, paneling, doors and frames, metal roofing, resealed glass, cabinetry and furniture, brick, pavers, decorative items.

3.2 Research Local & Bioregional Sources: finding local sources reduces transportation costs and the pollution related to distance purchases.

INVESTMENT PAYBACK:
High quality, recycled building materials can be purchased at considerable bargains and reduce the overall cost of a building. Getting another use from a processed material reduces the energy and pollution to make new components thus protecting the environment

LESSONS LEARNED:
Recycled building materials require a level of cleanup and refurbishing and for structural elements, need re-certification. This is not too onerous for professionals familiar with these materials and what to look for in the material.

above: reused materials ready to disassemble in future

The Ecocafe's target is to build the facility out of 50% recycled building materials, components and equipment.

4.0 RECYCLED CONTENT

Increase demand for building products that have incorporated recycled material content materials, therefore reducing the impacts resulting from the extraction of new materials.

4.1 Post-consumer Recycled Content Material 25-50%

4.2 Identify Materials and Suppliers

4.3 Measure Materials Content in Building

above: cellulose fiber insulation from newpapers

CASE STUDY: ECOCAFE

4.1 Post-consumer Recycled Content Material 25-50% of materials of 20% post consumer recycled content in aggregate or a minimum weighted average of 40% post-industrial recycled content material

4.2 Identify Materials and Suppliers: EcoCafe will source local and bioregional green products and ensure they can reach the defined targets

4.3 Measure Materials Content in Building: a meticulous accounting of the materials used in the construction will be documented to calculate the overall percentage and thus the impact of these policies.

INVESTMENT PAYBACK:
Recycled materials require less energy to extract from the ecosystem. Their availability to be easily transformed into building materials makes them valuable to a region and to local builders. This eco-industrial approach sees wastes as resources for value creation.

LESSONS LEARNED:
All wastes are nothing more than misplaced resources. The advantage to using waste as part of the making of new building products is their relatively low cost and consistency of form and quantity.

above: siding made from waste wood fiber & cement

EcoCafe will select materials with high recycled material content to reduce the impacts on ecosystems for virgin materials.

5.0 LOCAL/REGIONAL MATERIALS

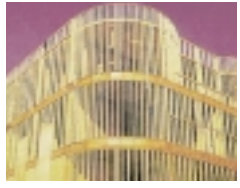
Increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.

5.1 Specify 20% Materials- 800 km Radius

5.2 Specify 50%of 20% Extracted, Harvested or Recovered - 800 km Radius

5.3 Measure 5 of Local Materials

5.4 Identify Local Suppliers



CASE STUDY: ECOCAFE

5.1 Specify 20% Materials-800 km Radius: EcoCafe will specify 50% of its materials to be sourced locally.

5.2 Specify 50%of 20% Extracted, Harvested or Recovered -800 km Radius: EcoCafe will support 75% of its local materials being extracted locally.

5.3 Measure 5 of Local Materials: EcoCafe will measure the % of materials installed from local sources.

5.4 Identify Local Suppliers: EcoCafe will develop a suppliers database that has a number of criteria surrounding materials choices including, ethics of companies, environmental policies, and contribution to community.

above: certified wood timber structure

EcoCafe's first priority is to assist the economic development of local community enterprise through a source local criteria.

INVESTMENT PAYBACK:
Local materials cost less (fuel, pollution, trucks, road infrastructure) to transport and thus may cost less. Harvesting local materials also taps the creativity of the designers to use what is at hand. They also put cash back into the local economy and create local self-reliance regarding building materials for shelter as a basic need

LESSONS LEARNED:
Local materials allow a relationship where service is more available and responsibility to the community and the local environment is more expected.

6.0 RAPIDLY RENEWABLE MATERIALS

Reduce the use and depletion of finite raw, and long-cycle renewable materials by replacing them with rapidly renewable materials.

6.1 Specify Rapidly Renewable Materials 5%

6.2 Review Installation and % Installed

left: flooring made from fast growing bamboo

CASE STUDY: ECOCAFE

6.1 Specify Rapidly Renewable Materials 5%: EcoCafe will consider using 5% of such products as bamboo flooring, wool carpet, strawboard, cotton batt insulation, linoleum flooring, poplar OSB, sunflower seed board, wheatgrass cabinetry,

6.2 Review Installation and % Installed: EcoCafe will ensure that materials are installed properly a nd accounted for in order to establish the %

above: walls made of straw (grown yearly)

INVESTMENT PAYBACK:
High quality, rapidly renewable products like straw (yearly) and bamboo (3-4 years) have the advantage over longer term products such as trees in that their access and timeframe to harvest is very short and leaves options for land use over time. Straw is also a waste product of wheat, rice and other grain production and thus has a low cost to consumers.

LESSONS LEARNED:
These products can perform very well against more traditional and refined materials. The sense in growing a tree for 30-40 years only to cut it up into thin pieces to place on floor needs to be questioned in light of achieving a result by appropriate selection of a material's quality regardless of how long it took to grow.

Rapidly renewable materials such as straw, bamboo, hemp, and alder provide alternatives to materials requiring longer growing sequences or more complex extraction methods

7.0 CERTIFIED WOOD

Encourage environmentally responsible forest practices.

7.1 Specify 50% Certified Wood

7.2 Review Installation and % Installed

above: eco-certified wood

CASE STUDY: ECOCAFE

7.1 Specify 50% Certified Wood: EcoCafe will specify wood certified by the Forest Stewardship Council. The wood products include: framing lumber; flooring; finishes; furnishings; and temporary bracing, forming, and barriers.

7.2 Review Installation and % Installed: to ensure the material is installed and calculate the % installed.

INVESTMENT PAYBACK:
Installing certified wood products into green buildings has an economic benefit to local communities who plan to manage their resource sustainably. The extra cost for certified wood shows an organization's support for sustainable forestry and forest dependent communities.

LESSONS LEARNED:
Generally, the products are the same. The difference is the contribution one makes to the future of our children and the world they inherit.

EcoCafe will work with design professionals, wood suppliers and foresters to reinforce the need to support sustainable forestry practices.

above: certified wood timber structure

PREREQUISITE:

Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

1.1 Ventilation for Acceptable Indoor Air Quality

1.2 Identify Site Related IAQ Problems

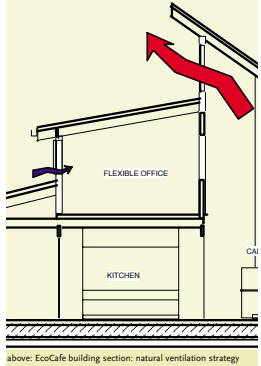
CASE STUDY: ECOCAFE

1.1 Ventilation for Acceptable Indoor Air Quality: EcoCafe will meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999

1.2 Identify Site Related IAQ Problems: EcoCafe will locate air intakes away from contaminant sources. Ventilation will be achieved in summer via perimeter window vents and rooftop operable clerestory system where louvers are controlled based on temperature. Plantings in and around the facility will filter air from the surrounding city.

INVESTMENT PAYBACK:
The payback of high indoor air quality (IAQ) is in the health of the building occupants which shows up in lower absenteeism, higher productivity, lower staff turnover and general feelings of satisfaction.

LESSONS LEARNED:
If being indoors could be as comfortable as the freshness of being out in nature this would be the perfect working and living environment. Low constriction air filters is a research opportunity for naturally ventilated urban buildings.



above: EcoCafe building section: natural ventilation strategy

EcoCafe will ensure a high level of IAQ especially in winter when buildings are usually closed up.

1.0 CARBON DIOXIDE MONITORING

Provide capacity for indoor air quality *(IAQ) monitoring to sustain long-term occupant health and comfort.

1.1 Permanent Carbon Dioxide Monitoring

1.2 Adjustable Ventilation Rates

above: monitor to background levels of CO_2 from people

CASE STUDY: ECOCAFE

1.1 Permanent Carbon Dioxide Monitoring: EcoCafe will monitor the CO_2 levels due to numbers of people.

1.2 Adjustable Ventilation Rates: the EcoCafe building will ensure a healthy ventilation rate whether summer (natural) or winter (mechanical) through its link to the CO_2 sensor.

INVESTMENT PAYBACK:
The principle is simple: a few people, a little CO_2, a little ventilation. A lot of people, more CO_2, more ventilation. An adjustable ventilation system will allow variable energy use based on ventilation requirements.

LESSONS LEARNED:
If CO_2 levels are monitored in order to regulate the ventilation rate, then another way to look at the issue is to absorb CO_2 and other gases. Plants have that capacity.

EcoCafe will create a balance of indoor plants to occupants to absorb co2 and other gases

above: people and plants create a co2 balance (plants absorb, people breath out)

2.0 INCREASE VENTILATION EFFECTIVENESS

Provide for the effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.

2.1 Effective Air Changes to ASHRAE 129-1997

2.2 Naturally Ventilated Air Changes

2.3 Plant Biofiltration to Reduce Air Changes

2.4 Post Construction Air Change Testing

above: heat recovery ventilator

CASE STUDY: ECOCAFE

2.1 Effective Air Changes to ASHRAE 129-1997: air change effectiveness will be greater than or equal to 0.9 as determined by ASHRAE 129-1997 for mechanically ventilated systems. Air changes in winter will be achieved with heat recovery ventilation and/or by passive continuous air changes

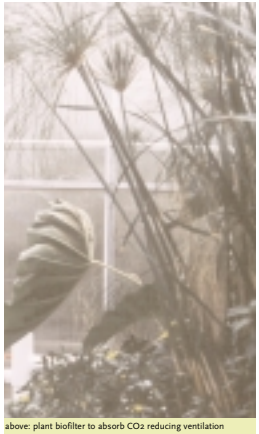
2.2 Naturally Ventilated Air Changes: EcoCafe will have operable windows, adjustable window vent ports and an adjustable roof cupola to facilitate natural air changes.

2.3 Plant Biofiltration to Reduce Air Changes: air changes are required to keep air fresh and remove humidity. Plants integrated into the building system will absorb CO_2 and other gases and dehumidification can be achieved by condensation in proximity to vapour sources.

2.4 Post Construction Air Change Testing: EcoCafe will test the building for air change effectiveness.

INVESTMENT PAYBACK:
Air changes in winter can waste heat by dumping previously heated air. By filtering air with indoor plants, recovering heat with heat recovery ventilators and allowing passive, controlled infiltration of fresh air one can reduce heat loss and costs.

LESSONS LEARNED:
Plants absorb CO_2 and give off oxygen in the daytime, thus making the air quality higher within a closed system.



above: plant biofilter to absorb CO_2 reducing ventilation

EcoCafe will provide for effective air quality through a combination of bio filtration of air and heat recovery ventilation

3.0 CONSTRUCTION IAQ MANAGEMENT PLAN

Prevent indoor air quality problems resulting from construction/renovation process, to sustain long-term installer and occupant health and comfort.

3.1 Protect HVAC Systems from Contamination

3.2 Avoid Contaminating Absorptive Materials

3.3 Post-construction Building Flush-out

3.4 Test Contaminant Levels Preoccupancy

CASE STUDY: ECOCAFE

3.1 Protect HVAC Systems from Contamination: EcoCafe will protect its HVAC equipment from contamination by exceeding the requirements of the Sheet Metal & Air Conditioning National Contractors Association Guideline for Occupied Buildings Under Construction, 1995.

3.2 Avoid Contaminating Absorptive Materials: Sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum board. EcoCafe will look to minimize absorptive materials to reduce long term risks of contaminants such as molds and fungus establishing in these materials.

3.3 Post-construction Building Flush-out: EcoCafe will conduct a 2-week flush of the buildings air systems at 100% outside filtered air. All filters will be replaced after the flush-out.

3.4 Test Contaminant Levels Preoccupancy: The Ecocafe will test for contaminants just prior to occupancy.

INVESTMENT PAYBACK:
Prevention at this stage of construction can reduce risk of materials replacement or liability later in occupancy stages.

LESSONS LEARNED:
Construction is a "dirty business" and contaminants are present at every step of the way. It's about being careful and having a way to do it right.

EcoCafe will protect the construction by introducing subcontractors to a "clean" installation procedures to avoid damages to materials or to the quality of the project.

4.0 LOW-EMITTING MATERIALS

Reduce the quantity of indoor contaminants (VOCs) that are odorous or potentially irritating to provide installer and occupant health and comfort.

4.1 Specify Low VOC Adhesives & Sealants

4.2 Specify Low VOC Paints and Coatings

4.3 Specify Low Toxicity Carpets

4.4 Specify 0% Urea-formaldehyde Resins in Materials

above: Low VOC paints and coatings

CASE STUDY: ECOCAFE

4.1 Low VOC Adhesives & Sealants: EcoCafe will attempt to avoid adhesives and sealants and focus on mechanical attachments with gaskets.

4.2 Low VOC Paints and Coatings: EcoCafe will exceed the standards for VOC and chemical components of the Green Seal requirements. EcoCafe will also seek to limit the use of paints and coatings in favour of natural finishes and oils.

4.3 Low Toxicity Carpets: EcoCafe will use natural fiber underlays and carpets such as wool, jute, sisal, etc. Ecocafe will seek to limit the use of carpets as they are still good places for dust to collect and molds to grow.

4.4 Zero Urea-formaldehyde Resins in Materials: EcoCafe will seek only materials using natural resins and binders

above: safe finishes

INVESTMENT PAYBACK:
Low toxicity materials reduces ventilation requirements and leads to higher levels of occupant health and all the benefits that comes with that aspect.

LESSONS LEARNED:
Non-toxic materials are winning the battle over their toxic cousins. All designers need to take the precaution of protecting their client's health or risk future, legal action.

EcoCafe acknowledges the role of toxic building materials in human and environmental health and will use only the purest of products in the construction and operation.

5.0 CONTROLLABILITY OF SYSTEMS

Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity and comfort conditions.

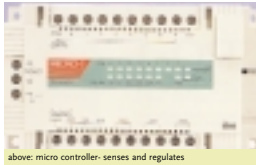
5.1 Operable Windows & Lighting Controls

5.2 Individual Control-Airflow, Temperature & Lighting

CASE STUDY: ECOCAFE

5.1 Operable Windows & Lighting Controls: EcoCafe will provide one operable window and one lighting control zone per 200 s.f. for all areas within 15 feet of the perimeter wall.

5.2 Individual Control-Airflow, Temperature and Lighting: EcoCafe will provide controls for each individual for airflow, temperature and lighting for 50% of the non-perimeter, regularly occupied areas. Strategies will be task lighting, operable windows, underfloor HVAC with individual diffusers.



above: micro controller- senses and regulates indoor climate of building

INVESTMENT PAYBACK:
The payback is in occupant satisfaction, productivity and less absenteeism.

LESSONS LEARNED:
The more a building can respond to occupants' unique comfort requirements while maintaining its performance targets, the better the design and training has to be.

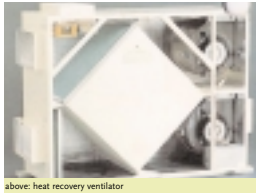
EcoCafe will support unique people to control the daylight, temperature, ventilation and artificial light that affects their work.

6.0 THERMAL COMFORT

Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

6.1 Humidity Control

6.2 Monitoring System-Temperature & Humidity



above: heat recovery ventilator

CASE STUDY: ECOCAFE

6.1 Humidity Control: Ecocafe will comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control per climate zone. The building envelop will focus on neutralizing radiant surfaces to effect lower air temperature without compromising comfort. HVAC systems will also focus some attention on radiant comfort. Winter-overhead hot water radiant heat. Summer-overhead cold water radiant heat absorption.

6.2 Monitoring System-Temperature & Humidity: EcoCafe will install a permanent temperature and humidity monitoring system to allow control over these factors to ensure effective occupant health.

above: EcoCafe radiant floor system

INVESTMENT PAYBACK:
By controlling humidity one can control the growth of material decaying fungus and promote human health. Radiant heat puts comfort into the building without high air temperatures that result in hot air stratifying at the ceiling and higher heat losses.

LESSONS LEARNED:
Human comfort is relative to a number of factors with the temperatures of surfaces around us being a primary factor.

EcoCafe will provide occupant comfort by neutralizing the surfaces to which human bodies radiate and by condensing excess moisture with a heat recovery ventilator..

7.0 DAYLIGHTING AND VIEWS

Provide a connection between indoor spaces and outdoor environments through the introduction of sunlight and views into the occupied areas of the building.

7.1 Design for Maximum Daylighting

72 Design for Maximum Views

7.3 Model the Daylighting Strategies (computer)

above: board room daylight well

CASE STUDY: ECOCAFE

7.1 Design for Maximum Daylighting: EcoCafe will be designed with SE, S and SW building orientation, shallow floor plates, increased building perimeter, exterior & interior shading devices, light shelves, light pipes, high performance glazing, and photo-integrated sensors for balancing available daylight with artificial.

72 Design for Maximum Views: Ecocafe will maintain a direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including low occupancy support areas.

7.3 Model the Daylighting Strategies: EcoCafe will model its daylighting strategies with both physical models and with computer simulators to assess footcandle levels and daylight factors achieved by the design.

EcoCafe's open plan, clerestory windows, south greenhouse and City views seek to enhance the occupants' experience of health

INVESTMENT PAYBACK:
Daylighting not only saves energy daily, providing general lighting is improves the health and satisfaction of building occupants both of which equals savings.

LESSONS LEARNED:
Daylight is best bounced onto overhead surfaces or reflected off walls.

above: EcoCafe section & plan indicating daylighting

1.0 INNOVATION IN DESIGN

To provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovation performance in Green Building categories not specifically addressed by LEED.

1.1 Education of Occupants

1.2 Community Development

1.3 Lifecycle Analysis of Material Choices

1.4 Build System as Ecosystem

above: example-Boyne River Ecology Centre

CASE STUDY: ECOCAFE

1.1 Education of Occupants: EcoCafe has been designed as a "catalyst for ecological awareness". The cafe and offices are designed specifically to enable healthy debate and measured experimentation with all things "green".

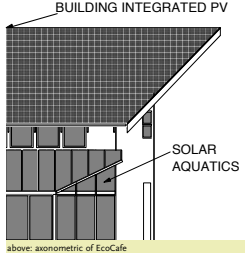
1.2 Community Development: EcoCafe will be educating occupants and users about green buildings. EcoCafe has developed the theme of "transparency" in order to facilitate being a model of sustainable community.

1.3 Lifecycle Analysis of Material Choices: EcoCafe will assess every material used in its construction with a comprehensive protocol of environmental, social and economic criteria.

1.4 Building System as Ecosystem: integrated systems will be what EcoCafe will explore. Connecting flows of water, energy, air, nutrients, biodiversity to achieve higher efficiency, stabler systems.

INVESTMENT PAYBACK:
A building as an educator has big payoffs if it seeks inspire others to stretch further with each iteration.

LESSONS LEARNED:
Cutting edge buildings must inherently evolve toward improved excellence or become a static moment in time.



above: axonometric of EcoCafe

EcoCafe will be a model of sustainable community to inspire others to push the envelop of buildings & landscapes as urban ecosystems.

Summary of LEED Scorecard

The following table lists every LEED principle and shows how the EcoCafe building rates. The higher the number of points, the greener the building.

KEY	
	■ one LEED point (principle satisfied)
	□ no point

Sustainable Sites

- ■ Erosion and Sedimentation Control
- ■ Site Selection
- □ Urban Redevelopment
- □ Brownfield Redevelopment
- ■ Alternative Transportation—Public Transportation Access
- ■ Alternative Transportation—Bicycle Storage and Change Rooms
- □ Alternative Transportation—Alternative Fuel Refueling Stations
- ■ Alternative Transportation—Parking Capacity
- ■ Reduced Site Disturbance—Protect/Restore Open Space
- ■ Reduced Site Disturbance—Development Footprint
- ■ Stormwater Management—Rate and Quantity
- ■ Landscape/Exterior to Reduce Heat Islands—Non-Roof
- ■ Landscape/Exterior to Reduce Heat Islands—Roof
- ■ Light Pollution Reduction

Water Efficiency

- ■ Water Efficient Landscaping—Reduce by 50%
- ■ Water Efficient Landscaping—No Potable Use/ No Irrigation
- ■ Innovative Wastewater Technologies
- ■ Water Use Reduction—20% Reduction
- ■ Water Use Reduction—30% Reduction

Energy and Atmosphere

- ■ Fundamental Building Systems Commissioning
- ■ Minimum Energy Performance
- ■ CFC Reduction in HVAC&R Equipment
- ■ Optimize Energy Performance —20% New/10% Existing
- ■ Optimize Energy Performance —30% New / 20% Existing
- ■ Optimize Energy Performance —40% New / 30% Existing
- ■ Optimize Energy Performance —50% New / 40% Existing
- □ Optimize Energy Performance —60% New / 50% Existing
- ■ Renewable Energy—5%
- ■ Renewable Energy—10%
- ■ Renewable Energy—20%
- ■ Additional Commissioning
- ■ Ozone Depletion
- ■ Measurement & Verification
- □ Green Power

Materials and Resources

- ■ Storage and Collection of Recyclables
- ■ Building Reuse—Maintain 75% of Existing Shell
- □ Building Reuse—Maintain 100% of Existing Shell
- □ Building Reuse—Maintain 100% of Shell and 50% Non-Shell
- ■ Construction Waste Management—Divert 50%
- ■ Construction Waste Management—Divert 75%
- ■ Resource Reuse—Specify 5%
- ■ Resource Reuse—Specify 10%
- ■ Recycled Content—Specify 25%
- ■ Recycled Content—Specify 50%
- ■ Local/Regional Materials—20% manufactured locally
- ■ Local/Regional Materials—of 20% above, 50% harvested locally
- ■ Rapidly Renewable Materials
- ■ Certified Wood

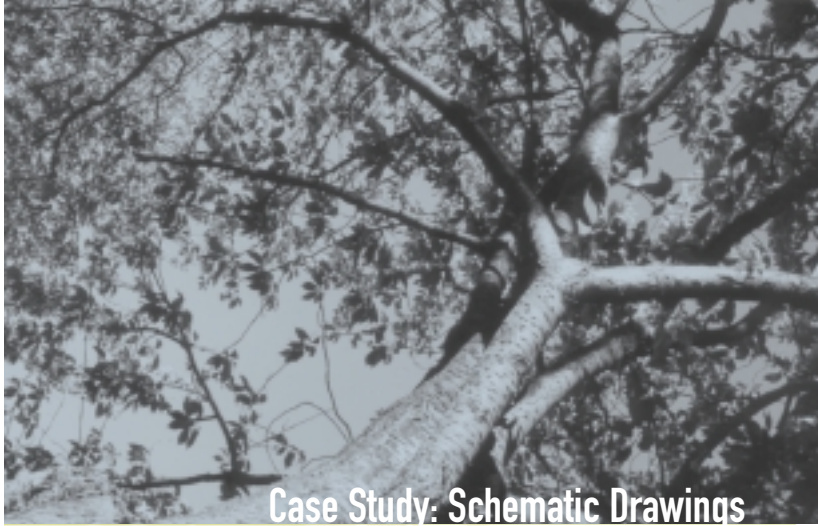
Indoor Environmental Quality

- ■ Minimum IAQ Performance
- ■ Environmental Tobacco Smoke (EST) Control
- ■ Carbon Dioxide (CO_2) Monitoring
- ■ Increase Ventilation Effectiveness
- ■ Construction IAQ Management Plan —During Construction
- ■ Construction IAQ Management Plan—Before Occupancy
- ■ Low-Emitting Materials—Adhesives & Sealants
- ■ Low-Emitting Materials—Paints
- ■ Low-Emitting Materials—Carpets
- ■ Low-Emitting Materials—Composite Wood
- ■ Indoor Chemical & Pollutant Source Control
- ■ Controllability of Systems—Perimeter
- ■ Controllability of Systems—Non-Perimeter
- ■ Thermal Comfort—Comply with ASHRAE 55-1992
- ■ Thermal Comfort—Permanent Monitoring System
- ■ Daylight and Views—Daylight 75% of spaces
- ■ Daylight and Views—Views for 90% of spaces

Innovation and Design Process

- ■ Innovation in Design—Education of Occupants
- ■ Innovation in Design—Community Development
- ■ Innovation in Design—Lifecycle Analysis of Material Choices
- ■ Innovation in Design—Build System as EcoSystem

63 TOTAL POINTS



Case Study: Schematic Drawings

elevations (north, south, east, west)

main and upper level floorplans

EcoCafe Building
Schematic Drawings

The EcoCafe responds to the four directions in unique ways. Each elevation responds to the contextual forces of access, view, solar orientation and wind direction.

The East elevation faces parking lots, traffic, typical urban fast food outlets and sunrise. Thus the elevation has daylighting (windows) to staff lockers, upper level offices, kitchen and early morning greenhouse warmup from the sun.

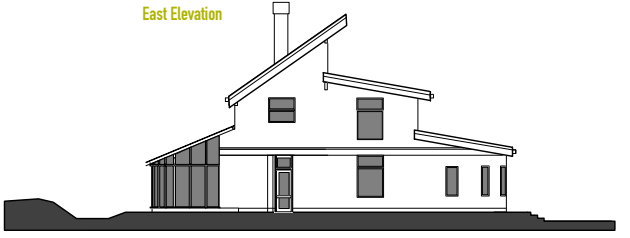
A delivery and secondary egress entrance is also located on the east to access the vehicle delivery area in the parking lot.

The West elevation is open visually to take in the big City and harbour views and to present the EcoCafe to the public.

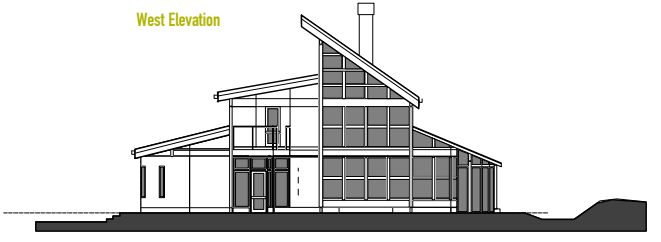
The North elevation roof gathers wind for natural cooling and clerestory glass, north light for office work. The South elevation is the source of solar power both electrically (photo-voltaic cells) and for heat (water and space heat). A main floor greenhouse supports the lungs (oxygen from plants) and kidneys (solar aquatics) of the EcoCafe.

Each elevation responds to the contextual forces of **access, view,** solar orientation and **wind direction.**

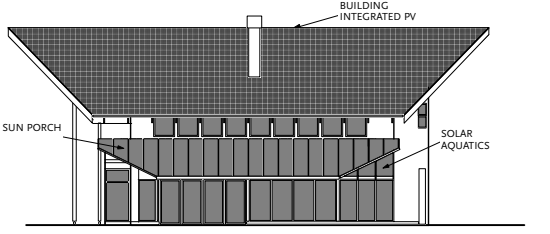
East Elevation



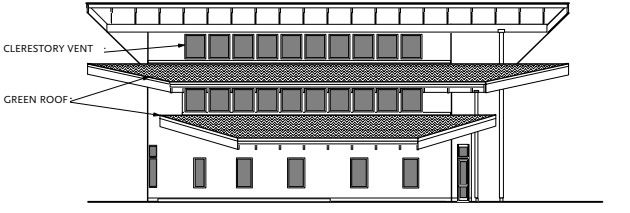
West Elevation



South Elevation



North Elevation



The building, in plan, responds to both occupants' program and the context. The dual purpose of café business and educational facility required flexibility for main floor uses to serve the educational functions along with the café functions. Thus the open café, board room, closable dining area function to allow small to large educational gatherings.

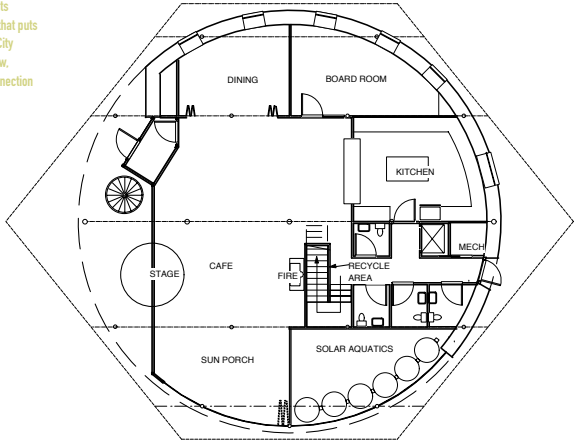
The sustainable technologies are all there on the main floor: Solar Aquatics; advanced wall systems; heat pumps; infloor heat pipes; bioponics; natural ventilation and daylighting.

The main floor responds to the context by the following zoning of uses:

- glazing and entrance to the West responding to the Seawall pedestrians
- solar greenhouse along the south side to maximize solar exposure
- service functions, washrooms, mechanical space and kitchen areas were loaded to the East side where parking lots and roadways are located.
- north side features more intimate spaces for board rooms and dining on the cooler, balanced side of the building.

Main Floor

The plan presents internal zoning that puts nature and the City in the prime view, seeking the connection between them.

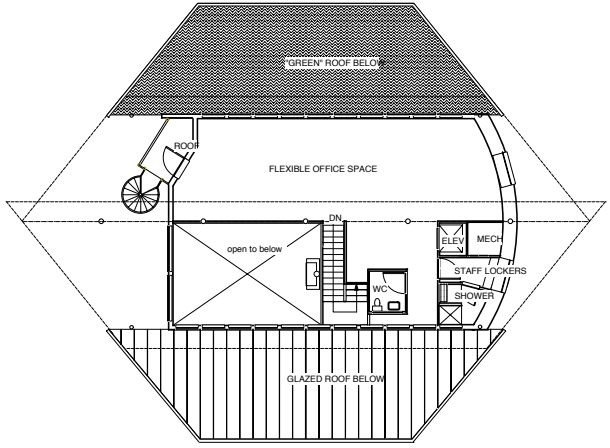


The upper floor plan by nature is more intimate and private being a workspace for the Society and other organizations. The open plan reinforces collaboration as the primary operational mode. Again, flexible spaces allow for buildings to remain sustainable for their life. Showers and locker room refresh the staff who ride, walk or run to work.

The high roof clerestory windows bring in daylight and open automatically to vent heat in summer. A "green" north roof absorbs solar energy by photosynthesis, evapotranspirates and purifies water, adds oxygen to the air and extends the life of the roofing membrane.

The best sustainable buildings are ones that are simply "flexible" i.e. able to have their uses change over time and remain functional

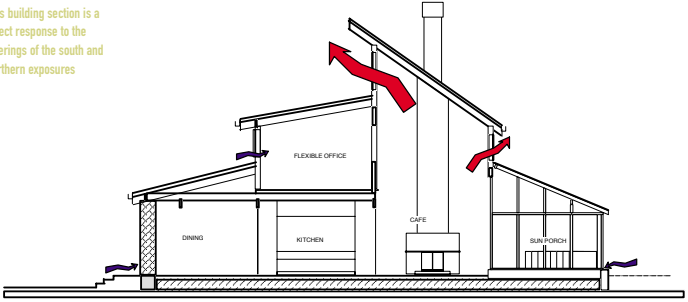
Top Floor



This building section reveals the vertical functioning of the facility. The high, interconnected floor plates allow daylight to penetrate from both sides and natural ventilation to be used to flush the building. The low pitch north side roofs hold lightweight soil for the green roof whereas the south facing, building integrated photovoltaic array is the highest, steepest roof to maximize the solar exposure.

The main floor, southside solar greenhouse has a medium pitch to gather diffuse fall, winter and spring solar radiation from the cloudy Pacific Northwest climate.

This building section is a direct response to the offerings of the south and northern exposures



Performance Measures and Chronicles

Ways of reporting our performance

Performance Measures Chart

EcoCafe Chronicles of Events and Activities

Chronicles summary chart

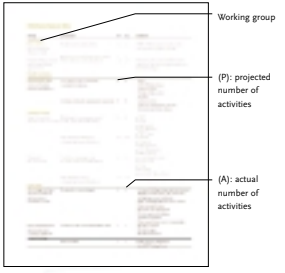
Ways of Reporting
Our Performance

We review our progress in two ways:

1 Performance measures table
2 Chronicles of programs and events

Performance measures table
The EcoCafe is organized in four working groups (organizational, resource development, community programs and design build) that attend to the vision of the whole organization. Each working group has a different set of functions and projects based on those functions. The performance of these working groups demonstrates how all aspects of an organization can affect climate change.

Our performance measures table is organized under the headings of our four working groups. A description of the activity is listed, then the number of Projected activities planned (P), as well as the number of Actual activities delivered (A).



Chronicles of programs and events
In addition to these performance measures, EcoCafe has assembled Chronicles of important programs and events to assist the learning process and help better refine future programs.

above: Integrated Design Team and EcoCafe Council Members at a building design meeting

Performance measures table

activity	performance	#P	#A	comments
ORGANIZATIONAL				
Green building planning methods design principles	People trained in sustainability	10	10	HRDC & E-team program participants and volunteers involved in process
	Greening community organization created	1	1	EcoCafe design/build working group was formed
Integrated design process with ecological design approach and full cost accounting	Public education materials produced	100	100	Decision to place info on website to widen distribution. Decision to follow LEED to rate the EcoCafe design.
RESOURCE DEVELOPMENT				
Implementation plan: sources of funding materials and alliances	New partnerships to undertake sustainability planning	6	6	• SPEC • EcoTrust • SeFC Working Group • collective echoes • Environmental Youth Alliance • Friends of False creek
	Greening community organizations supported	6	6	• collective echoes • SPEC • Vancouver Permaculture Network • Environmental Youth Alliance • SeFC Working Group • Friends of False creek
COMMUNITY PROGRAMS				
Share technical info with other BC communities	Workshops to increase awareness of climate change and sustainability	6	5	• EDRS at the Roundhouse • EcoFair at BCIT • Pearson College Seminar, Vancouver Island • SeFC Workshop at SFU • YMCA Camp
	Participants at workshops on ecological systems and strategies	60	180	• EDRS-45 • EcoFair-15 • Pearson College-30 • SeFC Workshop-60 • YMCA Camp-30
Showcase to BC communities	Events to increase awareness of climate change and sustainability	12	5	• 3 eco-philosopher cafes • SummerFest • EcoFair
	Participants at events on ecological systems and strategies	120	920	• 3 eco-philosopher cafes-120 • SummerFest-200 • EcoFair-600
DESIGN / BUILD				
Set of design drawings and specs for Ecocafe that incorporate sustainable systems	Sustainable systems designed	6	6	• Advanced building design: high performance glazing, super-insulated walls, rainscreen, daylighting, natural ventilation • BIPV (building integrated photovoltaics) • Solar Aquatics System • Bioponics plant/fish System • Rooftop garden & building Integrated plantings • Heat pump & heat recovery technologies
Project implementation plan for next steps: workplan; budget and potential funding	Number of plans for implementing systems	1	1	• EcoCafe workplan • EcoCafe budget • EcoCafe funders list
	Plans for SeFC	1	1	Design charette organization with SeFC Working Group

EcoCafe Chronicles of Events and Activities

The EcoCafe chronicles are listed to help the organization track its progress in terms of milestone events that take a number of different forms. Milestone events usually have a longer process than just the event. These include concept development, planning, management and execution.

The EcoCafe chronicles describe a range of events, seminars and meetings that groups can use as rough templates during the integrated design process to gather information, build support, manage their project, involve stakeholders, publicize their project, and develop the building design.

It is important to share the commitment of the organization and its progress toward measurable goals. That is why this kind of documentation is valuable. Chronicles can also be used to give credibility to an organization, to help it learn effective ways to get its message across and build a team of people who share a commitment to community sustainability.

The chronicles are categorized as follows:

- *design meetings:* facilitated by project manager and attended by integrated design team members and at times other stakeholders
- *seminars:* sharing of the project and its green building principles via powerpoint presentations
- *conferences:* building support and sharing the sustainable technologies information
- *tradeshows:* organizations' display booths surrounding a theme

The chronicles were developed by establishing a standard form representing some key information:

- *Date:* the exact date or period of the event
- *EcoCafe project name:* the name of the project that relates best to the event
- *Name of activity:* the title of the event
- *Kind of activity documented:* workshop, seminar, conference, design meeting, etc.
- *Description:* a short narrative of the event

The EcoCafe chronicles describe a range of events, seminars and meetings that groups can use as rough templates

right: The central display for *EcoFair 2001* held at BCIT. This event was an excellent relationship building opportunity.

Chronicles Summary

date of event	name	kind of activity	description
April 7, 2001	Green Home Pavilion	tradeshow	Participation with BCIT to build a central display for EcoFair 2001 held at BCIT. Great relationship building with BCIT and other sustainability organizations
April 2001	EcoDesign Resource Society	seminar	Powerpoint slideshow introducing the Build Green Build Healthy Case Study: EcoCafe and all its green building and sustainable community principles
May 2001	UBC Environmental Studies Conference	conference	Local experts on sustainable community development spoke to students and others on local and global actions. EcoCafe set up its display of its principles and concept plans
May 2001	Youth Design Workshop	design meeting	Design meeting to seek the youth input to the Society's goals, activities of relevance and design ideas
June 9, 2001	Saltspring Island Environmental Youth Training Seminar	seminar	Seminar to train youth in environmental stewardship, specifically green buildings and sustainable landscapes
June 16, 2001	SummerFest	conference	EcoCafe assisted in the planning of the event and displayed its concept plans in a booth.
August 7, 2001	Pearson College Youth Leadership Seminar	seminar	
October, 2001	Predesign Report Initiation	design meeting	Meeting of EcoCafe staff and trustees to brainstorm the scope of the GCI Climate Change report, the predesign report and workplan for the EcoCafe design project
January, 2002	Integrated Design Team (IDT) Meeting #1	design meeting	Introduction of core IDT to the project with a brief project description and discussion of logistics, schedule and phasing the design contracts
February 18th, 2002	PreDesign Meeting	design meeting	The IDT had a discussion of the facilities program, zoning issues, regulatory and political hurdles, questions to be answered
March 12, 2002	Schematic Design Meeting #1	design meeting	The IDT met to confirm the main themes and spatial requirements. Development of contextual responses to the site, spatial relationships in bubble diagrams began. Several alternatives were developed.
March 25, 2002	Design Development Meeting #1	design meeting	The IDT met to finalize schematics, systems integration and preliminary specifications.

Next steps in progress

Workplan

Workplan Budget and Schedule

Potential Funders list

Next Steps
Plan of action

EcoCafe's next steps are the logical continuation of the development process. They include developing a workplan/schedule, estimating a construction budget and finally developing a potential funder list with a capital campaign.

Ecocafe workplan

The workplan is divided into columns that identify the majors task components and approximate budget cost.

Budgets start very general and get more detailed as the design detail increases. The framework for the budget follows closely the construction process. Under each section are categories of greater specificity. Budgets are typically developed using spreadsheet software that can have built in calculation wherein the entire building is broken into numeric quantities. The more detail that one can provide the greater the sense of accuracy one can predict for materials and labour. In the case of EcoCafe, many materials and the equipment will be supplied by suppliers as project partners. More detailed specifications and quantities in the budget will help find supplier partners for the project.

Each major task has a monthly timeframe or schedule. For facility design/build projects, the major workplan tasks tend to remain the same with the more detailed sub-tasks in constant refinement.

EcoCafe workplan budget and schedule

Task	Cost	Months
		1 2 3 4 5 6 7 8 9 10 11 12 13 14
Permit drawings	$60,000	
Submit building permit	$10,000	
Construction documents	$30,000	
Tenders	$5,000	
Onsite office setup	$10,000	
Sitework	$15,000	
Demolition	$10,000	
Excavation	$5,000	
Foundations	$20,000	
Superstructure	$50,000	
Envelope	$60,000	
Plumbing systems	$30,000	
Mechanical systems	$40,000	
Electrical systems	$25,000	
Building integrated PV	$50,000	
Insulation	$10,000	
Interior finishes	$40,000	
Millwork	$20,000	
Equipment	$60,000	
Commissioning	$10,000	
TOTAL	**$560,000**	

Potential Funders List

There are many sources of funds for projects related to urban sustainability and climate change actions. Having a list is only a small part of a capital campaign. Preparation for the campaign includes getting the following components established:

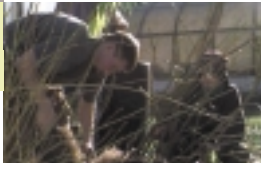
- credibility established in a high profile board
- a compelling case for the project
- plans and models of the project
- establishing ethical criteria for selecting funders

The potential funders list is summarized in the following table. Funding organizations and key contact people are listed. A brief summary of the funder's focus is included. We have chosen these funders because their focus fits our project.

Finally, the percentage of total funds, type and amounts of funding that the organization is willing to grant are listed. In some cases the organization cannot provide cash funding but rather inkind consulting or materials. This is a partial list and based on existing contacts. Research has begun to identify a wider range of inkind and cash contributors to the project through an EcoCafe Capital Campaign under the mentorship of successful fundraisers.

above: surrounding urban environment next to the EcoCafe site

right: EcoCafe volunteers working in the earth



funder/website/contact	focus	%	type	amounts
Apple Canada www.apple.com	User friendly computer interfaces and virtual education systems	100	inkind	$20,000
BC Construction Assoc. www.bccassn.com	Assisting the education of its members to participate in producing greener buildings.	100	inkind	$20,000
BC Energy Engineers www.ecodesign.bc.ca/Practitioners	Supporting the reduction of energy consumption through efficiency improvements and better integration.	100	inkind	$10,000
BC Hydro eww.bchydro.bc.ca	Helping to develop alternative sources of energy.	100	cash	$50,000
BC Institute of Technology www.tc.bcit.ca/pv	Focus on BIPV (building integrated photovoltaics). Design and install a BIPV array on EcoCafe	100	inkind	$20,000
CEIA www.ceia-acie.ca	Canadian Environmental Industries Association supports members in promoting their products. Each company is a candidate to support the project with inkind materials	100	inkind	$250,000
Environment Canada www.ec.gc.ca/envhome	Improving the health of our environment through community participation projects	50	cash	$50,000
Farm Folk City Folk	Developing food security through demonstration projects	100	inkind	$5,000
Friends of the Environment Foundation	Demonstration projects of community action to protect & enhance the environment.	50	cash	$10,000
Greater Vancouver Regional District	Building a sustainable regional strategy through support of local demonstration projects	100	cash	$100,000
Green SEED www.christinalake.com/moonbeans/seed.html	Providing funds for the social, economic and environmental development of communities	100	cash	$50,000
HRDC youth.hrdc-drhc.gc.ca	Youth training and employment in valuable community initiatives	100	cash	$200,000
Industry Canada www.ic.gc.ca	Helping Canadian companies develop export markets through demonstration projects that can be publicly accessed	25	cash	$100,000
National Research Council www.nrc.ca	Help companies to hire recent science graduates to develop and demonstrate sustainable technology clusters.	50	cash	$50,000
Real Estate Foundation www.landcentre.ca/foundation	Increasing the livability of communities and the value of real estate through demonstration projects.	50	cash	$20,000
Science Council of BC www.scbc.org	First jobs in science for young science graduates	50	cash	$20,000
VanCity Credit Union www.vancity.com	community sustainability award, innovative, self-sustaining legacy	100	cash	$1,000,000
Vancouver Foundation www.vancouverfoundation.bc.ca	Provides cash for capital cost of demonstrations of community sustainability	50	cash	$20,000

A brief summary of the funder's focus is described.

Resources

Websites for further research

Books on green design

Websites for further research

British Columbia Sites

www.greenbuildingsbc.com
This site is an initiative of the British Columbia government. It provides a comprehensive array of resources related to green and healthy buildings, some of which are fact sheets, publications and example building and systems related to ecological performance resources, human health and comfort resources and economic performance resources.

www.vitp.ca
This is the site of the Vancouver Island Technology Park which is being developed as a showcase high performance green building and site development to further the principles of environmental and community stewardship. The Park is situated in what was an abandoned building that has been redeveloped using the principles of green building. A report of the redevelopment process is available on the website.

Other Canadian sites

www.advancedbuildings.org
This site, sponsored by a consortium of the Federal government and private organizations, provides builders with information about more than 90 environmentally appropriate technologies and practices. The information provided includes: definitions, benefits, limitations, application, cost and where available.

www.greenbuilding.ca
This site, sponsored by the Green Building Information Council, is a portal for the dissemination of information about energy and environmental issues for the building industry. It is developing assessment and other software tools that will be downloadable.

www.athenasmi.ca
This site is operated by the Athena Sustainable Materials Institute, a Canadian non-profit organization that researches issues related to sustainable building and conducts life cycle assessments of building materials and products. The results of their research are available on the site in the form of down-loadable reports and a searchable data base. The latter is available to members only.

www.ucalgary.ca/~josepha
This University of Calgary site offers a 10 week course: Sustainable Building and Design via the internet. The site has an exhaustive list of web based resources related to the course material.

www.adm.waterloo.ca/infowast/greenbuildingmaterials.html
This site is administered by the University of Waterloo. It contains an extensive list of websites related to sustainability. The University is striving to be "a showcase of sustainability, a true ecosystem in harmony with the environment."

United States Sites

www.oikos.com
This site is devoted to serving professionals in the U.S. and Canada whose work promotes sustainable design and construction. It offers a library of information, a bookstore and listings of appropriate products.

www.energydesignresources.com
This site, under the auspices of the California Public Utilities Commission, is designed to assist designers and builders meet the energy efficiency standards set by the state. Virtual courses are offered and on-line software can be used to calculate energy costs to cool, light and heat buildings.

www.greenconcepts.com
This site provides information for a general audience about strategies and products that reduce greenhouse gas in the generation of electricity, manufacturing, heating and transportation. The site provides guidelines to consider when purchasing and using a number of products.

www.usgbc.org
The Unites States Green Building Council, a member-based organization operates this site. Membership is made up of building industry businesses and professionals; educational institutions, governments and environmental organizations. This site offers a clearinghouse of green building-related information, product data bases, case studies, staff papers, directories and other information. It administers the LEEDS assessment program and certifies professionals to conduct assessments.

www.crbt.org
This is the site of the Center for Resource for Building Technology based in Missoula, Montana. The organization actively promotes resource efficiency in building design through research, education and demonstration projects. It provides a data base with excellent descriptions of sustainable aspects of products and where they can be obtained. Some Canadian sources are included.

www.nextstep.state.mn.us
This site is a project of the Minnesota Sustainable Communities Network. It offers a host of useful information to promote sustainable development. The site features 12 topic areas, one of which is green buildings. Users can post information and resources to the site.

Most of these sites provide lists of resources and links to other webpages for further research

www.eren.doe.gov
This site is the Home page of the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy. The site is searchable by keyword, provides links to information on the whole spectrum of energy-efficiency and renewable topics, as well as a list of key contacts. The site provides access to DOE's national laboratory databases on a host of topics, such as solar access and wind regimes.

www.globalgreen.org
Global Green is the U.S. affiliate of Green Cross International. Their site provides information about the Resource Efficiency and Sustainable Communities for the Urban Environment (R.E.S.C.U.E.) program which promotes the reduction of resource consumption, fosters sustainable communities and the shifting of patterns of consumption by addressing the issues of land-use; energy, infill development and brownfields; open space, and re-use/rehabilitation of homes and workplaces. A variety of publications can be ordered through the site.

www.greendesign.net
This site is primarily a searchable list of descriptions of resources about sustainable development, including publications and case studies. Included in many instances is information about how to obtain the resources. They cannot be read or ordered from the site.

International Sites

www.ises.org
This site is operated by the International Solar Energy Society whose aim is to encourage the use and acceptance of renewable energy. It provides access to resources through its World-wide Information System for Renewable Energy (WIRE).

Books on green design

Below are listed some ground-breaking books that we have found very useful in designing our green building.

- AIA, Denver Chapter, The Sustainable Design Resource Guide: Colorado & the Western Mountain Region, AIA, Denver Chapter, Denver, CO, 1994
- Akbari, Hashem, Cooling Our Communities: A Guidebook on Tree Planting and Light-Colored Surfacing, US Superintendent of Documents (US EPA), Pittsburgh, PA, 1992
- Alexander, Christopher, Sara Ishikawa, & Murry Silverstein, A Pattern Language: Towns–Buildings–Construction, Oxford University Press, Cary, NC, 1977
- Allen, Debi & Mike O'Brien, Builder's Guide to Design and Construction, Portland General Electric Co., Portland, OR, 1994
- Bainbridge, David, Athena Swentzell Steen & Bill Steen, The Straw Bale House, Chelsea Green Publishing Company, White River Junction, VT, 1994
- Barnett, Dianna Lopez, William D. Browning & Rocky Mountain Institute Department of Green Development Services, A Primer on Sustainable Building, Rocky Mountain Institute, Snowmass, CO, 1995
- Brown, G. Z.; DeKay, Mark. Sun, Wind & Light: Architectural Design Strategies. John Wiley & Sons, 2000
- Canadian Home Builders' Association Builders' Manual, Canadian Home Builders' Association, Ottawa, ON, 1994 (they have many other publications and free material on everything from straw bale construction to preventing indoor air pollution)
- Center for Renewable Energy and Sustainable Technology, Resources for Environmental Design Index Guide, Iris Communications, Eugene, OR, computerized database, http://solstice.crest.org/efficiency/iris/ (resource efficient products)
- Center for Resource Building Technology, Guide to Resource Efficient Building Elements 5th Edition, Center for Resource Building Technology, Missoula, MT, 1995
- Chappell, Steve (ed.) The Alternative Building Sourcebook
- Chiras, Daniel D. The Natural House: A Complete Guide to Healthy, Energy-Efficient, Environmental Homes. Chelsea Green 2000.
- City of Austin, Sustainable Building Sourcebook: Supplement to the Green Builder Program City of Austin, Environmental & Conservation, Austin, TX, 1993
- Crosbie, Michael J., Green Architecture: A Guide to Sustainable Design, American Institute of Architects Press, Washington, DC, 1994
- Dauncey, Guy. Stormy Weather: 101 Solutions to Global Climate Change. Gabriola Island, BC. New Society Publishers, 2001
- De Oliviera, Ana Rosa; Bahamon, Alejandro; Cheviakof, Sofia. Eco-Tecture: Bioclimatic Trends and Landscape Architecture in the Year 2001 Loft Publications, 2000
- Environmental Building News, Environmental Building News: A monthly Newsletter on Environmentally Sustainable Design and Construction, Environmental Building News, Brattelboro, VT, monthly newsletter http://www.ebuild.com
- Fong, Clay & Alice Hubbard, The Community Energy Workbook, Rocky Mountain Institute, Snowmass, CO, 1995
- Givoni, Baruch, Passive and Low Energy Cooling of Buildings, Van Nostrand Reinhold, New York, NY, 1994
- Guzowski, Mary. Daylighting for Sustainable Design. McGraw Hill, 1999
- Hastings, S.R. & International Energy Agency, Passive Solar Commercial and Institutional Buildings: A Sourcebook of Examples and Design Insights, John Wiley & Sons, New York, NY, 1994
- Javits, Tom, Helga Olkowski, Bill Olkowski & Farallones Institute Staff, The Integral Urban House: Self-Reliant Living in the City, Sierra Club Books, San Francisco, CA, 1979
- Johansson, Thomas B., et al. Renewable Energy: Sources for Fuels and Electricity, Island Press, Washington, DC, 1993
- Kibbey, David, ed. Architectural Resource Guide, ADPSR, Berkeley, CA, 1995 (low toxic and resource efficient products)
- LeClair, Kim & David Rousseau, Environmental by Design: A Sourcebook of Environmentally Aware Material Choices, Hartley & Marks, Publishers, Point Roberts, WA, 1993

- Miller, Neal, Construction Materials Recycling Guidebook: A guide to reducing and recycling construction and remodeling waste, Minnesota Office of Environmental Assistance, St. Paul, MN, 1993
- Morre McGregor, Suzi; Burba Trullson, Nora. Living Homes: Sustainable Architecture and Design. Chronicle Books, 2001
- National Audubon Society & Croxton Collaborative, Architects, Audubon House: Building the Environmentally Responsible Energy-Efficient Office, John Wiley & Sons Inc., New York, NY, 1994 (case study)
- Olgyay, Victor, Design with Climate: A Bioclimatic Approach to Architectural Regionalism, Van Nostrand Reinhold, New York, NY, 1992
- Pearson, David, Earth to Spirit, Chronicle Books, San Francisco, CA, 1995
- Pearson, David. New Organic Architecture: The Breaking Wave. University of California Press, 2001
- Pople, Nicholas. Experimental Houses. Watson-Guptill, 2000
- Real Goods Trading Corporation, Alternative Energy Sourcebook, Chelsea Green Publishing Company, White River Junction, VT, 1994 (energy efficient products)
- Rousseau, David & Wasley, James. Healthy by Design. Vancouver, BC: Hartley & Marks Publishers Inc., 1997
- Sardinsky, Robert & Rocky Mountain Institute Staff, The Efficient House Sourcebook, Rocky Mountain Institute, Snowmass, CO, 1992 (resource efficient products)
- Smith, Peter F. Architecture in a Climate of Change: A Guide to Sustainable Design.
- Stafford, Barbara, Harris Directory, Stafford-Harris, Inc., Port Townsend, WA, 1995 computerized database (recycled content building materials)
- Stewart, Mary Lou, Stewart's Environmental Directory, Stewart's Environmental Directory Ltd., Delta, B.C. Canada, 1993 (resource efficient products)
- Tillman Lyle, John. Regenerative Design for Sustainable Development. John Wiley & Sons, Inc. New York, NK, 1994
- Todd, Nancy Jack & John Todd, From Eco-Cities to Living Machines: Principles of Ecological Design, North Atlantic Books, Berkeley, CA, 1994 (formerly published as Bioshelters, Ocean Arks, City Farming: Ecology as the Basis of Design, Sierra Club Books, San Francisco, CA, 1984)
- Tsui, Eugene. Evolutionary Architecture: Nature as the Basis for Design. Book News Inc.
- Van der Ryn, Sim & Stuart Cowan, Ecological Design, Island Press, Washington, DC, 1996
- Von Weizsacker, Ernst; Lovins, Amory; Lovins, L Hunter. Factor Four: Doubling Wealth, Halving Resource Use. Earthscan Publications Limited, UK, 1997
- Watson, Donald, FAIA & Kenneth Labs, Climactic Design: Energy-Efficient Building Principles and Practices, McGraw-Hill, Inc., New York, NY, 1983
- Wiley, John, Environmental Resource Guide, AIA & John Wiley & Sons, New York, NY, 1996
- Wines, James. Green Architecture. Taschen America, 2000

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