

**'Mainstreaming Green':
Disseminating Knowledge about Sustainable Design
through Interactive and Multi-Sensory Exposition**

By
Heather G. Anderson

A Practicum
Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements for the Degree of

MASTER OF INTERIOR DESIGN

Department of Interior Design
University of Manitoba Winnipeg, Manitoba

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Abstract

This practicum derives impetus both from indignation towards a built environment which has failed to reconcile human needs with environmental conservation and inspiration from the emerging ecological values of Canadians. The outcome of this practicum is the design of an exhibition facility which strives to provide the public with knowledge for evaluating 'green' alternatives capable of mitigating societal impacts on the environment through the practice of sustainable design. Contemporary design issues, sustainable design projects, and green materials, products and systems will be exhibited in an interactive learning environment intended to foster public awareness concerned with consumerism and development. A theoretical framework comprising contextual information about design, sustainability, and educational theory examines informal learning through exhibition and informs the programme and design of an interactive and multi-sensory exhibition facility. Hopefully the educational model discussed in this practicum will be relevant to other processes concerned with informal learning dedicated to sustainable design. Sustainable design strategies are culturally and geographically specific, therefore a site for the project has been selected in downtown Winnipeg, Manitoba, Canada enabling the building itself to serve as a learning resource and to demonstrate sustainable principles.

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Preface

In August 2004, the summer between graduating with my Bachelor of Environmental Design and beginning my Master of Interior Design, my travels took me to Montreal in the company of three ‘non-design-school’ friends. Previous experience working as a tour guide at the Manitoba Museum in Winnipeg had infinitely increased my interest in the art of exhibiting, therefore, I was curious to visit a museum dedicated to architecture. Without too much reluctance, my friends accompanied me to the Canadian Centre for Architecture (CCA), the most renowned of only a handful of other centres of its kind in Canada. According to their website, the CCA is:

An international research centre and museum founded on the conviction that architecture is a public concern. Based on its extensive collections, the CCA is a leading voice in advancing knowledge, promoting public understanding, and widening thought and debate on the art of architecture, its history, theory, practice, and role in society today.¹

Although I was unfamiliar with the CCA’s practices, I was delighted to have an opportunity to share this exciting passion of mine with my friends and foresaw the museum providing them with some insight into the field I was studying. At the time I had just begun to recognize the myriad of benefits resulting from a built environment of high quality and the extent which public support was integral for increasing the calibre of design.

Initially, the CCA’s severe grey stone exterior was intimidating and disorienting to my friends whose expectations were that a facility promoting design would immediately elicit intrigue and anticipation. One article describes the building in their exact sentiments as being “beautiful and thoughtful... but it is hard to find the entrance. That does not seem to bother librarians and researchers, but what message does it convey to the public?”² For my friends, the interior of the centre provided a similar reaction. White walls and hardwood floors conformed to the idiom of the traditional art gallery and the atmosphere evoked the conduct of a library patron:

¹ This is a description of the CCA provided in the ‘Institutional Overview’ section of their website.

² This portrayal of the CCA is provided in an article outlining the programs and design of several architecture centres. The (unknown) author of this article also notes that “there is an interesting contrast between the esoteric, academic and elitist atmosphere of the building and the very activist, public roles that Phyllis Lambert, [architect, conservation campaigner, and founder/director of the CCA], has played in the past” (Anonymous, 1991, p. 55).

contemplative, serious, and silent. The galleries displayed a monotonous array of black and white architectural drawings and conceptual sketches interspersed with excessive amounts of text in an uninvitingly small font. The sole model, at a scale too small to be accessible, was safeguarded under a glass box in the centre of one room. A small group, identified presumably as design students by their serious expressions and sketch books in tote, directed their attention toward a museum interpreter communicating in a dialect incomprehensible to anyone without a firm grasp of design vocabulary.

While the methods of communication employed by the CCA were appropriate for disseminating knowledge to designers, planners, or others in related fields, they reinforced the esoteric nature of design and excluded a large portion of the population who could benefit from opportunities to learn about issues related to their built environment. It became apparent to me that disseminating knowledge to the public about design would require different forms of communication. How could design be rendered accessible and comprehensible to the public, increasing their awareness and support to ultimately improve the quality of the built environment?

Public concern for the natural environment and the plethora of design innovations that address environmental renewal influenced my decision to focus on educating the public about sustainability and green design. A focus on sustainable design would demonstrate to the public the impacts that design can have on their lives and the potential for green design to increase the quality of the built environment. Although the target market and educational focus of this practicum differs from that of the CCA, my initial experience in Montreal inspired my interest in the dissemination of knowledge to the public about the pertinent issues which affect their environment.

1.0. INTRODUCTION

1.1. Project Description

According to Howard Davis (1999), author of *The Culture of Building*, “the built world is not in very good shape. It satisfies the quantifiable and separate needs of individual institutions, but as many people have pointed out, much of it is fragmented, lacking in humanity, [and] without real depth of feeling” (p. 4). Furthermore, the current state of the built environment has failed to address environmental protection, resulting in climate change, resource depletion, and pollution. The substantial contribution of buildings and consumerism to environmental deterioration is desperately requiring changes in our current practices. Fortunately, public awareness of lifestyle and environmental impact has recently increased. Awareness of sustainable design as a strategy for preservation and conservation of the natural environment has also increased considerably in the last decade. Emerging public values have incited a growing demand for environments, products, and services which are environmentally sensitive throughout their lifecycle and are incorporated into all design scales ranging from urban planning to product design.

The development of a facility that addresses ‘design poverty’³ in Winnipeg is motivated by increasing public interest in design and is also validated by heightened public awareness of correlations between values and the condition of the environment. Public involvement in issues concerned with a greater sense of environmental stewardship can effect change. The central focus of this practicum is rendering green design accessible and resonant

³ ‘Design Poverty’, is a term used to describe the poor quality of the built environment as Howard Davis stated above and is discussed in further detail in section 2.1. of the literature review.

to the general public who likely has minimal prior knowledge of design and sustainability and has many competitive alternatives for their leisure time and money.

Design is often promoted strictly for its visual attributes. This view, propagated by the media, does not communicate the factors that should inform the design decision-making process. If design is to be a relevant and a proactive agent for a sustainable future, it must be understood and appreciated for its environmental, operational, economic, experiential, and social benefits. It is important to positively influence consumer values related to sustainability because the condition of the built and natural environment depends largely on the choices we make.

The outcome of this practicum, the proposed *Ecological Design Centre*, will hopefully illustrate ways to disseminate knowledge to the public. Striving to provide the public with the knowledge to evaluate ‘greener’ alternatives that mitigate societal impacts on the environment and encourage the adoption of sustainable lifestyles, the Ecological Design Centre will also ensure that the public is aware of the necessity and benefits of ‘quality’ design⁴. The knowledge delivery system will be reflective of the learning climate influenced by postmodernism, consumer culture, and the ubiquitous nature of information communication technologies (ICTs). Within this contemporary context as well as their historical contexts, the theoretical framework will examine the correlation between design and sustainability, knowledge dissemination through exhibition, and the methods and practices employed by contemporary informal learning and exhibition typologies. The

⁴ ‘Quality’ in design is a highly subjective term. Bruce Kamin (2001), author of *Why Architecture Matters*, bases his definition of ‘good’ design on a set of consistent but flexible principles which have been adapted for this practicum: quality (well crafted and well designed), utility (serve inhabitants both functionally and spiritually), authenticity (rooted in reality and locality) and continuity (dialogue established between buildings rather than ignoring or mimicking one another) (p. xvi). To this definition, minimal negative environmental impact and minimal consumption of matter and energy must also be added.

theoretical investigation will inform the programme and design of a facility that endeavours to democratize design and address the quality of the built and natural environment by extending greater access to the public through strategies that inform, enlighten, stimulate, persuade, and delight.

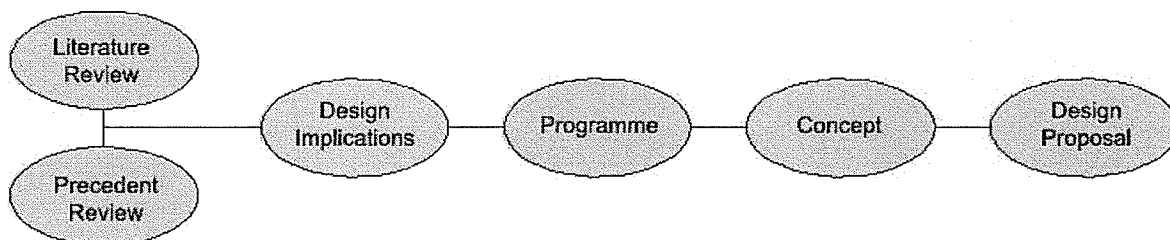
The Ecological Design Centre will fulfill its mandate through a variety of programs organized principally in five building components. 1) The Eco-Elements Showroom will be an interactive display area where visitors can familiarize themselves with the sustainable properties of materials and products that will assist them in making personal contributions to the environment. Construction and finish materials, furniture, fixtures and equipment, and mechanical and electrical systems will be showcased to exploit their sensory and green qualities. 2) The Design Exhibition Space will generate awareness of ecological issues, green planning, and architectural design projects, all representing sound approaches to sustainable development. Small and large scale temporary exhibitions will communicate their message through a variety of media and spatial experiences, to educate visitors about the larger context of sustainability and contributions that can be made by communities and nations. 3) The Ideas Forum will be a space accommodating presentations, discussions, seminars, and workshops where visitors will be invited to share their ideas and priorities concerning sustainability, lending their voice to the learning experience. 4) The Roof Garden Café and Green Cuisine Demonstration Area will provide refreshments in an atmosphere that is conducive to reflection, relaxation, and socialization. Demonstrations of healthy cooking practices and energy efficient appliances will be offered to compliment the food experience consistent with the overall learning objective of the Ecological Design Centre. A green roof

will be open to the public, demonstrating the water management system and the garden which features prairie grasses and herbs.

1.2. Inquiry and Methodology

According to Rosemary Kilmer and W. Otie Kilmer (1992), authors of *Designing Interiors*, “the process of designing interiors involves defining problems within interior environments, generating and evaluating alternatives, and implementing solutions” (p. 154). As suggested in the project description, the problem involves creating an interior environment which is conducive to the dissemination, comprehension, and future application of knowledge to encourage sustainable consumerism, lifestyles, and practices. Inter-disciplinary research of pertinent literature in the fields of ecology, environmental science, sociology, psychology, education, and museum studies as well as an analysis of precedents have been conducted and constitute the theoretical framework of the practicum. Design implications identified in the theoretical framework and project specific data compiled in the programme have informed the spatial planning design development as well as design detailing all compliant with sustainable design practices.

Figure 1: Practicum Process



The inquiry process begins with a literature review that consists of three sections. The first section of the literature review, **2.1. Sustainability: Consumerism, Design, and Environment**, explains the selection of the central topic and provides the contextual information illustrating the repercussions of lifestyles on the environment. This section also describes how emerging public values supported by professional knowledge have the potential to foster change. **2.2. Knowledge Dissemination: Making of Meaning** examines learning and learning methods. **2.3. Exposition and Museums: An Informal Learning Typology in the Twenty-first Century** discusses how the museum typology has evolved to accommodate the preferences of learners in the Postmodern condition.

Two types of design precedents are examined in order to further define the design problem. Firstly, three projects which focus on education and/or exhibition, Architecture/Design centres, Design Showrooms, and an innovative museum are examined to inform the program and design of the Ecological Design Centre. Secondly, three exhibition examples employing diverse modes of communication, *Sustainable Condo*, *Big & Green: Toward Sustainable Architecture in the 21st Century*, and *The American Lawn: Surface of Everyday Life*, are outlined to establish design criteria for the main exhibition space. How the exhibition space can be adapted to accommodate these three exhibitions is demonstrated in the design proposal. Further to an examination of design precedents, a programme was developed to record a detailed analysis of the project site, user groups, and spatial requirements.

Design implications resulting from the theoretical framework and program data are synthesized to inform the ideation phase which consists of schematic design to graphically illustrate space areas and relationships and concept definition which is expressed in written

form. The most effective alternative produced during the design development phase was refined to become the solution to the initial design problem. The design proposal synthesizes theoretical implications and programmatic needs with poetic intentions and sustainable practices.

2.0. LITERATURE REVIEW

2.1. Sustainability: Consumerism, Design, and Environment

Introduction

As the public becomes more concerned with ecology, demand has increased for green environments, products, and services and the design industry has responded with innovative sustainable approaches. This section of the literature review demonstrates the impetus for this practicum by examining ecology and design, consumer culture and its negative effects on the natural environment, the state of 'design poverty' which has contributed to ecological deterioration, and recent and emerging sustainable strategies adopted out of concern for the environment. Sustainability is defined through a holistic approach encompassing social, economic, and environmental dimensions, and the benefits of increasing public awareness of issues affecting the built environment are presented.

Ecology and Design

The term *oekologie* was coined in 1866 by the German biologist Ernst Haeckel, derived from the greek words *oikos* "household" and *logos* "study", therefore defining ecology as 'the relationships and interactions between organisms and their external environment' (Krampen, 1995, p.89). Sim Van der Ryn and Stuart Cowan (1996), authors of *Ecological Design*, define *design* as "the intentional shaping of matter, energy, and process to meet a perceived need or desire." This inclusive definition of design renders the correlation

between culture, design, and nature evident: our environment, composed of buildings, artifacts and domesticated landscapes, has been shaped by human purpose.

Van der Ryn and Cowan (1996), argue that “in many ways, the environmental crisis is a design crisis. It is a consequence of how things are made, buildings are constructed, and landscapes are used” (p. 9). The condition of the natural environment and the physical form of the built environment directly manifests former and contemporary societal values. Environmental catastrophes such as climate change and resource depletion along with the poor quality of the built environment require a re-evaluation of our symbiotic relationship with the natural environment. The public needs to be educated about new approaches in design and development that are more harmonious with ecological principles because sustainability can be helped or hindered by design (Papanek, 2003, p.235).

Consumerism and ‘Unsustainability’

According to the David Suzuki Foundation, in Canada, “over-consumption is the root cause of our environmental woes... Our prevailing emphasis on consumption – with high levels of waste, energy use, and greenhouse gas emissions – jeopardizes the capacity of natural resources and systems to support future generations” (Boyd, 2004, p.5). Consumption in this context refers not only to the energy and resources consumed by individual Canadians but encompasses the use of energy and resources by the entire industrial economy (Boyd, 2004, p.5). Shelter, transportation and nutrition (agriculture) are responsible for the largest material flows, energy expenditures, and carbon-dioxide (CO₂) emissions in industrialized countries (Sustainable Consumption Research Exchange, 2005). For instance, buildings account for almost one third of Canada’s annual, non-renewable energy consumption and

greenhouse gas emissions, consume one eighth of the water supply, and transform land that provides valuable ecological resources (Canadian Green Building Council, 2003).

Currently, the designed environments of the industrial city conceal ecological and technological processes from our everyday awareness, detaching us from the natural environment and processes that sustain our existence (Van der Ryn, 1996, p.161). The Suzuki Foundation explains that most Canadians are only aware of the comparatively minimal quantity of resources which are consumed to supply the goods and services required by our current lifestyles and are generally not privy to the industrial activities that consume vast amounts of resources and cause extensive environmental damage (Boyd, 2004, p.5). Growing concern for the environment may not be paralleled by active changes in behaviour as the public may not have the knowledge to adopt 'greener' lifestyles.

An examination of the impact of civilization on the built and natural environment can be examined from a psychological and a sociological perspective. Sociologist and environmental expert Philip Sutton, concurs that present environmental problems have been "largely socially generated, connected as they are to the spread of capitalism, industrialization and continuing technological development, all of which are central to sociological theories of modernity and social change" (Sutton, 2004, p.176). From the viewpoint of eco-psychologist Deborah Du Nann Winter (2004), "the environmental crisis has been brought on largely by the thoughts, feelings, attitudes, values, and behaviours of human beings" (p.76) which are influenced by these contextual social and cultural factors, particularly consumer culture.

Consumer society has marked significant changes in the economic, political, and cultural spheres and is based on three basic premises. First, as productive work has become

less influential in the formation of identity, consuming has provided people with the opportunity to “construct [personal identities] by purchasing the elements to do so in the marketplace, giving the perception of more free choice and individuality” (Sutton, 2004, p.134). In our consumer culture, commodities have become signs or communicators rather than just utilities wherein their original use-value is replaced by an abstract exchange value and we compare ourselves to others based on our material acquisition and constructed lifestyles (Featherstone, 1991, p. 67, 85).⁵ Second, consumers have become the central focus as corporations are concerned about accessing and producing for a more flexible and differentiated consumer demand rather than putting the needs of production first (Sutton, 2004, p.134). Third, while excessive consumerism may have been restricted to the wealthy in the past, more social groups now seek status and differentiation through symbolic exchanges which has increased the amount of consumerism as a whole (Sutton, 2004, p.134).

Although material consumerism is often equated with happiness, research has shown that quality of life is more an outcome of less tangible considerations such as freedom, security, social embeddedness, environmental quality, health, and the ability to live in accordance with one’s values and ideals (Sustainable Consumption Research Exchange, 2005). Unfortunately, to satisfy the seemingly exponential increases in the demand for products, buildings and services spawned by consumer culture, rapid and cost effective production has been favoured over environmentally sound design, resource extraction and manufacturing processes resulting in urgent environmental catastrophes and a poor quality of the built environment as a whole.

⁵ Because consumer culture is socially embedded, a consumer’s choices are not isolated acts of rational decision making. These choices are heavily influenced by contextual social factors, most notably advertising and media images of “the good life”, and are subject to structural features that often make it convenient, rewarding, or even necessary, to increase consumption (Princen, Maniates, & Conca, 2002, p. 14).

Parallel Dilemmas: Environmental Deterioration and 'Design Poverty'

Nan Ellin (2006), Director of the Urban and Metropolitan Studies Program at Arizona State University, believes that the physical form of our built and natural environment manifests former societal values including Modern ideals of separation, segregation and machine-like utility as well as Postmodern cynicism and nostalgia. The “wounds” inflicted upon the landscape by Modernism and Postmodernism include sprawl, the growing perception of fear, a declining sense of community, and environmental degradation (Ellin, 2006, p.1). Ellin (2006) also attributes late twentieth century private sector development motivated principally by the bottom line to the generic form of cities.⁶ Such trends in urban design “ultimately suppress critical thinking, problem solving, and concern for the larger community” (p.xxxiii).

Van der Ryn and Cowan (1996) classify the current processes which have shaped industrial cities as “dumb design”, where a limited number of templates are adopted and replicated in many cities irrespective of local contextual factors including culture, climate, and geography (p. 9). The result is a designed city that fails to consider the health of human communities or of ecosystems, let alone the prerequisites of creating an actual place. Such design processes have provided very little of enduring value at a great environmental, social, and economic cost (Van der Ryn, 1996, p. 10). For instance, sprawl, which has become the major organizational device of many North American cities since the 1950s, has had negative environmental repercussions such as air and water pollution, habitat destruction, climate change, and loss of productive farmland. There are also economic and social implications resulting from sprawl including congestion, traffic accidents, and gridlock which contribute

to stress and frustration and have resulted in the loss of billions of dollars due to decreased productivity, a car-dependent culture, and air pollution (Boyd, 2004, p.31).

Winnipeg is a large prairie city that is plagued by 'design poverty'. A progression towards the extremities of the city reveals a built environment indistinguishable from any other North American suburban development, characterized by big-box retail, large single family dwellings, and expanses of roadway that cater to automobiles rather than people. David Witty (2006), Dean of the Faculty of Architecture at the University of Manitoba, notes that Winnipeg appears to have "a laissez-faire attitude" toward how the city is built (p. A13). Winnipeg has fallen behind the planning and design ambitions of other cities that have imposed design standards and guidelines to ensure quality in the built environment; cities with which it will increasingly compete (Witty, 2006, p. A13).

Environmental Awareness and Twentieth Century Attempts at Addressing the Environmental Crisis

Awareness of the detrimental repercussions of our lifestyles and the continuing degradation of the environment initially entered the public consciousness with the radical environmental movements in the 1970s and came to be seen as an international dilemma by the 1980s. Du Nann Winter's (2004) research on attitudes about environmental problems has demonstrated an increasingly widespread endorsement of pro-environmental values across age groups, socioeconomic classes, cultures, and countries (p. 81). Locally, strategic council polls published in the Winnipeg Free Press throughout 2006 and 2007 demonstrate that environmental issues have become the second-biggest voter concern for Manitobans, after health care (Bueckert, 2006, p. A16). One study has demonstrated that of the Canadians

polled, 76% would pay at least 10% more for “green” products, 87% would pay more to avoid harmful household products, and 73% would put environmental protection ahead of economic progress (Public Works and Government Services Canada, 2001). Furthermore, the media’s emphasis on achieving greener lifestyles is widespread, ranging from documentaries such *An Inconvenient Truth* by Al Gore, former Vice President of the United States, to *The Green Page*, a new monthly feature in the Winnipeg Free Press which offers ecological advice for Manitoban consumers that began March 18, 2007. Two frameworks evolved in the last two decades of the twentieth century for addressing environmental deterioration, *Green Consumerism* and *Sustainable Development*. They differ in their approach and focus but share the same modern mentality that social and environmental dilemmas can be solved and the current pattern of industrial and technological development can continue albeit in less ecologically destructive ways (Sutton, 2004, p.133).

In an attempt to address environmental issues, Green Consumerism takes advantage of the newly found persuasive powers of consumers and consumer groups to demand ecologically sound products. Since the 1990s, Green Consumerism has become one of the main organizing devices for the “consciousness of consumption” because it alleviates both environmental anxiety and consumer desire by encouraging the selection of products that contribute to a cleaner environment (Cha, 2001, pp.305-306). Ultimately, the marketing strategy aims to transform ecologically damaging production methods and practices. The consumer demand resulting from a preference for ‘environmentally friendly’ products as part of changes in lifestyle, has encouraged many corporations to create new environmental

images or 'brands' for themselves as a way of greening their public image (Sutton, 2004, pp.137-138).⁷

In contrast to Green Consumerism, the focus of Sustainable Development is concentrated on state involvement and international co-operation in environmental protection rather than on market mechanisms and the actions of individual consumers (Sutton, 2004, p.144). The 1987 United Nations Commission on Environment and Development report, *Our Common Future* defined sustainable development as "...development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Van der Ryn, 1996, p. 5).⁸ The approach dictated by Sustainable Development is characterized by democratic principles, a faith in science and technology, an optimistic view of the future, an assertion of the moral responsibility of those alive today, and the acknowledgement of our position as part of a global family (Sutton, 2004, p.144). The achievement of this vision requires action by governments, businesses and non-governmental organizations as well as the participation of individual citizens at the community level (Sutton, 2004, pp.143-144).

Green Consumerism and Sustainable Development have both been criticized for a variety of reasons. Sutton (2004) questions the effectiveness of green consumerism because it relies on an environmentally enlightened population which is able to tell the difference between "greenwash", the strictly public relations use of green labelling, and genuine advances in reducing pollution and waste. For Sutton (2004), the ability to make this distinction requires the existence of the same green awareness which the strategy is

⁷ These lifestyle changes also include saving energy, recycling and using less polluting forms of transport when possible.

⁸ The 1987 United Nations Commission on Environment and Development report is also known as the Bruntland Report, after its president, Gro Harlam Bruntland

supposedly helping to generate (p.139). Michael Maniates (2002), Professor of Political Science at Allegheny College, is also critical of Green Consumerism because he believes it contributes to the “individualization of environmental responsibility” (p.45). For Maniates (2002), individualization promotes an understanding of environmental degradation as a “product of individual shortcomings best countered by action that is staunchly individual and typically consumer based” (p. 45). Individualizing responsibility for environmental problems can potentially narrow our “environmental imagination” and undermine our capacity to ponder institutions, the nature and exercise of political power, or ways of collectively changing the distribution of power and influence in society (Maniates, 2002, pp. 45-46).

The definition of Sustainable Development cited by the United Nations Commission on Environment and Development has been criticized for being deliberately unobtrusive and quite vague. Because it is difficult to distinguish genuine “needs” from non-necessary “wants” and “desires” in the present, having the ability to discern what will constitute a “need” for future generations is even more problematic (Sutton, 2004, p.143). However, the potential for Green Consumerism and Sustainable Development to bring more people towards environmental awareness, provide a range of positive ways for people to feel involved in environmental protection, and maintain pressure on companies and governments for environmental reform and new protective policies has also been recognized (Sutton, 2004, pp.138-140).

Public Interest in Design in the Twenty-first Century

Architecture and design have also witnessed an unprecedented rise in popularity amongst the public in the late twentieth and early twenty-first century. The “profusion of

style in the everyday” is evident as increasingly savvy consumers are demanding well-designed industrial products and environments (Postrel, 2003).⁹ The benefits of capitalizing on the public’s increasing interest in architecture and design have been recognized by cultural and corporate institutions alike.¹⁰ There has been a proliferation of populist television programs, magazines, and retail dedicated to Do-It-Yourself (DIY) decoration and home improvement. The DIY industry manifests influences of Postmodernism and consumer culture as the home and property becomes another outlet for defining identities and projecting newly constructed images of lifestyle. According to a recent article in the *Winnipeg Free Press*, the prairie region is particularly enthusiastic about home renovations as 75% of Manitoba and Saskatchewan homeowners plan to renovate in the coming years and 54% plan to do some or all of the work themselves (Bryksa, 2006, p. F1).

Unfortunately, the media provides an often inaccurate and superficial portrayal of design, misinforming the growing audience by oversimplifying design processes and neglecting to present critical information such as cost, mission, environmental impacts, or potential for increased productivity. Networks such as Home and Garden Television (HGTV) exploit entertainment and drama to draw audiences and provide snapshots of lifestyles that are completely circumscribed by the “dominance of taste” (Blundell Jones, Petruscu, & Till, 2005, p. xv). The public becomes “fixated on a superficial and transient version of architecture, losing sight of the transformative potential of the built environment and the way in which they become properly engaged in the transformation” (Blundell Jones et al., 2005,

⁹ This reverence for design may be partially attributed to what Mike Featherstone (1991), sociologist and cultural theorist, describes as the “aestheticization” of our primary mode of perception, and consequently the “aestheticization” of everyday life, resulting from Postmodernism and consumer culture (p.124). Art and aesthetic experiences have become the master paradigms for knowledge, experience, and sense of life-meaning in the Postmodern era (Featherstone, 1991, p. 124).

¹⁰ Architecture/design centres have emerged to forge connections between the public, professionals in the fields of architecture and design, and urban environments and are discussed in section 3.1. of the precedent review.

p. xv). The public needs to understand the social, economic and environmental benefits of design as well its contextual, experiential, and sensory qualities. However, it has also been acknowledged that the DIY industry has provided a critical mass of “design savvy consumers” who may be ready for more theory and detail (Sobchak, 2004, p. 28). Western society is witnessing a gradual reorientation to valuing a sense of community, place, and ecology and recognizing the potential for design on all scales to achieve an environment that is more aligned with these emerging values.

A Holistic Approach to Sustainability

Sustainability is a broad term which involves the adoption of a holistic perspective that links all dimensions of the natural environment with individual and social behaviours and at the same time with values and lifestyles. It is essential that we develop consumer strategies that foster the efficient use of natural resources along with the highest quality of life and the effective satisfaction of human needs while promoting equitable social development, economic competitiveness, and technological innovation (Sustainable Consumption Research Exchange, 2005). As discussed earlier, ecology-conscious development and design must be rooted in social practices because “human consciousness [is] the major component both of the cause of the imbalance and of its possible rectification” (Ingersoll, 1996, p. 144).

The condition of the built and natural environment is a result of the everyday socio-culturally influenced individual and collective decisions which result in excessive consumerism or selection of unsustainable products and practices. A sustainable environment can only be achieved if we lead all aspects of our lives in a sustainable manner. Individuals

must understand themselves not only as consumers who have the potential to positively affect the environment through independent lifestyle decisions, but also as citizens in a participatory democracy working together to change broader policy, larger social institutions and the distribution of power and influence through bold political leadership and citizen-based debate (Maniates et al., 2002, pp. 45-46). The individual emphasis of Green Consumerism and the large scale focus of Sustainable Development must be combined in an ecological approach because it is the performance of cities and urban organizations that have the largest potential impact on the environment (Ingersoll, 1996, p. 145).

Design should be understood as a “fundamental activity in which we need to invest in order to improve the social, economic, and environmental performance of the built environment” (Macmillan, 2004, p. xviii). Environmental benefits of sustainable design are vast and include, but are not limited to, the controlled use of non-renewable resources, the controlled emission of contaminant agents, the maintenance of biological diversity, the health of inhabitants, and the preservation of flora and fauna (Uzzel, Pol, & Badenas, 2002, p. 27). The social and economic benefits of sustainable design include the potential for increases in civic pride and cultural identity as well as the fulfillment of such basic needs as health, safety, and welfare. Sustainable design not only impacts positively on public health and the environment, but also reduces operating costs, enhances building and organization marketability, potentially increases occupant productivity, and contributes to the creation of sustainable communities (Canadian Green Building Council, 2003). Design can increase economic viability and stimulate urban regeneration as it has become important to the choices that people make. Companies are increasingly concentrating on design as a selling tool because people are becoming more interested in well-designed environments and

consumer items (Witty, 2005, p. B2). At a larger scale, design has become a key variable for attracting investment dollars and the mobile, well-educated “creative class”, a term coined by American economist and urban studies theorist Richard Florida in his book *The Rise of the Creative Class: and How It's Transforming Work, Leisure, Community, and Everyday Life* (Florida, 2002).

Green Building Design

Although sustainability is a global cultural problem and not specifically an architectural problem, an ecology-conscious approach to the design of buildings may contribute solutions because design plays a major role in determining environmental impacts at all stages of the lifecycle. Architect Daniel Williams describes green design as an element of sustainable design. Although green design incorporates ecologically sensitive materials, efficient mechanical systems and high performance technologies while employing processes that do not negatively affect the environment before, during, or after manufacture, construction, and deconstruction, it may still function primarily through the use of fossil fuels (Williams, 2007, p.16). Sustainable design integrates principles of green design and goes further to become a passive and active structure designed to maximize the use of a site's natural renewable resources (Williams, 2007, p.16).

Ecology conscious decisions during planning, design, and construction can determine resource extraction, manufacturing, distribution, and the potential for end of life reuse or deconstruction. The Canadian Green Building Council's (CaGBC) Leadership in Energy and Environmental Design (LEED) rating system, forms the basis for an understanding of what constitutes green building. LEED® Certification distinguishes building projects that have

demonstrated a commitment to sustainability by meeting higher performance standards in environmental responsibility and energy efficiency throughout design, construction, and operation (CaGBC).¹¹ LEED provides guidelines and prescriptions for green building design, but provides a narrow understanding of sustainability and many other design criteria must be considered.

John McMinn and Marco Polo indicate in their catalogue of the exhibition *41° to 66°: Regional Responses to Sustainable Architecture in Canada* that the adoption of a universal framework such as LEED disregards the variance in bio-climatic zones that have long called for regional strategies which are inherently sustainable. Fundamental design strategies such as building orientation, location and nature of fenestration, and viability of alternative energy sources must all be closely attuned to local climatic, microclimatic and geological conditions for effective performance and energy reduction (McMinn & Polo, 2005, p.6) McMinn and Polo (2005) also emphasize the importance of flexibility and adaptability for green environments: “to be truly sustainable, buildings need to remain relevant and functional to the community they serve over the long term” (p.5). The shift to a culture of sustainability is demanding from designers a “broad and sweeping reassessment of the way buildings are made and used” (McMinn & Polo, 2005, p.3). McMinn and Polo (2005) suggest that design “can play both a practical and a symbolic role in the development of a carefully attuned cultural response to the larger paradigmatic movement of sustainability” (p.3). As sustainability moves to its maturity, a new aesthetic is developing and buildings are being

¹¹ LEED Canada consists of a specific set of environmental performance criteria organized within five performance categories: Sustainable Sites; Water Efficiency, Energy and Atmosphere; Materials and Resources, and Indoor Environmental Quality. A sixth category, Innovation and Design Process, rewards exceptional environmental performance or innovation over and above that explicitly covered in the basic LEED credits. Projects earn points toward LEED certification by meeting or exceeding each credit’s technical requirements, and points add up to a final score that designates the building as having LEED CERTIFIED, SILVER, GOLD, or PLATINUM certification (Canadian Green Building Council, 2003).

conceived as coherent, holistic systems, with extended lifecycles that must be considered throughout the design process (Rynd, 2005, p.9).

In their book *Sustainable Commercial Interiors*, coauthors Penny Bonda, a noted expert on interior design and sustainability, and Katie Sosnowchik, an interior design editor and innovator suggest that the most environmentally responsible design is that which occurs in the renovation of existing building stock. According to Bonda and Sosnowchik (2007), the reuse of existing buildings “preserves the energy and materials imbedded within their walls, and it also reduces the need to employ additional resources toward the construction of something new” (p.15). New buildings comprise only two percent of the total building stock at any one time (Smith, 2005, p. 118). Sixty six percent of the buildings standing in the year 2050 have already been built today, which means there will be a large market for energy efficient renovations (Young, 2007, p. F7). Therefore the Ecological Design Centre could serve as a model for existing buildings wishing to implement sustainable features through a renovation.

Addressing Environmental Renewal and Quality Design through Public Involvement and Education

Large scale improvements to the built and natural environment depend not solely on the individual acts of architects and city planners but rather on raising the level of critical awareness amongst the commissioning clients, professions, industry, and general public (Macmillan, 2004, p.178). Knowledge and processes of planning and building should be transparent. Van der Ryn and Cowan’s ecological approach to design suggests a participatory process in which technical disciplinary languages and barriers are exchanged for a shared

understanding of the design problem. Sustainability becomes a cultural rather than an expert process where it is imperative that everyone acquire a basic competence of their world (Van der Ryn, 1996, p.147). In addition to generating a public that is more sympathetic to environmental and design issues, involving the public with design also has the potential to create better informed clients and a more appreciated profession.

Despite the current lack of information available to the public, professional engineer and researcher Ted Kesik feels that “the future of sustainability lies in public education and will be reinforced through the eco-labelling of products, materials and buildings” (Kesik, 2002, p.29). While strategies such as Green Consumerism have the capacity to promote sustainable production and consumerism by influencing producers to provide better goods and services while using resources more efficiently, they are only effective if consumers have the ability to distinguish which alternatives are most sustainable (Cohen, 2001, p. 29). Joseph Murphy and Maurie Cohen, authors of *Exploring Sustainable Consumption: Environmental Policy and the Social Sciences*, argue that consumers need assistance to make environmentally sound choices. The individual as a consumer can make fully informed and rational choices only if product information covers all relevant aspects including performance, reliability, energy efficiency, durability, running cost and if the product is priced at the full cost to society (Cohen, 2001, p.26).¹² The prairie population may not only be motivated by their environmental concerns but also by their budgets to economise, suggesting that products and practices which conserve energy or water would be appealing to Manitobans.

¹² Products not priced at their full cost to society enable producers, and indirectly consumers through artificially-low prices, to shift a portion of their costs onto the wider society.

Du Nann Winter (2004) notes that environmental educational efforts fail more often when alternative behaviours are not apparent, are inconvenient, or are costly (p. 82). She states that recognition of environmental problems depends on the way that information is presented; therefore if information is represented in a visually or otherwise compelling manner, the public is more likely to cognitively respond and react appropriately (Du Nann Winter, 2004, p. 82). While this section has discussed the correlation between design, consumption and the environment and the potential for public involvement and education to address environmental renewal and design poverty, the next section explores theory regarding how this knowledge can be disseminated to the public.

2.2. Knowledge Dissemination: Making of Meaning

Introduction

Theorist Elizabeth Grosz describes education as “one of the present’s ways of conceptualizing its current problems” (cited in Ellsworth, 2005, p. 149). Knowledge promotes an understanding of the contemporary issues which face our environment and is integral to the development of personal and communal strategies for addressing these issues. The objective of the Ecological Design Centre will be to disseminate information to visitors about sustainable issues and ‘greener’ alternatives through exposition. To inform the design of a learning environment, this section first explores exposition as a method of disseminating knowledge, the general process of learning as the transformation of experiences into knowledge, and a learning model that has been tailored specifically to the experience of free-choice learning in an informal learning environment (the museum) by considering contextual

influences. Constructivist learning theory and contemporary pedagogies and their application in an exhibition setting are also examined.

Free-Choice Learning in Informal Learning Environments

In an economy that is increasingly based on information and knowledge, more emphasis is being placed on learning throughout the lifespan and the continuous acquisition of information (Falk & Dierkling, 2000, p. 217). Out of the eighteen hours Canadians spent each week engaged in some type of structured activity in the late 1990s, nearly 95% was free-choice learning and nearly 85% occurred in some kind of informal, nonschool context (Falk & Dierkling, 2000, p. 213-214).¹³ These statistics emphasize that the public values stimulating informal learning environments for their combination of leisure and educational opportunities. As an informal learning facility, the Ecological Design Centre will employ exposition as a method of disseminating knowledge. Although the Ecological Design Centre will not be a museum specifically, the conditions which enhance or hinder free-choice learning in certain informal learning environments are transferable. Museums use exposition as a primary mode of disseminating knowledge, therefore museum theory has been used throughout this section in relation to learning and the next section in relation to contemporary spatial requirements of an exhibition facility.

¹³ Free-choice learning can be described as learning that is intrinsically motivated as opposed to compulsory learning. Free choice learning typically takes place in informal learning settings and can occur during a wide range of activities such as visiting a museum or other arts event, reading the newspaper, watching television, surfing the internet, or talking with friends, while compulsory learning typically takes place in an institutional (school) setting (Falk, 2000, p.13).

Exposition and Exhibition as a Contemporary Mode of Knowledge Dissemination

Exhibition can be defined as ‘setting out to public view’ while exposition involves ‘laying open the sense of meaning’ of the content on display. Mieke Bal (1996), well known interdisciplinary cultural analyst and theorist, explains that “something is made public in an exposition, and that event involves bringing out into the public domain the deepest held views and beliefs of a subject” (p. 2). Bal (1996) argues further that exposition creates a “subject-object dichotomy” by putting the object on display allowing the subject to make a statement about the object (p.3). Therefore, while exhibition consists of the physical act of display, exposition provides an explanation or interpretation which is likely to be somewhat subjective.

Expositions can be an accessible communicative device because they have the capacity to direct the dichotomous and complex behaviour of people by considering the two separate parts of the mind: simple observation and conscious judgement as well as action and participation (Podrecca, 2001, p. 55). Dr. John Falk and Dr. Lynne Dierkling, President and Associate Director respectively of the Institute for Learning Innovation in Annapolis, have focused their research on the behaviour of adults and children in informal learning settings with particular emphasis on museums. Falk and Dierkling (2000) have found that expositions, unlike other pedagogical methods such as reading large blocks of text or listening to a lecture, are an easily comprehensible way to access information and make meaning because they simplify, organize, and contextualize information (p. 122). Expositions facilitate intellectual connections by associating disparate facts, ideas and feelings, influencing values and attitudes, fostering visitor interest and curiosity which inspires self-

confidence and motivation to pursue future learning, and affecting how visitors approach their worlds in relation to what they think (Hein, 1998, p. 150).

Current research supports the notion that the brain learns best through rich, complex, and multi-sensory environments (Roberts, 2006, p. 3). This research substantiates exhibitions as a form of knowledge dissemination because they can be environments where visitors experience rather than simply observe the subject matter. In a successful exhibition space, the content, arrangement, and design of the exhibition are merged and transformed into a message that will accompany the visitors throughout their experience of the exhibition. Compared to graphic messages such as books and magazines or audiovisual messages such as radio and television, the addition of the spatial element and sensory engagement unique to an exhibition setting makes the visitor more receptive and better able to retain the message (Tuminelli, 1997, p. 5). The manifestation *hic et nunc* (the here and now) character inevitably tied to a space-time frame makes exhibition design much closer to “modern” forms of communication such as television or internet (Tuminelli, 1997, p. 5). Expositions become more than just informative events as the “hard” elements (exhibits, equipment, graphics) blend with the “soft” elements (lights, atmosphere, temperature, colours), creating an opportunity to experiment with “new forms of multisensorial perception” (Tuminelli, 1997, pp. 5-6).

As an effective communicative device, exhibitions also benefit from the appeal of their ephemerality. Boris Podrecca (2001), professor of architecture and interior design at Stuttgart Technical University in Germany, explains that although the exhibition is impermanent, it is “from this specific transience, this almost tragic nature, [that] the exhibition acquires its real decorum” (p. 54). The ephemeral nature of an exhibition also

presents the challenge of converting fleeting messages into permanent memories. As the visitor's experience with the exhibition culminates, there is the potential for the memories and acquired knowledge to also be lost, which induces the need to 'design' the survival of the work in the minds of the visitors. Paolo Tuminelli (1997) asserts that the potential for visitors to retain the knowledge acquired is increased when exhibitions involve visitors emotionally as well as physically because it is the "irreplaceability of emotions received from participation with an exhibition" that promotes not only correct message transmission but also "a certainty of conservation" (p. 6).

Bal (1996) argues that the success of exposition strategies is measured not by what "one person 'wants to say'", but rather by what the visitors "think, feel, or experience to be the consequence of the exposition" (p.8). This understanding of exposition warrants an exploration of the disciplines of psychology and education because they are vitally concerned with the conditions under which learning can successfully occur by accounting for the needs, interests, and abilities of the intended audience (Miles, 1982, pp. 20-21).

Learning as the Transformation of Experience

Peter Jarvis, internationally renowned expert in the field of adult learning and continuing education, has undertaken a complex interdisciplinary study of the processes of human learning to construct a critical theory of lifelong learning. Jarvis (2006) considers learning to be essentially a process of transformation which occurs through two processes, "altering first the sensations of the external world into an experience and then changing the experience into an element of our biography, which could be knowledge, skills, attitudes, values, beliefs, emotions or the senses – or any combination of them" (p. 87). Throughout the

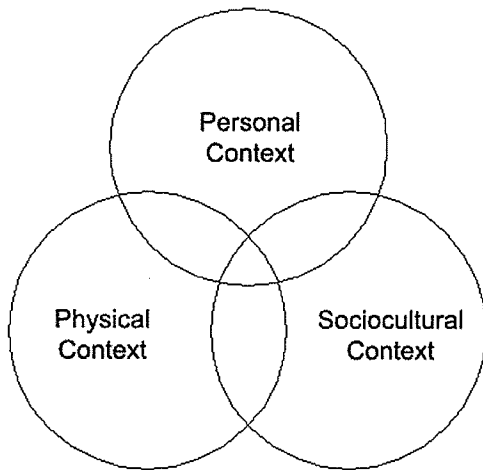
processes whereby we transform our experiences, emotions and practical aspects occur simultaneously with the cognitive therefore learning can occur through thinking, doing, or feeling (experiencing emotion) (Jarvis, 2006, p.18). According to Jarvis (2006), “until data and information are learned by individuals, they remain data and information: learning transforms information into knowledge and belief” (p. 90).

Knowledge is the product of the learning experiences which inform our values and it is those values which in turn influence our actions. The educative purposes of experiences in an informal learning environment are not complete unless they lead to some action beyond the immediate satisfaction of understanding the exhibition (Hein, 2006 p. 194). The Ecological Design Centre will aspire to provide meaningful experiences which instil the knowledge that will instigate an adoption of sustainable values. The application of this new knowledge to subsequent life experiences in the form of decisions that promote a sustainable lifestyle will ultimately be in the hands of the visitor.

The Contextual Model of Learning

In their book *Learning from Museums: Visitor Experiences and the Making of Meaning*, John Falk and Lynne Dierkling (2000) describe learning as a cumulative, long term process of making meaning and finding connections. Due to the complexity of the phenomenon of learning, rather than providing a singular definition of learning as Jarvis has done, Falk and Dierkling have proposed a model that could apply to a variety of free-choice or compulsory learning settings but have tailored the specifics to apply directly to learning in the museum. They conceptualize learning as the integration and interaction between three overlapping contexts, 1) Personal, 2) Sociocultural, and 3) Physical, over time in order to

Figure 2: Contextual Model of Learning



Note: Adapted from "Learning from Museums: Visitor Experiences and the Making of Meaning (p. 12), by J. Falk and L. Dierkling, 2000, Walnut Creek, CA: Altamira Press

make meaning (figure 2). As the personal context moves through time, it is constantly shaped by events experienced within the physical context, all of which are mediated by and through the sociocultural context (Falk & Dierkling, 2000, pp. 10-11).

1) Personal Context

Motivation and expectations from visit

Because we act in accordance with

the image we have of ourselves and the standards and precepts that are of value to us,

the state of mind of visitors depends on many

psychological factors such as the time they have at their disposal, eagerness to learn, experiences of past exhibitions, and expectations induced by media publicity and hearsay (Miles, 1982, p. 25). Visitors appraise the value of the visit by balancing likely effort (in terms of time, money and energy that the proposed course of action requires), for likely reward (magnitude and value of the consequences and the likelihood that the proposed course of action will indeed be successful) (Miles, 1982, p. 26).

Prior knowledge, interests, and beliefs

Visitors seek 'hooks' or entry points which enable them to relate their previous experiences to the present experience. Either consciously or unconsciously, learners are seeking ways to connect this particular exhibition or program to who they

are, what they need, and/or are curious about (Falk & Dierkling, 2000, p. 182).

Visitors need to understand why this particular experience is relevant to them and how the information will enhance their life (Falk & Dierkling, 2000 p. 182). This emphasizes the importance of providing context in exhibitions.

Opportunities for choice and control over learning

Individuals learn most effectively when they can exercise choice over what and when they learn (Falk & Dierkling, 2000, p. 138). This information emphasizes the need for creating spaces which provide an arrangement that is not so structured that visitors cannot select their own path and learning objectives.

2) Sociocultural Context

Much of the way we make sense of the world is through social interaction with others: what we learn is mediated through conversation, gestures, emotions, observation of others, use of culturally and historically constructed tools, signs and symbols, and the cultural/historical overlays of societal beliefs, values and norms (Falk & Dierkling, 2000, p. 38). Individuals and groups spend more time at exhibitions involving interaction with other visitors or staff (Falk & Dierkling, 2000, p. 107).

Within-group sociocultural mediation

Interaction between the people who are attending the exhibition together primarily consists of conversation but group members also observe each other to gain information, to figure out how to interact with exhibitions, and to learn effective ways to engage in inquiry (Falk & Dierkling, 2000, p. 110).

Facilitated mediation

Few other museum experiences afford as much potential for significantly affecting visitor learning as the interactions between visitors and skillful museum facilitators (Falk & Dierkling, 2000, p.139). This emphasizes the importance of investing in knowledgeable and skilled interpreters (Falk & Dierkling, 2000, p. 107).

3) Physical Context*Orientation and organization*

Visitors have an innate need to make meaning of the physical setting, initially by orienting themselves in space, exploring that which is novel, preparing mentally for what is to come, and making overall sense of the museum (Falk & Dierkling, 2000, p. 132) A feeling of disorientation directly affects the visitor's ability to focus on learning and content (Falk & Dierkling, 2000, p.139). Consequently, a logical layout and innate wayfinding that alleviates the need for signage would be conducive to learning.

Design

"Learning is influenced by design" and 'good design' draws the visitor in, engages all the senses, and compels the visitor to investigate the topic at hand (Falk & Dierkling, 2000, p. 123, 139). The design of the entire interior environment, which is informed by contextual factors, must facilitate learning by taking into account the conditions under which learning can successfully occur.¹⁴

¹⁴ The influence of contemporary contextual factors such as postmodernism, consumer culture, and ICTs on the design of informal learning facilities is the topic of the next section of this literature review.

Learning Theory and Pedagogy

Museum scholar George Hein (1998), who has specialized in the qualitative evaluation of programs and visitor research, emphasizes that “learning in museums is dependent on theories of education” (p.149-50). The epistemological view that is assumed dictates which pedagogies are implemented to disseminate knowledge (Boghossian, 2006, p. 718).¹⁵ A learning theory, such as Constructivism, is a general explanatory model for how people learn, but does not delve into specific delivery mechanisms (Boghossian, 2006, p.720). Whereas, Thomas Dutton (1996), co-editor of *Reconstructing Architecture: Critical Discourses and Social Practices*, defines pedagogy as “part of the processes that shape what people know and how they come to know it, processes always inherent within institutions and other social forms” (p. 171). Methods or activities that impart knowledge, such as a lecture or a seminar, constitute traditional pedagogies while contemporary pedagogies which are more pertinent to exhibition, discussed later in this chapter, have evolved out of the context of postmodernism and the information age.

Constructivist Learning Theory

Constructivism, the learning theory that has dominated over the past decade, evolved from the theories of pragmatist psychologists and philosophers William James (1842-1910) and John Dewey (1859-1952) who emphasized learning through direct experience (action) and focused reflection to increase knowledge, develop skills, and clarify values. These components are all now characterized as part of the learning process known as ‘inquiry’ (Hein, 2006, p. 190). Postmodern theory, which is based on the premise that there are

¹⁵ Epistemology is a branch of philosophy that investigates the origin, nature, and limits of human knowledge by asking the question “how have we come to know what we know?”

multiple perspectives, interpretations and truths which are all equally valid, is evident in Constructivism.¹⁶ Constructivists believe that rather than directly copying reality, learners actively construct or find meaning in their subjective experiences and this result becomes knowledge (Boghossian, 2006, p.714).

Constructivism proposes that learning environments should support multiple perspectives or interpretations, knowledge construction, a sensitivity and attentiveness to the learner's previous constructions, and active participation to encourage voice and ownership, and collaboration. Context-rich and experience-based activities promote exploration and reflective practices where learners are actively engaged in posing questions, investigating, experimenting, being curious and creative, solving problems, assuming responsibility, and constructing meaning. Learners are engaged intellectually, emotionally, socially, soulfully, and/or physically. Pedagogies that involve physical actions and hands-on experience have long been accepted as an effective mode of disseminating knowledge in formal and informal educational institutions.¹⁷ Constructivism's additional focus on reflection transforms simple experiences into learning experiences, because the internalization of knowledge requires that the learner test assumptions about the outcomes of their decisions and actions and weigh them against past and future implications.

The widespread acceptance of Constructivist theory among many scholars of education is evident. For example, Jarvis' definition of learning refers to the integration of new knowledge into our 'biography' and Falk and Dierkling's *Contextual Model of Learning* emphasizes the importance of prior knowledge and beliefs as well as social mediation in the

¹⁶ Postmodernism is characterized by a rejection of the encompassing narratives of Modernism historically associated with the supremacy of the white male bourgeois subject in favour of multiplicity, difference, heteroglossia, and specificity.

¹⁷ As noted by one curator in 1905, "an hour's worth of teaching would not get so much information into a child's mind as he would get by finding out the information for himself" (Griffiths, 2006).

construction of new knowledge. Joe Kincheloe (2005), an internationally-recognized scholar on critical pedagogy and constructivism, states that constructivism promotes modes of self-analysis that result in changes in attitudes and dispositions wherein individuals hold the power to reconstruct their consciousness (p. 82-83). These modes of self-analysis would hopefully help the public to re-evaluate their current practices and acquire values that promote more sustainable choices and behaviours.

When considering what a museum designed along constructivist principles would entail, Hein (1998) feels that it may not be possible for any museum to ever satisfy the criteria completely (p.15). Hein (1995) explains that maximizing the conditions which favour constructivist learning, by creating situations that are open, ambiguous, and easily manipulated in a variety of ways, restricts our ability to predict with certain what meaning learners will make of the experiences we provide for them (p. 191). However, the methods by which this information is communicated would benefit from constructivist theory. Constructivist theory is applicable as it requires that the focus be on the dispositions of the *learner* (visitor) rather than strictly on the subject matter to maximize the potential for learning (Hein, 1995, p. 191). The constructivist museum would provide opportunities for learning using the maximum possible modalities both for visitor interaction with exhibitions and for processing information (Hein, 1998, p.165)

Postmodern Pedagogies

The pedagogies which facilitate learning in formal and informal learning environments are becoming more interdisciplinary and integrated in the context of Postmodernism. Postmodernism was discussed above in relation to its notions of multiplicity

and difference, but the Postmodern emphasis on visual images over words, primary processes of the ego over secondary, and immersion rather than distanced appreciation of the spectator (Featherstone, 1991, p.98) have particularly influenced contemporary pedagogies. Dr. Elizabeth Ellsworth, an interdisciplinary theorist of learning in higher education and a faculty member in the Media Studies Program in New York City, thinks innovatively about pedagogy and processes of learning by using ideas and approaches from arenas such as media studies and architecture to bring alternative understandings to education. Pedagogy becomes a dynamic that creates the experience of an idea, of a way of making sense of self, the world, and self in the world (Ellsworth, 2005, p. 38). In her book, *Places of Learning: Media, Architecture, Pedagogy*, Ellsworth draws upon the work of Bill Green to illustrate new pedagogies that address our media saturated and semiotic context.

The proliferation of digital media and new information communication technologies has spawned new forms of cognition and learning. Bill Green, professor and sub-dean for research and scholarship at the Charles Sturt University in Australia, specializes in Postmodern curriculum inquiry. For Green, accommodating the “new forms of cognition and learning” associated with media and with digital-electronic apparatus requires that educators implement less “logocentric and print-bound” ideas about learning because “something ‘happens’ that alters the whole ecology of learning when we teach and learn through media and within a media saturated culture increasingly dominated by “semiosis” (cited in Ellsworth, 2005, p. 121). A new form of multi-modal learning is emerging out of a convergence of “oral, literate, and video conduct in our society” which exceeds text-based learning (Ellsworth, 2005, p. 121). Exhibitions have a unique capacity to incorporate oral, literate, and video modes of knowledge dissemination.

Another repercussion of Postmodernism has been the implication of “bodies in pedagogy”, a method of learning which has seldom been explored through the field of education but has always been integral in architecture and design (Ellsworth, 2005, p. 6). For Ellsworth, the *experiences* of learning, such as bodily sensations and movements, are crucial to *what* may potentially be understood. Pedagogy has been informed by visceral, kinaesthetic, and haptic epistemologies that are conducive to experience.¹⁸ Ellsworth (2005) explains that “designers of content-based experiences, museum exhibitions, and public spaces” are inventing places of learning such as “processual paths,” “communicative instruments,” and “provocative interactive encounters,” – with pedagogical intent – and they are doing so in ways that emphasize processes such as “movement, sensation, intensity, rhythm, passage, and self-augmenting change” (p. 6). Rather than through language, these designers communicate their pedagogical intent through the design vernacular: the orchestrations of space, time, duration, movement, sensation, sound, text, image, interaction, and juxtaposition (Ellsworth, 2005, p. 10). Indirectly through design, these anomalous places of multi-modal learning promote surprise and constantly challenge visitors with new and unexpected questions.

Ellsworth’s emphasis on the significance of bodily sensations and movement for learning is reflective of phenomenology, a philosophy or method of inquiry based on the premise that reality consists of objects and events as they are perceived or understood in the human consciousness without any theories from the natural sciences or psychology

¹⁸ Visceral epistemologies involve sensory experience or physical awareness of the body’s movement, kinesthetic epistemologies relate to or are based on the sense of touch, and haptic epistemologies are based on instinct or emotion.

(Pallasmaa, 1996, p.447).¹⁹ French phenomenologist Maurice Merleau-Ponty argues that perception is significant because it denies the separation of subject and object and is the only means of broaching the divide between self and world (Drake, 2005, p.54). Phenomenology is based on the premise that movement of the body is significant to sensory experience and our interpretation of our environment (Drake, 2005, p.56). Architect and phenomenologist Juhani Pallasmaa (2001) believes that the meaning of our surroundings resides in human experience as this meaning is “evoked in the acts of occupying and inhabiting space, in one’s experiences of space, matter, gravity, and light” (p.52).

Ellsworth uses Maya Lin’s Vietnam Veterans Memorial in Washington, D.C. to exemplify the implication of bodies in pedagogy (figure 3). Lin designed the memorial with the pedagogical intent of teaching visitors about a historical event. The sensations of

Figure 3: Vietnam Veterans Memorial



Note: Image from *The Vietnam Veterans Memorial*. Retrieved May 2, 2007, from <http://thewall-usa.com/wallpics/wallnew2.htm>.

movement and duration are experiences that are crucial to an understanding of her concept (Ellsworth, 2005, p.18). The physical experience of passing slowly down and through the tapered passage, symbolically walking through the war’s course, “past a silent, chronological roll call of the more than 58,000

¹⁹ Phenomenology originated from the work of Edmund Husserl (1859-1938) who studied phenomena that appealed directly to the consciousness and believed that there was an excessive reliance on scientific rationalism (Drake, 2005, p.54).

American war dead” also facilitates interior journeys because “the reflective surfaces of dark, polished granite engraved with text, enable us to see ourselves in relation to the content” (Stein, 1997, p.118-119). Of this project and her other landscape works, Lin declares: “I create places in which to think, without trying to dictate what to think” (cited in Ellsworth, 2005, p.54). Lin’s statement is also reflective of the subjectivity of Constructivist learning theory.

2.3. Exposition and Museums: An Informal Learning Typology in the 21st Century

Introduction

Although preservation and conservation are recognized as important functions of a museum, this aspect of museums is not relevant to this practicum because the Ecological Design Centre will focus on representing contemporary issues in sustainability and the latest green products rather than developing and maintaining a permanent collection. Alternately, it is the communication and interpretation strategies employed by museums as an informal learning typology to disseminate information which are relevant to this discussion. The discourse around which museums evolve, and which defines their primary function, is exposition (Bal, 1996, p.2). Rather than narrowly considering discourse in terms of language, Bal (1996) “multi-medializes” the concept of discourse to imply “a set of semiotic and epistemological habits that enables and prescribes ways of communicating and thinking...” (p.3). Bal’s conceptualization warrants a critical analysis of museums theoretically and physically by examining their discourse as well as their spatial qualities and characteristics.

This section of the literature review briefly explores historic exposition models including the traditional museums and the Great Exhibitions and World Fairs to develop an understanding of the evolution of exposition facilities. To inform the design of the Ecological Design Centre, this section examines innovative modes of communication employed by contemporary museums and the additional services they provide as well as the relationships museums are attempting to establish between subject matter and building form.

History of Exposition

Museums are continuously evolving ideologically and physically in relation to the dual pressures of relevance and solvency which are subject to social, political, economical, and cultural changes. Curators have always been cognizant of the necessity to consider contemporary standards of pleasure and education. One of the earliest incarnations of the museum, the pre-nineteenth century 'cabinet of curiosities', displayed a jumble of natural and art objects on the walls, ceilings, cupboards, and drawers of one or two rooms to surprise and delight their upper class audience (Newhouse, 1998, p. 9). Collections presented the paragons of the aesthetic and intellectual pursuit with a lack of contextual information in a venue where the predominant mood was one of display rather than debate (Casey, 2003, p.4). Content was typically communicated through what Peter Walsh describes as the "unassailable voice", which attempted to suppress differences in interpretation by speaking with one authoritative voice, giving the institution a monolithic character and hiding museum processes such as collecting, cataloguing, and developing exhibitions (Witcomb, 2003, p.120).

A departure from the elitist and hierarchical early museums, The Great Exhibitions and World Fairs combined didactic intentions with dramatic displays of industrial prosperity while introducing notions of entertainment and consumerism into the museum setting.²⁰ While traditional museums focussed on collecting, the Fairs were devising innovative ways to sell products. By the nineteenth century, entertainment was embraced and education, commerce, and propaganda had to be disguised as pleasurable activities (Greenhalgh, 1988, p. 42). The exhibitions provided opportunities for corporate sponsors to associate their products with an atmosphere of abundance, exoticism, entertainment, and spectacle while constructing consumer images of the brands of their goods (Belk, 1995, p. 14). The exhibitions brought together disparate types of produce in a way that no cultural manifestation before them had accomplished, thus they reflected and influenced taste and attitudes in their respective times (Greenhalgh, 1988, p. 82).

As noted in its title, *Building the World of Tomorrow with the Tools of Today*, the New York World Fair of 1939 optimistically described 'tomorrow's world' by familiarizing visitors with the inventions industry was offering for the improvement of daily life. By attracting over a million visitors a day, more visitors attended the Fair than had any other type of exhibition in the past (Picchi, 1999, p.90). The Fair marked the "apotheosis of the impact of design on the market" and leading industrial designers were brought in to exalt the positive power of industry which would revolutionize life in the very near future through a generous and "phantasmagorical promise of prosperity" (Picchi, 1999, p. 90). Of primary importance is the influence of the Fair on consumer values wherein new 'needs' were created that had not existed before. Although the intent of the Ecological Design Centre is not to sell

²⁰ Which begins with the *Great Exhibitions of the Works of Industry of All Nations* held in 1851 at the Crystal Palace in London, was followed by the fairs in Paris and Chicago, and succeeded by the New York World Fair in 1939.

products, but rather to educate the public about the advantages of green products and practices, methods of communication will draw more from the World Fair than the traditional museum model which focussed on collection and preservation. While the Fairs were extremely utopic, they drew impressive crowds due to the success of their delivery methods and are exemplary when devising a system that will increase the appeal of sustainable items to the public.

The Contemporary Museum

Throughout the twentieth century, the public museum underwent a transformation involving the creative adaptation of aspects of other new institutions such as the international exhibition and the department store (Bennett, 1995, p. 19). Recent ideological and physical transformations in the museum manifest the contemporary context of Postmodernism, consumer culture, and the ubiquitous nature of ICTs. Competition from leisure commodities, such as shopping, theme parks and television, has established new modes of exhibition employing Postmodern qualities of reproduction, simulation, and spectacle. Similar to George Hein's suggestion that Constructivist museums would require a focus on the dispositions of the *learner* rather than strictly on the subject matter to maximize learning potential, the contemporary museum has shifted its orientation away from the museum's artefacts and towards establishing a relationship with its *visitors* (Kirshenblatt-Gimblett, 1998, p.138). In the contemporary museum, display techniques have primacy, and museums have established a new framework of information, customer service, and 'experience'.

With regard to museums and information, George MacDonald, past director of the Canadian Museum of Civilization in Quebec, argues that "all museums are fundamentally

concerned with information: its generation, its perpetuation, its organization, and its dissemination” (cited in Witcomb, 2003, pp.113-114). MacDonald sees the information society as resulting in a new social class and type of visitor, and it can generally be assumed that this group will be defined by its:

inclination to reject traditional, low tech, interpretive technologies that employ academic jargon with which they have no familiarity; preference for new information technologies, with which many people feel comfortable and in control, and which allow them to query more; its greater interest in behind-the-scenes technical operations; and its demand for non-collections based facilities and services, such as lounges, restaurants, and film presentations (cited in Witcomb, 2003, p. 114).²¹

The public is seeking multiple experiences such as quality time with family or friends, education, culture, entertainment, and convenience (Falk, 2000, p. 210). MacDonald also notes that if the museum is not relevant to this new social group, it risks being defined out of its list of leisure activities (Witcomb, 2003, p.115). As museums face a decline in private and public funding, services including restaurants and gift shop are also contributing a vital source of revenue.

Barbara Kirshenblatt-Gimblett (1998), Professor of Performance Studies at the Tisch School of the Arts at New York University states that a focus on visitor services is why mounting exhibitions, which is how museums produce experience, has become their major activity (p.138). Visitors are no longer interested in the quiet contemplation of objects in a cathedral of culture—they want to have an “experience”, what Kirshenblatt-Gimblett (1998) describes as an “engagement of the senses, emotions, and imagination” (pp.138-139). There has been a significant rise of experience-oriented display techniques due to the preference of audiences for immersive environments (Casey, 2003, p.20) and technology has been instrumental in the creation of such experiences. Since the mid-1980s, electronic media has

²¹ Interest in behind-the-scenes technical operations is exploited at the Eyebeam Museum of Art and Technology, discussed in the Precedent Analysis section.

assumed a greater presence in exhibition facilities, manifest in a multitude of forms including interactive touch-screen kiosks, large-screen installations and videowalls, digital orientation centres, virtual reality, and increasingly sophisticated web sites (Griffiths, 2006).

Technologies may facilitate the representation of complex ideas and processes as they have the capacity to “activate an otherwise static exhibition with sound or moving images, provide a variety of view points, engage visitors in multi-layered activities, and encourage and support interaction among people in an exhibition” (Griffiths, 2006). Many directors and curators have embraced new interactive technologies for their promise to democratize knowledge, to offer contextual information on exhibits, and to boost museum attendance (Griffiths, 2006).

For instance, The Learning Zone, housed on two concourses in London’s Tate Modern Art Museum, is a dedicated space where visitors can discover more about the art on display through electronic technologies and other means. The glossy red fibreglass suite of furniture is equipped with interactive games, computer programs, a hand-drawn mural which organizes art history into a timeline, and a cinema (Himelfarb, 2006, p.41). Architectural critic Grant Gibson (2006) affirms that the Tate wanted “to be more proactive and less passive when dealing with people. In other words, when you’re not looking at art, you should be interacting with art...or doing something” affirmed (p. 142). Gibson (2006) argues that although the Tate has provided a successful avenue of encouraging visitors to discover more about the work on display, it has neglected to provide visitors with space “to actually think for themselves, to ponder on what they’ve just seen and what it might mean... Wouldn’t it be great to offer them a spot away from the noise of the cafes in which to mull over their interpretations?” (p. 145)

Some critics have noted that contemporary emphasis on “edutainment” and immersive experiences appear to be at the expense of intellectual encounters esteemed in the traditional museum (Casey, 2005, p.80). French cultural theorist and philosopher Jean Baudrillard argues that the exploitation of simulation and spectacle has resulted in the “Disneyfication” of museums where rational learning and enlightenment has been sacrificed to superficial entertainment based on illusions (Belk, 1995, p.123). Russell Belk, Professor in the David Eccles School of Business at the University of Utah, focuses his research on consumer behaviour and materialism, and has addressed these topics in relation to exhibiting at museums and world fairs in his book *Collecting in a Consumer Society*. Belk contends that marketing strategies such as the ‘blockbuster’ show, a progeny of the International Exhibitions and World Fairs, have been accessible and profitable, providing spectacular though often superficial entertainment with a lack of substance, but do not necessarily break any new educational or scholarly ground (Belk, 1995, pp.123, 135).²²

In fact, privileging pleasure over pedagogy and considering content strictly in terms of entertainment is simply a return to the astonishment and sensual delight associated with traditional museums (Newhouse, 1998, p. 190). Belk (1995) explains that what people want may not be what they need, and consumers may not know or be able to explicate what they want (p.133). Expositions have a unique capacity to teach by showing and it is the responsibility of the design team, including curators, architects or interior designers, exhibition designers, and graphic designers to ensure that while content must be made accessible to the largest possible audience, that the educational aims are not neglected in favour of superficial display.

²² This interest in behind-the-scenes functions is exploited at the Eyebeam Institute of Art and Technology, discussed in section 3.1. of the precedent analysis.

Developing a relationship with visitors has also required that museums offer a variety of services to compliment the learning experiences. Restaurants have become integral to the museum experience and have the potential to support the museum's mission and emphasize its identity. Dining experiences within a museum can acclimatize visitors to the museum content and prepare them for encounters with the exhibits. Conversely, the food and dining experience can also be authenticated and enhanced by its association with a cultural institution (Klein, 2002, p.93). According to museum scholar and marketing consultant Margot Wallace (2006), museum restaurants provide visitors with a place to "relax and refresh, discuss and ponder, and re-attack the museum with renewed interest" (pp.143-144). Indeed, a space for reflection, where visitors can internalize new knowledge, is critical to constructivist learning theory. Furthermore, the dining experience has a distinctive capacity to engender emotion: "because eating is so basically sensual and nonrational at its root, it is a powerful trigger of feelings and memories" (Klein, 2002, p.96). As discussed previously by Paolo Tuminelli, experiencing emotion is conducive to retaining knowledge which supports the incorporation of a dining facility restaurant space in the exhibition facility.

Exhibition Space: The Relationship between Form and Content

Intrigued by the proliferation of museums in the last decade, Amanda Reeser Lawrence and Ashley Schafer co-edited *Praxis: Journal of Writing and Building: Untitled Number Seven* which scrutinizes recent projects that have attempted to reconceptualise the space and discourse of museums. Although there has been a vast array of exhibition facilities completed since Frank Gehry's Guggenheim Bilbao museum in 1997, they feel that there has been a lack of innovative approaches. Reeser Lawrence and Schafer (2005) describe two

main genres that have dominated: the conventional building type, “a modernist version of the white-box – a neutral, ‘flexible,’ Miesian ‘universal space’ where the architecture ennobles the display of [its contents]” or the stylistic classification, “a post-modern icon where the image of the museum is paramount and often indifferent to its contents” (p. 4).

The white cube has represented to many an almost optimum exhibition space, with a clean, minimal aesthetic which embodies modern sensibilities. Yet, in the Postmodern condition of inconsistency and change, the intransigent purity of the white cube has challenged its continued relevance. Artist and curator Marion Von Osten (2005) argues that viewing an exhibition in the white cube has typically put the viewer in a specifically silenced and disciplined position (p. 207). The “body politics” associated with the white cube have generally resulted in a privileging of the spectator’s eye and have thus constructed passive audiences (Von Osten, 2005, p. 209). Victoria Newhouse (1998), author of *Towards a New Museum*, argues that the ‘white cube’, with its “formulaic impersonality” and “one-size-fits-all approach”, relates neither to the work exhibited nor to the city where it is located (p.65).

In contrast, the form of the Guggenheim Bilbao was inspired by the local ship building industry and arguably responds to its context. This architectural icon has become a tourist attraction and therefore had the capacity to put the previously unknown city of Bilbao on the map as a major tourist attraction. Yet, this form of ‘statement architecture’ has been criticized for overpowering the museum’s contents, narratives, and dialogues (Fleming, 2005, p.57). Thomas De Monchaux (2005), architectural critic and practitioner, is against the Guggenheim process for its tendency to build “an art piece...which kidnaps the interior for its own selfish value” (p. 124). In the case of statement architecture, it seems that the purpose

of the objects, art or other agents on display may simply be to authenticate the exhibition space as a 'cultural' experience.

Debating between the 'white cube' and the 'Guggenheim Bilbao' does not provide a satisfactory resolution to the dilemma of developing a relationship between the physical space and the subject matter on exposition. As discussed earlier, exhibition content has become increasingly experiential and engaging. Art critic and curator Fumio Nanjo (2005) suggests that rather than serving as a mere occasion for displaying content, exhibition space should provide experiential environments for "viewer-participants" to actively engage with the physical, social, and cultural contexts surrounding the subject matter (p.10). Because architecture and often the content on display has become 'ambiguous', 'cross-cultural', 'subjective', 'regional', and 'individuated', exhibition spaces demand new identities and functions that are distinctive and accommodate diverse circumstances (Nanjo, 2005, p.1).

Reeser Schafer and Lawrence (2005) have also asked the fundamental question, "how can design forge an integral relation between an architectural and a curatorial intention?" (p. 4). Although the term 'curate' has been conventionally used to signify the organization of content for purposes of exhibition and education, Reeser Lawrence & Schafer (2005) extend the act of curating to entail the "orchestration of a relationship between architecture and exhibition" (p. 4). In this sense, the exhibition space as a programmatic typology becomes a design operation or strategy, the construction of a means for accessing the content (Reeser Lawrence & Schafer, 2005, p. 4). As opposite exhibition environments, the 'white cube' and the 'bilbao' demonstrate the need for a new typology which seeks innovative ways to engage subject matter which is also in a continuous state of evolution. The dialogue of this alternative exhibition space comprises flexibility, transparency, regionalism, and an

attentiveness to sensory experiences and body sensations.²³ The Ecological Design Centre will attempt to use the interior environment to support the subject matter.

²³ The Eyebeam Museum, by Diller Scofidio + Renfro, is an example of a facility which has questioned and redefined the purposes of exhibition space and is discussed in the precedent section below.

3.0. PRECEDENT ANALYSIS

3.1. Educational and Exhibition Facilities

As there are no exact precedents for the Ecological Design Centre, this section has explored the programs and spaces of several organizations which have as their objectives, education, display, or a combination. Two separate models, 1) Architecture/Design Centres and 2) Design Showrooms and Product Resource Centres, are examined to contrast the types of services they offer. An evaluation of these facilities and their respective limitations has precipitated their use as negative precedents in a sense because it is what they have not accomplished or sought to accomplish, which generates the need for a new typology. The proposed Eyebeam Museum of Art and Technology in New York has approached the design of exhibition space unconventionally and is reviewed programmatically and also spatially to provide inspiration for an exhibition facility that is responsive to contemporary learning needs.

Architecture/Design Centers

After my initial visit to the Canadian Centre for Architecture (CCA) in Montreal, which defined the topic of my practicum, a theoretical and spatial exploration of architecture/design centres regarding their mandates and their methods of disseminating information was undertaken. Besides gathering any relevant literature published about architecture/design centres, throughout the span of my practicum I have visited numerous centres in North America and abroad including the CCA, the Design Exchange in Toronto,

the Chicago Architecture Foundation in Chicago, the Design Museum in London England, and the Netherlands Architecture Institute in Rotterdam. It was evident from these studies that the title 'architecture/design centre' was a term used extremely broadly to encompass a wide range of facilities with varying subject matter, mandates, agendas, and knowledge delivery systems.

Architecture centres are a phenomenon that only originated in the late 1980s and early 1990s but are widely increasing in popularity, "mirroring the field's increasing cachet" (Lubell, 2004, p.86). Introducing "a traditionally isolated field to a once-ignorant or skeptical public, [would help] to establish a dialogue between them that is essential to promoting good design." Lynne Osmond, president of the Chicago Architecture Foundation, states, "there's all this interest in the world about architecture. But the real question is: How are we going to put this movement forward rather than letting it drop?" (cited in Lubell, 2004, p. 86)

Architecture and design journalist Tom Dyckhoff, indicates that architecture/design centres generally intend to promote the cultural importance of architecture and issues of the built environment and provide public forums for debating the past, present, and future of cities (Dyckhoff, 2003, p. 13). Their function is to broker, engage, promote, interpret, and provide a public information resource. He clarifies that it is their commitment to reducing the "alienation felt by the public from understanding and controlling the built environment" which distinguishes architecture/design centres from other architectural institutions such as research centres, or heritage and civic organizations (Dyckhoff, 2003, p. 9). Many centers set forth to accomplish this objective through design exhibition accompanied by programming consisting of lectures, seminars, outreach programs, tours, and/or design competitions.

As communicated in their mission statements and mandates, the primary objective of many centres is education and engagement of the public with issues related to the built environment. For example, the mission statement of the Design Exchange in Toronto is: "To promote the value of Canadian design, through engaging and enriching programs" (Design Exchange, n.d.). According to their website, "the Chicago Architecture Foundation is dedicated to advancing public interest and education in architecture and related design" and their vision declares that "because no art other than architecture so vividly expresses what Chicago is and where it is going, CAF will educate the public to expect the highest standards from Chicago's built environment" (Chicago Architecture Foundation, n.d.). The Design Museum in London states their aim as "the advancement of the education of the public in the study of industrial and manufacturing art and design in its historical, social, artistic, industrial, and commercial context" (cited in Usherwood, 1995, p.260). According to Stephen Bayley, the first executive of the Design Museum, the educational aim has a specific objective: to provide a "framework of ideas to explain the everyday," which will produce "a better educated consumer... able to make more discriminating choices, thus forcing up standards from retailers to manufacturers" (cited in Usherwood, 1995, p.260).

These facilities rely on the public's desire for knowledge and/or entertainment and have accomplished their missions to varying degrees. Although most centres have as their mandate the desire to involve the general public, many cater mainly to professionals as a resource centre because they have not adopted strategies which make their content accessible to the general public. Criticism directed towards the centres is often regarding their stated objectives as opposed to the reality of the organization's accomplishments.

While the Canadian Centre for Architecture in Montreal projects an elitist and exclusive image, conversely, the DX has been criticized for acting as more of a “resource centre and party space than a museum”. The main floor is consumed by a restaurant and bookstore while the trading floor and boardroom are booked mostly for non-design events such as weddings and professional networking (Betsky, 1995, p. 122). The difficulty of accomplishing the centre’s mission while also being an economically viable organization is a dilemma which faces many centres.

Figure 4: Design Exchange exhibition gallery



Note: Image courtesy of the Design Exchange

At the Design Exchange

(figure 4) and the Design Museum, which have focused predominantly on industrial design for mass consumerism, discrepancies between the publicity material and actual presentation become evident. In certain exhibitions, the industrial products on display, designed to facilitate and enhance

our routine activities, are stripped of this context and mounted in a ‘white cube’ exhibition setting where they are subjected to aesthetic scrutiny. Despite the phantasm conjured by the media of a broader, contextual approach to educate the public about the benefits of design, these exhibitions have evoked the ‘look-but-don’t-touch’ ideology that is contrary to the inherent nature of the products. One critic states that at the DX, the notion of “exchange” is much less prominent than the vision of design as mercantilism, where success is measured in

terms of market share, not human liberty, and the seduction of the package is more crucial than the performance of the object (Mannell, 1995, p. 32). Such displays seem antipathetic to the missions of the facilities. The DX and Design Museum's strategies propagate the message that design is to be understood as art and their ultimate educational objective appears to be the cultivation of a more discriminating consumer who will contribute to increasing commercial success (Usherwood, 1995, p.267). Rather than portraying design as a highly conceptual finished or art, the exhibit should communicate the context of the design (Feireiss, 2001, p.8). Exhibits that engage visitors actively and encourage them to interact with the content rather than simply observing from photographs and models may allow them to decipher their own meaning.

Design Showrooms and Product Resource Centres

Design showrooms, such as Designers Walk in Toronto, the Pacific Design Center in Los Angeles, or Material Connexion in New York, consist of a resource, trade centre, and/or marketplace and their primary objective is the sale of products to professionals. A diverse range of commercial and residential product lines including furniture, fabric, floorcovering, wallcovering, and accessories are featured in a series of showrooms in an attempt to render the spatial and tactile qualities of the products comprehensible.

Showrooms possess many of the qualities inherent to department stores which differentiated them from museums and made the 'cathedrals of consumption' so appealing during the late nineteenth and early twentieth centuries. The pleasure of rummaging through materials brings "to the visual a tactile component in the presentation of commodities", which minimizes the distance between people and things that was often necessary in

traditional museums for preservation (Belk, 1995, p.125). Belk (1995) states that “touching allows for a provisional participation in the paradise of commodity pleasure, which only intensifies the desire for possession” (p. 128).

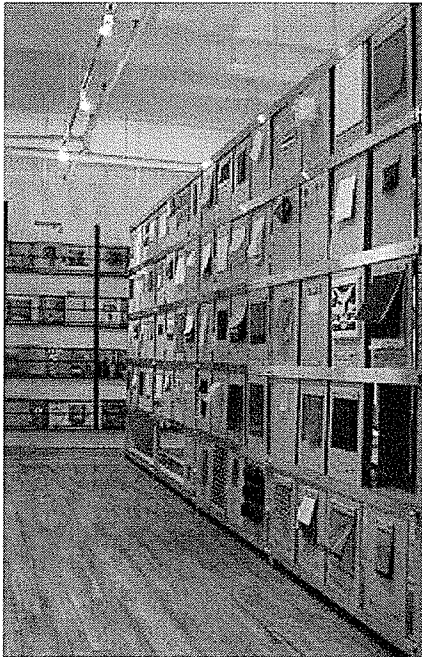
Although showrooms permit sensory exploration they have traditionally catered to professional designers rather than the inquiring public. Despite a trend in recent years where some showrooms are not only permitting but encouraging retail trade, they remain largely inaccessible to the public due to their lack of ease in navigation, lack of staff support, and overwhelming variety of products (Simpson, 1994, p. 32). Showrooms are focused towards professionals who have a specific agenda and the skills to determine what they are seeking. Temo Callahan, director of the fabric firm Clarence House, believes that “the customer is hiring the designer to edit, and only a technically trained, professional eye can find the right fabric among hundreds” (cited in Simpson, 1994, p. 46). Furthermore, showrooms are not equipped to be educative, which may be why many are strictly opposed to public access. John Stark, co-director of Stark Carpet which has showrooms in twelve cities, states that “we have sold exclusively to the trade, and there is simply not enough personnel here to work with the retail client... we can’t educate them in any quick practical way to deal with custom orders” (cited in Simpson, 1994, pp. 42,46).

Some centres are more tolerant of non-professionals and appreciate their increasing knowledge about the elements of design. These centres can take advantage of benefits such as increased sales and contact for designers and the opportunity for non-professionals to consult with industry experts (Turrentine, 2003, p. 154). Although the Pacific Design Centre in West Hollywood, California welcomes public access, they emphasize that their primary purpose is to conduct business by exercising control over access with a high entrance fee.

Except during certain annual events, an admission fee of one hundred dollars an hour is charged, which allows consumers to tour showrooms and make purchases at fifteen percent above wholesale (Turrentine, 2003, p. 155).

The focus of Material Connexion, which was established in New York in 1997, deviates slightly from that of the typical showroom. Rather, Material Connexion is a resource centre dedicated to finding and archiving “the most innovative materials in the world” (Paul, 2001, p.78). The facility features a library, testing laboratory, gallery space, and bookstore as well as online services and has since expanded with locations in Milan, Cologne, and Bangkok. Realizing the crucial role that intelligent, ecological, and innovative materials play in the design of buildings and industrial/consumer products, George M. Beylerian founded

Figure 5: Material Connexion sample library



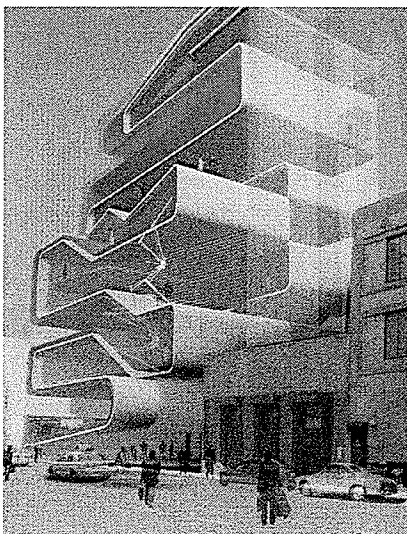
Note: Image courtesy of Material Connexion
Copyright ©, Material ConneXion®

Material Connexion as a resource for architects, industrial designers, interior designers, product designers, fashion designers and transportation designers. Acting as a consultant and matchmaker, the facility connects designers with manufacturers of new materials to provide solutions to existing design problems or inspire new design ideas.

The library contains over 3500 material samples internationally sourced from various industries and thoroughly investigated by a team of jurors (Material Connexion, 2007). The samples are arranged on library shelves in a manner that promotes perusal and an exploration of their sensory qualities (figure 5). By

decontextualizing the materials completely and focusing on technology, the display strategy facilitates a redefinition of the materials for new purposes (Paul, 2001, p. 80). Although the majority of the organization's functions cater to professionals, the gallery space is open to the public and demonstrates potential applications and adaptations to create new products through museum-style exhibitions (Material Connexion, 2007). However, even access to the gallery space is restricted to members and membership is a fee of \$200 annually. High entrance fees for Material Connexion and the Pacific Design centre would make the sensory opportunities of a showroom inaccessible to many. Showrooms have been successful in providing a sensory experience for designers, and their display strategies could be used in the Ecological Design Centre if they are supplemented with access to information or staff assistance.

Figure 6: Eyebeam Museum of Art and Technology exterior view



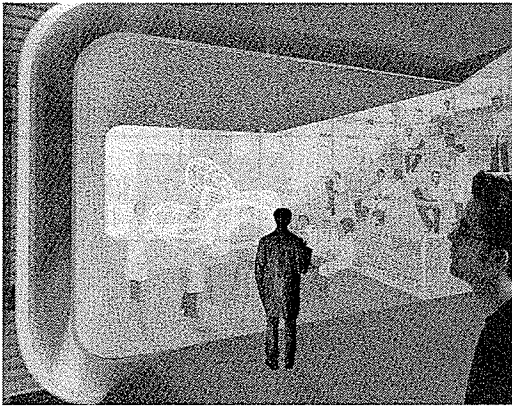
Note: Image courtesy of Diller, Scofidio & Renfro

Proposed Eyebeam Museum of Art and Technology

Diller, Scofidio and Renfro meld art and architecture in an interdisciplinary studio where they have produced provocative buildings, multi-media installations, and electronic media and print. They possess an unorthodox view of museums which has inspired their search for ways of transforming the visitor's experience and awareness of the institution itself by questioning distinctions between image and reality (LeCuyer, 2006, p.175). Diller, Scofidio and Renfro designed the Eyebeam Museum of Art and Technology in 2001, to be

located in New York, but construction has been put on hold. The 90,000 square foot facility dedicated exclusively to new media art will house an exhibition space, artist-in-residence studios, an education centre with multi-media classrooms, a state-of-the-art new media theatre, a digital archive, a restaurant, and a bookstore (figure 6).

Figure 7: Eyebeam Museum of Art and Technology interior view



Note: Image courtesy of Diller, Scofidio & Renfro

The project explores the functional and spatial duality of making art and viewing it by partitioning the program in two with a pliable ribbon—production (atelier) located to one side and presentation (museum and theatre) to the other. This ribbon undulates from side to side while climbing vertically from the street and with each change of direction enfolds alternate production and presentation spaces (Slessor, 2002,

p.76). The spaces of production and presentation, and their occupants, are exposed to one another as the surfaces are folded, spliced, shuffled and interwoven. This ‘controlled contamination’ juxtaposes “technical processes with their effects” and “the prosaic with the poetic” while blurring distinctions between the acts of creation and viewing (figure 7) (Slessor, 2002, p.77).²⁴ As mentioned by George MacDonald in regards to contemporary museum experiences, visitors are increasingly interested in behind-the-scenes functions rather than simply having access to a final product and the view of production spaces satisfies this inquisitiveness. Diller, Scofidio and Renfro have also transposed the boundaries traditionally defined by museum galleries to emphasize the pervasive nature of digital

²⁴ Controlled contamination is a term used by architects to describe the connections between the building residents (students, artists and staff) and the building’s users (museum goers and theatergoers)

technology creating the potential for installations to occur anywhere from washrooms to the street outside the building (LeCuyer, 2006, p.174).

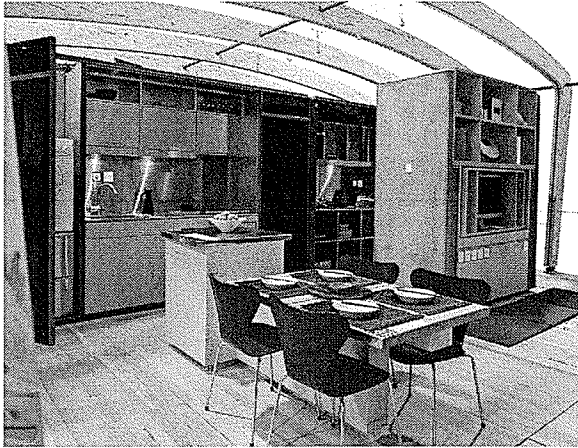
The building also had specific technical requirements which were addressed effectively through the structure resulting from the conceptual ribbon. To create an adaptable infrastructure capable of accommodating technical change and future technologies, the ribbon was devised as a double-skinned concrete envelope sandwiching a technical space between the layers. This interstitial space is expressed as a grid of “pores” embedded in the concrete floors and ceilings of the presentation galleries which provides data and electronic feeds, connections for space, light and sound systems, and structural mounts for equipment, screens, curtains, and artefacts (LeCuyer, 2006, p. 174). The dual program had distinct lighting requirements such as an even distribution of natural and artificial light for day/night work in the production spaces and a high degree of light control and sound isolation in the presentation. To accommodate these requirements, electrochromic glass was used because of its capacity to transform from transparent to opaque as required (LeCuyer, 2006, p.174).

3.2. Exhibition Examples

Because the exhibition space at the Ecological Design Centre will strive to accommodate a wide variety of exhibitions, three exhibitions have been selected as examples to establish design criteria. The exhibitions were selected not only for their content, which focuses on design and sustainability, but also because they differ widely in form. They communicate their content through a variety of media which would therefore impose distinct requirements on the space in which they would be exhibited. The three exhibitions exemplified include *Sustainable Condo*, *Big & Green: Toward Sustainable Architecture in*

the 21st Century, and *The American Lawn: Surface of Everyday Life*. An overview of the subject matter and educational objectives, a physical description, and a general analysis of the spatial and technical requirements of each exhibition is outlined below.

Figure 8: Sustainable Condo view of kitchen



Note: Image courtesy of Busby, Perkins & Will,
Photo by Martin Tessler

Sustainable Condo

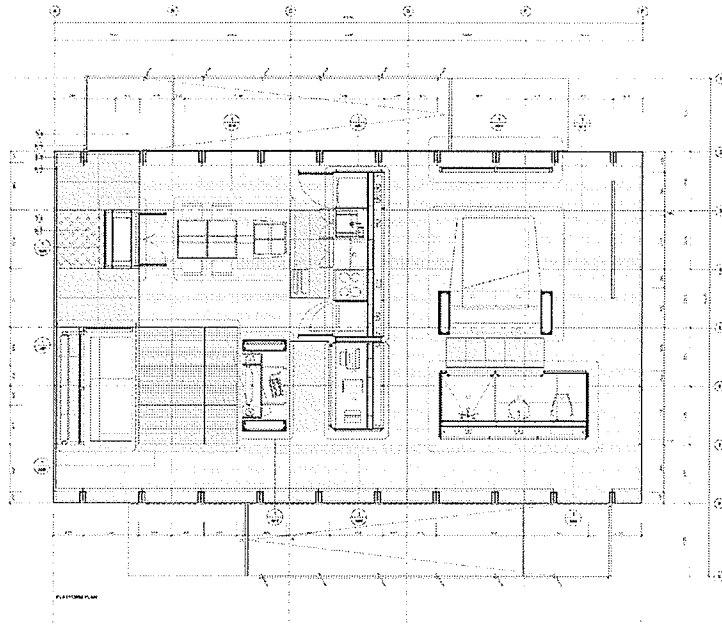
Initially exhibited at Globe 2004 the mobile Sustainable Condo was designed by Busby, Perkins and Will of Vancouver.

Sustainable Condo is “an innovative and dynamic exhibition of leading-edge green building technologies, products, and techniques showcas[ing] comfortable, cost effective, and environmentally friendly

living” (Busby, Perkins & Will, 2004). Appliances, devices, and building strategies are demonstrated to educate visitors about energy, water, and materials consumption, general health and well-being, and land use (figure 8). Featured products and systems that consume minimal energy and/or water or have been derived from local, renewable, and recyclable sources include appliances, windows integrated with photovoltaic panels, and convertible space-saving furniture and millwork. Information about environmental properties is identified with the use of cards containing symbols and text which are placed on each item. Journalist Trevor Boddy notes that the dramatic curving structural ribs which define the roof and exterior walls of the condo are built from strand board, the “eco-friendly alternate to plywood” (p.44). The condo living space is 750 square feet but the total exhibit, including the

two access ramps, is about 1200 square feet, with the exhibit measuring approximately 34 feet by 40 feet. The overall height of the exhibit is approximately 14 feet.

Figure 9: Sustainable Condo floor plan



Note: Image courtesy of Busby, Perkins & Will

Some of the components are quite large, requiring a loading area that is expansive and that also provides open space for assembly.

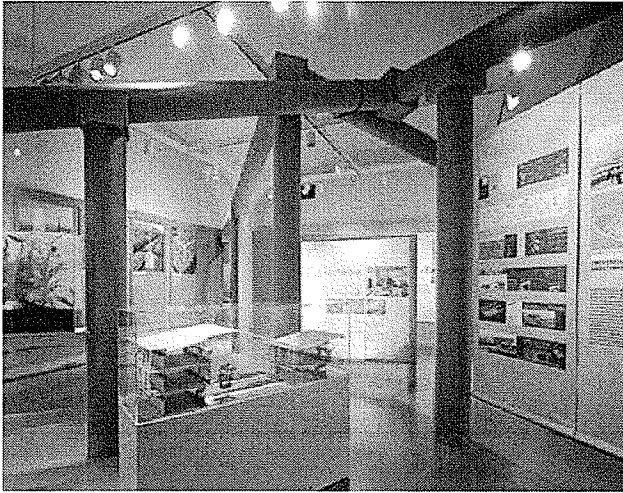
Big & Green: Toward Sustainable Architecture in the 21st Century

Big & Green was first exhibited at the National Building Museum in Washington in 2003 and was curated by David Gissen and designed by James Hicks and Pure & Applied Graphic Design. The Big & Green exhibition showcased large scale architectural projects that addressed environmentally sustainable practices to demonstrate how these structures can integrate the built and natural environment. The projects were organized into five categories

Sustainable Condo

requires a large, column-free space with ceilings that are higher than 14 feet. Views to and from the exhibit from several angles would also be preferred. Several features in the exhibit have designed-in lighting, thus the exhibit would simply require general illumination, either natural, artificial, or a combination.

Figure 10: Big & Green: Toward Sustainable Architecture in the 21st Century, View of the Urbanism room

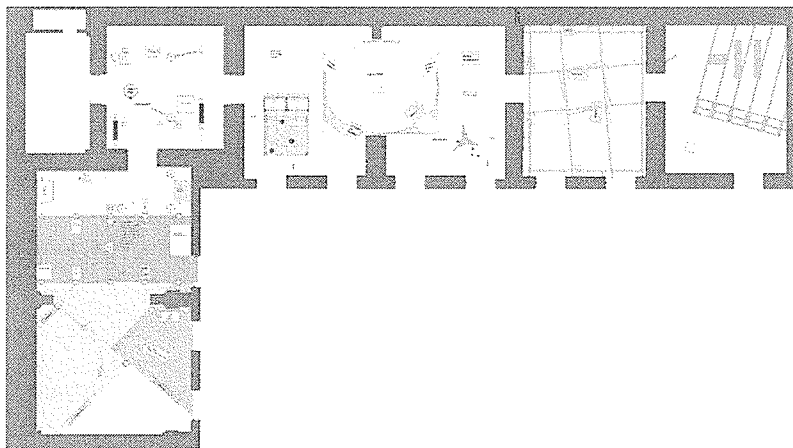


Note: Image courtesy of the National Building Museum

based on their environmental benefits and strategies: Energy; Light and Air; Greenery, Water and Waste; Construction; and Urbanism. The show comprised built, in-progress, and unbuilt works presented through traditional media including sketches, photographs, renderings, models, mock-ups, and a few interactive displays.

The exhibition design team responded to the challenge of “designing an exhibition about sustainable building principles while upholding said principles” by specifying recycled cardboard tubes and bamboo plywood for the exhibition structure (Hicks, 2005). The cardboard tubes were intended to make visitors feel as though they were “walking through a

Figure 11: Big & Green: Toward Sustainable Architecture in the 21st Century, Exhibition plan



Note: Image courtesy of the National Building Museum

forest or a partially built completed building—both places in transition, as green architecture itself is right now” (Snoonian, 2003, p. 93). The designers also attempted to confront the paradox dilemma of designing an exhibition

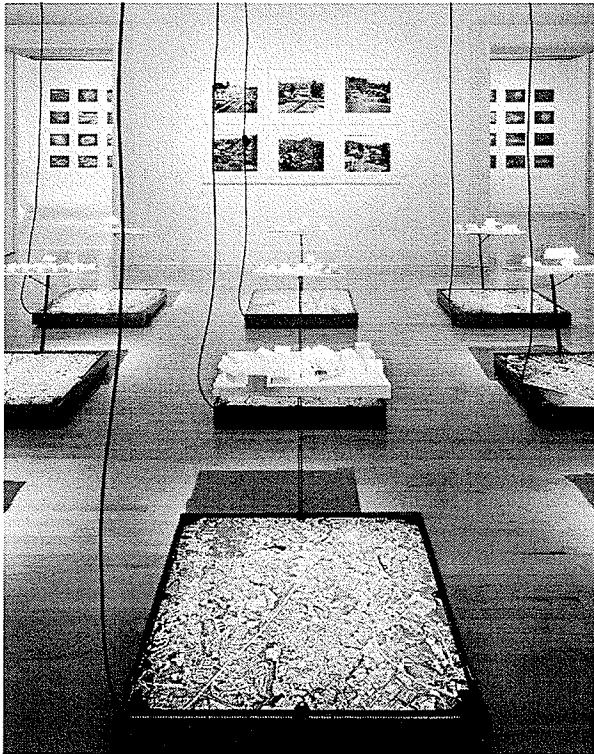
about ecological design in an inorganic museum space with sealed terrariums containing live plants (Hicks, 2005).

The organization of the exhibition requires that the space be divided into six separate 'rooms'. At the National Building Museum, each of these rooms varied between 750 and 800 square feet. A distinct space is needed for each of the environmental classifications noted above as well as an introductory room, which are differentiated from one another with brightly painted walls. The exhibition requires high ceilings as many of the cardboard tube structures exceed heights of twelve feet. Many of the two-dimensional displays are supported by the exhibition's own infrastructure of cardboard tubes, but some wall surfaces are also required for display of two-dimensional surfaces. Models are displayed in glass boxes supported on custom built horizontal bamboo surfaces alleviating the need for additional horizontal surfaces. The introductory kiosk is composed of backlit images and text with interactive components, yet the majority of the exhibits, two-dimensional presentations and models within glass display cases, are not individually lit and would require external natural or electrical lighting. Many of the exhibits, particularly the plants in the terrariums would be enhanced visually with daylight.

The American Lawn: Surface of Everyday Life

Initially exhibited at the Canadian Centre for Architecture in Montreal in 1998, American Lawn was curated by Beatriz Colomina, Alessandra Ponte, Georges Teyssot, and Mark Wigley and designed by Diller + Scofidio Architects of New York. American Lawn was a three-dimensional and multimedia exhibition that portrayed the suburban lawn through a "juxtaposition of historical and contemporary materials, both artistic and scientific and

Figure 12: American Lawn: Surface of Everyday Life, installation view



Note: © Centre Canadien d'Architecture/
Canadian Centre for Architecture, Montreal
Photo by Michel Legendre

from high and low culture [to demonstrate] that there is more to a simple carpet of grass than meets the eye" (Betsky, Hays, & Anderson, 2003, p. 117). Vitrines in the introductory "Museum of the Lawn" present artefacts that demonstrate the six curatorial classifications of the lawn: as a space between buildings and landscapes, a legal space, a field of play, a space of science and engineering, a feature of governmental and institutional architecture, and a site of imagination (Canadian Centre for

Architecture, 1998). A wide variety of media communicates the subject matter ranging from

digital projections on the floor to unconventionally displayed artefacts, to photography, and interactive exhibits. For instance, a series of infra-red aerial transparencies which trace the morphology of suburban developments by mapping the proportions of lawns, houses and driveways dating from the nineteenth century are accompanied by three-dimensional maquettes (figure 12). In the gallery where 'legal' issues of the lawn are explored, stereoscopic photographs show often disputed borderlines between neighbours' lawns. The gallery which depicts the lawn as a field of play features sports shoes with distinctive cleat designs placed cleat-side up beneath a glass table. The "Engineering the Lawn" gallery

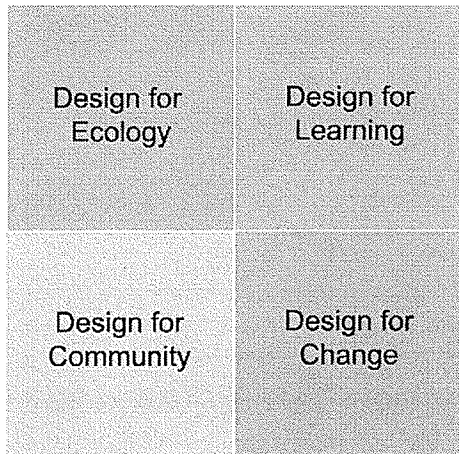
compared natural and artificial samples of turf species with scrolling LED text and tactile opportunities.

The exhibition requires that the space be partitioned into six gallery spaces. Each of the galleries at the Canadian Centre for Architecture has an area of between 450 and 600 square feet. The individual exhibits are fairly small scale and do not have the same height as requirements, creating a more intimate atmosphere in the galleries than the previous two exhibitions. Certain exhibits are suspended from above which requires a ceiling system that can support a substantial amount of weight and is accessible for installation and dismantlement. Furthermore, several of the exhibits have electronic features which require access to power at the floor and/or ceiling. Because there are a variety of exhibits with lit display screens, projections, and built-in lighting, a high degree of control over lighting is required to maintain image quality. Circulation paths still require lighting for safety as visitors pass from one exhibit to the next.

4.0. DESIGN IMPLICATIONS

The inquiry process has involved a review of the pertinent theoretical issues identified in the literature review and precedent review that will inform the practical requirements of the programme and then the design solution. An analysis of the literature and precedents has outlined four implications for the design of the Ecological Design Centre: Design for Ecology, Design for Learning, Design for Community, and Design for Change (figure 13). In each of the implications, the term ‘Design’ is used both as a verb and a noun. As a verb, ‘Design’ is indicative of the processes involved in planning the facility and as a noun it represents the end result.

Figure 13: Design Implications



4.1. Design for Ecology

Design for Ecology signifies that the relationship between people and the natural environment should be expressed through the architecture and interior environments of the Ecological Design Centre. A contextually appropriate identity should be developed for the Ecological Design Centre which reflects the local culture, climate, and geography to assist in instilling a sense of place. Sustainability must be considered in all phases of the design process, planning, design and construction, integrating functional and aesthetic considerations. Building materials that are available locally and/or manufactured from renewable resources or recycled materials should be employed when

possible. The facility should be designed so as to minimize energy consumption and embodied energy and maximise clean water, air quality, natural lighting, and human well being. The social, economic, and environmental benefits of sustainable design should be manifest in the interior environment. Transparency should be exploited to reveal the technological and ecological processes that sustain our existence. Functions typically relegated to being 'behind-the-scenes' such as mechanical systems should be made visible to visitors, blurring the boundaries between spaces for occupation and spaces for support. The building and interior environments should be used as a learning resource to express and explain sustainable design through building tectonics, structure, systems, materials, furniture, fixtures, and equipment.

4.2. Design for Learning

All components of the Ecological Design Centre should be designed to facilitate learning while simultaneously providing visitors with a leisure experience that is relaxing and entertaining. The exhibitions and the interior environment should provide a range of learning modalities to acquire information, foster multi-sensory exploration and input, and promote hands-on, interactive experiences. Because learning is also a social process, the spaces should encourage dialogue and collaboration, allowing visitors to discuss, share, and discover together. Various skill levels and prior structures of knowledge should be accommodated, enabling visitors to connect what they see, do, and feel with what they already know and understand. Additional resources should be available for visitors who require more information on a topic than is provided by the immediate exhibit. The potential for visitors to have choice and control over their learning experiences should be maximized by designing

exhibitions that offer multiple paths rather than fixed entry and exit points. The structure of the exhibition spaces should not be so rigid that visitors cannot tailor the content to accommodate their schedule and learning objectives. Comfortable and quiet spaces should be provided for contemplation and reflection which facilitate the internalization of knowledge. Amenities which also provide repose from learning should also be accessible and visible.

4.3. Design for Community

The Ecological Design Centre should engender a sense of belonging among visitors and promote the contributions that can be made to environmental renewal through collaboration at the community level. Human interaction should be encouraged by providing spaces that promote rendez-vous, discussion, and exchange. Visitors focusing on sustainable design at the community level as well as the individual level would require a large multipurpose space to generate debate and influence policy makers. Participation zones defined by design treatments including floor surface or transparency should be provided where visitors can observe group events from a distance or increase their proximity and involvement as desired. All visitors should be accommodated by integrating universal accessibility and avoiding any elements that could potentially exclude certain segments of the population such as technical jargon. Broadcast space should be provided for the achievements of local professional and student designers, or primary and secondary students. Projects related to sustainability by professionals or students could be displayed to demonstrate how various individuals or community groups are contributing to the environment.

4.4. Design for Change

Short term as well as long term change should be accounted for at the Ecological Design Centre. Sustainable design has the ability to adapt in order to remain relevant to the community and avoid financially and environmentally costly renovations or demolition. A technological and spatial infrastructure should be designed that will facilitate the widest possible range of programs and activities by conducting an overview of programs and activities offered by existing facilities. The Ecological Design Centre should also anticipate unpredictable future changes in exhibition and learning styles that would affect the interior environment. Flexible, hybrid, and multi-functional spaces should be created that accommodate learning and the amenities that support learning. Obsolescence should be designed for by creating spaces that can be stripped, re-fitted, and re-used while generating minimal or zero waste.

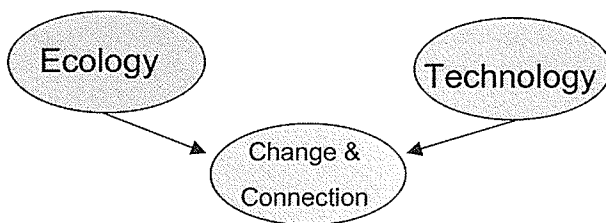
5.0. DESIGN PROPOSAL

5.1. Design Concept

My design approach seeks inspiration simultaneously from ecology and from contemporary information communication technology, which are characterized by change and connection (figure 14). Change and dynamicity are inherent in the environment which is shaped by diurnal and seasonal variations, climate, and human purpose. Similarly, information communication technology such as the internet is constantly changing and can be easily updated and modified to accommodate the development of knowledge. Connection and synergy are also vital to ecology and ICTs, bonding people with nature, their built environment, their community, and information. Ecology emphasizes our relationship with our environment and other organisms and the linkages between the existence of other species and our own. The internet is accessible to a large portion of the population and through the connection of multiple voices, establishes a rich dialogue of communication. The Ecological Design Centre will offer an opportunity to explore the relationships between culture and nature, interior space and methods of learning, and perception and everyday artefacts.

Processes and elements inherent in the natural environment have inspired the interior spaces which have been extrapolated to inform the building through biomimicry. Technology

Figure 14: Concept



has informed the approach to knowledge dissemination and communication. Rather than emulating the internet exactly, exhibition must adapt to this new

information culture but maintain cultural integrity (Witcomb, 2003, p.120). Building systems and materials establish a dialogue that is made visible to the public. Visceral, kinaesthetic, haptic, and social pedagogies that have evolved over the last few decades will also inform the spaces wherein learning occurs. While exhibits are designed for multi-sensory learning experiences, information is also provided digitally in the form of interactive computer programs and videos where visitors can email information to themselves. Staff interpreters will also be located throughout the spaces to assist visitors with exhibits.

The colour and materials palette has been selected to reflect the dual concepts of ecology and technology. Organic materials with inherent sensory appeal such as hempboard composite panels, and colours inspired from nature including moss green, are juxtaposed with aluminium, steel, glass, and a vibrant orange which signify environmental progress. Rather than concealing the roof structure, the joists are exposed, rendering the building structure transparent and creating expansive space in the lobby, exhibition, and showroom. All construction and finish materials, mechanical and electrical systems, furniture, fixtures, and equipment were selected for their sustainable properties. Preference was given to quality materials that have been acquired and manufactured through sustainable sources and processes.²⁵ Design criteria for custom-designed displays in the exhibition space and the showroom included the use of minimal materials, green materials, durability, and flexibility to be reconfigured, combined with other displays, or used in several ways.

²⁵ A complete description of the selection criteria for the furniture, finishes, and lighting as well as images and information regarding the sustainable features of all products are provided in Appendix C.

5.2. Spatial Program Description

Site and Building

The area of the main and second floors of the existing building is 8,672 square feet but the program will require a total square footage of just less than 20,000 square feet. Therefore a large addition to the existing building will be required. Bubble diagrams were used to explore approximate areas and adjacencies of building functions along with external

Figure 15: Tracing of neighbourhood plan to identify forms

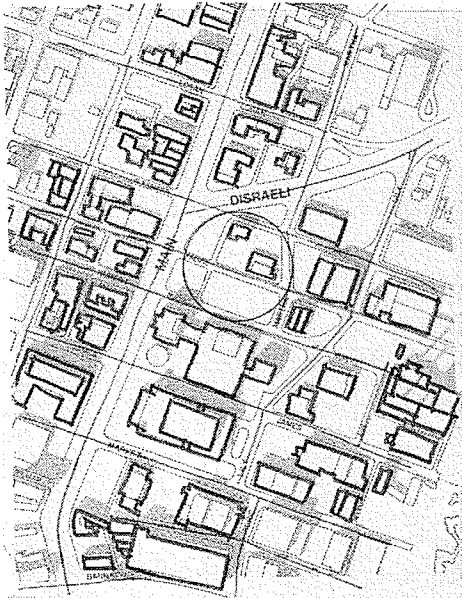
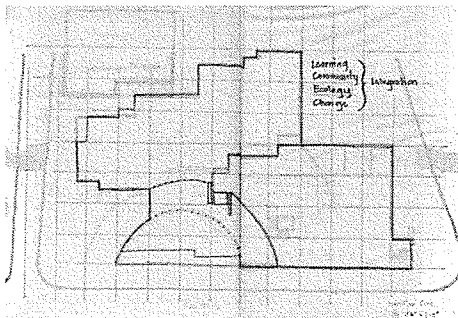


Figure 16: Preliminary building form



factors such as sun paths, existing vegetation, and circulation. Because ecology emphasizes relationships between organisms and their environment, a method of integrating the new building with its site was sought in the schematic phase of the design process.

Observations of the neighbourhood from plan view revealed irregularly shaped geometric buildings transposed on a grid of streets (figure 15). The existing building on the site is also defined geometrically by a grid of columns which provided inspiration to juxtapose the irregular forms of the surrounding

buildings at a larger scale onto the plan of the existing building. The site is defined by the curve of Disraeli Freeway, a dynamic feature which is unique to this area and disrupts the regularity of the street grid. This curve was incorporated into the building form in a location

which would become the entrance and lobby. The presence of the Ukrainian Cultural Centre, a five story building on the north side of the immediate site, also required consideration when establishing the perimeters of the building. The neighbourhood and bubble diagram studies assisted in establishing a flexible form and boundaries for the building which were ultimately refined to accommodate and reflect interior functions (figure 16).

The Ecological Design Centre will be recessed approximately 125 feet from Main Street, providing a 'buffer zone' between the chaotic vehicular traffic and the building. This transitional exterior space would provide opportunities for landscaping that could include indigenous plant species, water retention ponds, and other sustainable features. Although landscape development is out of the scope of this project, the potential for this space to extend educational experiences to the exterior has been acknowledged. In the northeast corner of the site, which is reserved for loading and staff parking for the Ecological Design Centre and the Ukrainian Cultural Centre, porous paving would be applied as an alternative to impermeable asphalt because it provides more green space and reduces the temperature at ground level by allowing plant material to grow up between the structured cells. Porous paving also allows surface water to drain and filter into the aquifer, reducing the load on cities stormwater conveyance and treatment systems and is suitable in an area such as this with limited traffic (Flynn, 2003, p.104).

The exterior of the building would begin to establish a local identity through materiality and form with locally quarried limestone cladding and horizontal masses reflecting the prairie landscape and urban context. Portions of the existing building would be deconstructed for permeability, passage, and sitelines. The juncture between the existing building and the addition would be most obvious from the south façade of the building which

would be visible to visitors approaching the main entrance from the parking lot between Rupert Avenue and Pacific Avenue. In this area, red exterior brick from the deconstructed areas would be salvaged and used to construct portions of the addition, helping to integrate the addition with the existing building. Also visible from the south façade is a display window for the Eco-Elements Showroom (figure 43, p. 140). Featured exhibits would be advertised on exterior video screens on the south façade and the west façade adjacent to the entrance (figure 44, p. 140). The existing building is composed of a concrete structure with ceiling heights of eleven feet but the exhibition spaces require much higher ceilings as noted in the program. Therefore the exhibition spaces, lobby, and forum were programmed into the addition while more intimate spaces such as the staff offices, the café, and core building functions not affected by the constraints of the concrete structure, are to be located in the existing building. Loading and exhibition preparation areas were also located to take advantage of the existing overhead garage door in a manner that could also service the café on the second floor by using the existing freight elevator. The addition provides opportunities to integrate other requirements for exhibition spaces such as access floors and ceiling systems. The existing portion of the building would be retrofitted with sustainable features such as energy efficient glazing.

The following section presents each area in detail: the Entrance and Lobby, the Eco-Elements Showroom, the Design Exhibition Space, the Forum, the staff offices and service core, and the Roof Garden Café and Green Cuisine Demonstration Area. The methods used in each space to fulfill programmatic requirements informed by the theoretical framework and a functional analysis are outlined. An overview of sustainable building features and how they are demonstrated to visitors is also provided.

Entrance and Lobby

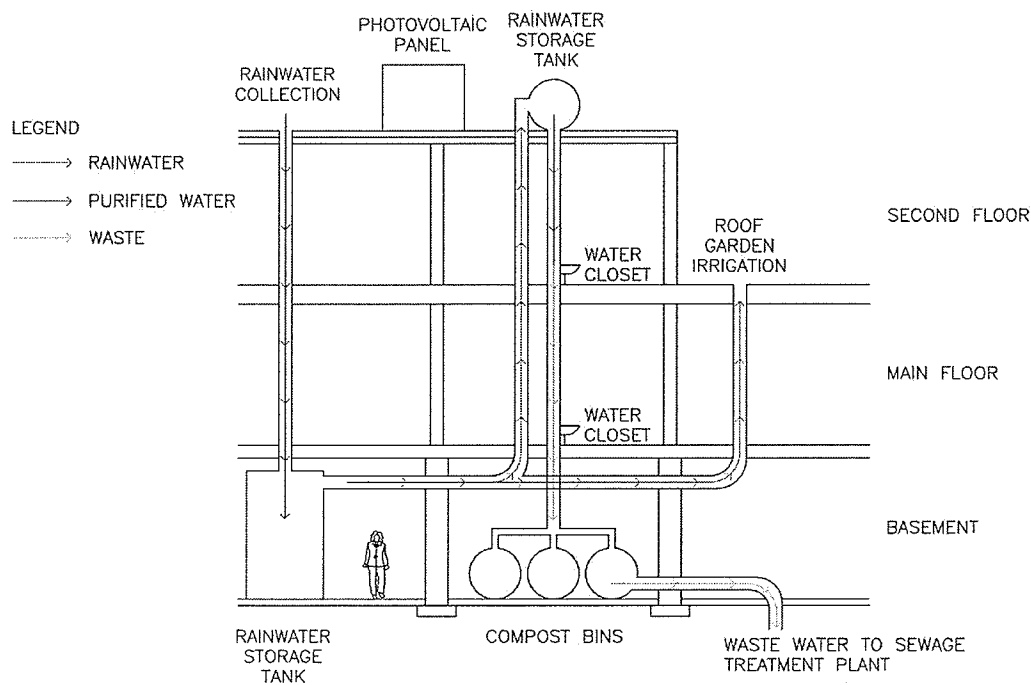
The main floor of the existing building is four feet above grade and out of concern for universal accessibility the addition was also designed on this same plane. The Ecological Design Centre would be entered via a gradual ramp which promotes a kinaesthetic engagement of the body through the act of ascent. The ramp's width of eighteen feet would provide ample space for circulation as well as opportunities for small exhibitions to be installed on the interior or on the exterior portion of the ramp in the summer months. Continuity between exterior and interior will be emphasized through the use of one solid surface of concrete (with saw-cut grooves for slip-resistance), vegetation, and seating stones. On the interior portion of the ramp, prairie grass will be grown year-round against a backdrop with strips of fenestration permitting glimpses into the forum and exhibition spaces. Another feature of the entrance will be the LCD screens mounted on rods to the floor and ceiling which advertise current and upcoming exhibitions and then intermittently flash images of visitors interacting with current exhibitions (figure 52, p. 149). These images, captured by video cameras placed throughout the facility would provide visitors with the vision of themselves contributing to sustainability as they leave the Ecological Design Centre and assist in 'designing the survival' of the information in the minds of the visitors.

The sloped roof of the entrance which mimics the ramp will give way to the double volume space of the lobby where visitors will be greeted and oriented (figure 51, p.146). To promote innate wayfinding and alleviate the need for signage, the lobby will provide at least partial views to all public areas of the facility: the main exhibition space, the showroom, the forum, and the cafe. An electronic ticket dispensing station would provide an efficient way for payment to be processed and would not need to be staffed. There would also be an

orientation centre which provides a place for staff to welcome visitors and a horizontal surface for activities such as a demonstration. Coat storage and recycling will be located below the stairs and seating stones would be dispersed throughout the lobby. As the central artery of the facility, public access to the exhibition space, showroom and forum would be gained through the lobby, and the café and exhibition mezzanine would be accessed via the elevator or stairs.

Exhibition will begin directly in the lobby with the feature water management system on display (figure 17). A glass enclosed system will demonstrate how water is collected from the roof and is filtered through a series of glass blocks containing soil and aquatic plants. The semi-purified water would be collected in cisterns in the basement and would be pumped up as needed to a smaller tank at the roof level. The water would then be used in the composting toilets in the washrooms and also to irrigate the roof garden. Three compost bins would be

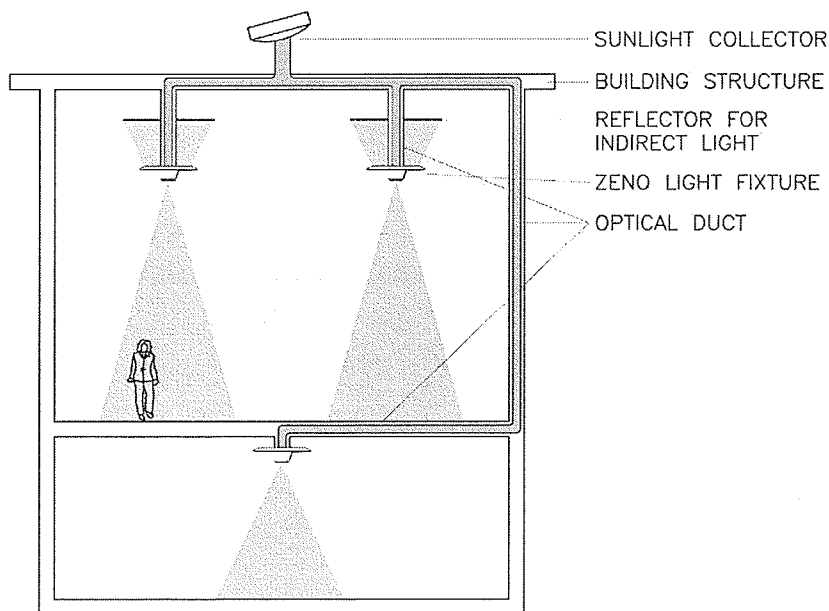
Figure 17: Water management system



located in the basement in a manner that one can be closed in order to sit for a period of time to allow the waste to become organic matter. The system would be powered by photovoltaic panels on the roof. The entire process would be rendered transparent to visitors allowing them to experience the system in an elevator which provides a view of the various components and transports visitors down to the basement to view an interpretive display of the tanks.

Another sustainable feature in the lobby will be the Luceplan light pipe system with Zeno™ suspension lighting fixtures which are designed to bring natural light into large spaces with high ceilings that may not otherwise have access to natural light (figure 18). The innovative system collects exterior light through “optical ducts” and conveys it to the fixtures. The fixtures incorporate other light sources that switch on automatically when low levels of natural light are sensed. Light quality can also be adjusted by the user to suit their

Figure 18: Luceplan light pipe system with Zeno light fixtures



current requirements. The single fixture houses the most energy efficient lighting sources available: compact fluorescent bulbs for diffused lighting, HID metal-halide and halogen bulbs for indirect lighting and PAR bulbs for direct lighting (Luceplan, n.d.).

Note: Adapted from video at <http://www.luceplan.it/>.

Eco-Elements Showroom

The Eco-Elements Showroom will be an interactive display area where visitors can familiarize themselves with the sustainable properties of materials, products, and services that will assist them in making personal contributions to the environment (figure 52, p. 147). Manufacturers who display their products in this space would provide a large portion of the funding for the facility. A series of coloured translucent panels spanning almost floor to ceiling will separate the showroom from the lobby and define critical terminology related to sustainability. Composed of 3-Form® eco-resin, the panels are engineered to be resurfaced and re-coloured (3-Form, n.d.). The colours and text could be changed as needed to reflect the exhibition content. A sliding glass panel system will close off and lock the showroom when it is closed to the public but other functions in the facility such as the café or the forum are still open.

The showroom space will have high ceilings and feature the same Zeno light fixtures that are in the lobby. An accessible floor system will provide flexibility for exhibits to be reconfigured as needed. The showroom will be organized into four sections: Materials (including construction materials and finish materials); Furniture, Fixtures, and Equipment; Electrical and Communications (including lighting and information communication technology); and Mechanical (including plumbing and heating, ventilation, and air conditioning systems). A reference area with books and journals related to design will also be available. Designed to be as interactive and multi sensory as possible, a flexible infrastructure has been designed for the showroom that will permit individual products and materials on display to be changed with minimum waste. In this large unpartitioned space, individual sections would be defined with floor treatment and signage. Rather than creating a

rigid, structured environment, visitors would be able establish their own path through the space to tailor the experience to their own needs.

Upon entering the showroom, visitors will be confronted with the undulating material table which provides a haptic learning experience. Bands of materials are placed on vertical and horizontal surfaces allowing visitors to appreciate the sensory qualities of the materials by touching, smelling or feeling different textures below their feet. 'Source' objects from which the materials were derived are suspended above the materials and can also be experienced by multiple senses and educate visitors about the origin of the product. Computers embedded in the table will allow visitors to click on information related to each material which is communicated through video and text. For each material on display, visitors will be able to access information about material acquisition, manufacturing and fabrication/distribution, use/reuse/maintenance, recyclability and waste management, as well as applications and performance.

In the centre of the showroom will be the Furniture, Fixtures, and Equipment area where visitors will be encouraged to 'loungue on the sofa' or 'open the oven door' to experience the products. While furniture will be arranged in scenes and placed directly on the floor for accessibility, other items such as appliances will be placed on display platforms that would be low enough so as not to make the items appear off limit. Computers in custom-designed stands will provide information about the items such as energy and cost savings, other brands which offer a similar product, or retailers. The stands would swivel, allowing access from all sides, and could be raised or lowered for universal access. These same computer stands will also be placed in the Electrical and Mechanical sections.

The Electrical section will be contained beneath the sloping roof of the Forum and entrance to provide a slightly darker space for visitors to appreciate the lighting on display. Custom designed shelves would display fixtures as well as other products including solar panels or communication technology. For example, Blackle, Google's new energy saving search engine could be exhibited as a simple means of implementing energy conservation at the individual level.²⁶ Visitors will be able to use the computer in this area to learn about object properties, quality of light, and energy and financial savings. Transparent floor panels over a part of the Electrical section permit views to the access floor below to educate visitors about the environmental and functional benefits of this system. In an access floor system, the walking surface and subfloor are separated so that power, electronics and ventilation can run between the two layers, which facilitates spatial reconfigurations or tasks such as updating wiring (Manasc & Mahaffy, 2002, p.64).

The Mechanical section will be identified by the building's two thirty-six inch diameter mechanical ducts. The same system of pedestals used in the furniture section, which can be stacked or placed side-by-side to create a variety of sizes and heights is used to display products such as toilets, waterless urinals, and water heaters. Smaller items including aerators, low-flow shower heads, or water filters would be wall mounted. A computer controlled display consisting of glass pipes demonstrates water consumption. The pipes fill with liquid representing the quantity of water consumed by the average Canadian through current practices and technology not designed with conservation in mind. Visitors will be able to control the quantity of liquid in the pipes by a computer and watch it decrease as they

²⁶ All white web pages use about 74 watts to display while black pages use only 59 watts. Therefore the widely-used search engine *Google*, which receives over 200 million 'hits' a day, invented Blackle, an identical search engine but with a black background which is capable of saving some 750 million megawatt hours of energy yearly (Heap Media, 2007).

implement the water conserving products on display. This will allow visitors to compare their current water consumption with the decreased water consumption facilitated by the use of the products on display.

The reference area will feature a variety of books and journals about sustainability, design, and other urban issues displayed in a manner similar to that of a bookstore, with the front covers facing outwards for ease of access. Lounge chairs with tablets will be provided for visitors who may be wishing to access specific information or are simply looking for a reflection space away from the exhibits. Computer terminals are also provided for visitors wishing to access additional information. Glazing is provided between the reference area and the staff offices on the opposite side of the wall which will allow visitors a glimpse into the area where creativity and technical knowledge are fused to cultivate the exhibits in the showroom.

Design Exhibition Space

While the Eco-Elements Showroom will communicate avenues for visitors to contribute at the individual scale, the Design Exhibition Space is intended to generate awareness of contemporary issues and projects in green design, architecture, planning, and sustainable development which will help visitors to envision 'the big picture' of sustainability and how they fit into this context (figure 53, p. 148). Small and large scale temporary exhibitions which communicate their message through a variety of media and spatial experiences will be accommodated in this space. A flexible infrastructure has been designed to address functional requirements of divisibility, display, and lighting. The

infrastructure will include an access floor and a system of moveable and adjustable vertical and horizontal surfaces.

Two separate entrances from the lobby will allow the large space to be divided into two or more exhibitions, and like the showroom, sliding glass panels also close the exhibition space when it is not intended to be accessed by the public. The Skyfold™ autolift wall system will be located in two locations so that large areas can be sealed off in the event of a single exhibition to conserve energy by reducing the heating or cooling in the unused portion of the exhibition space.²⁷ In its 'down' position, Skyfold is rigid and flat, but when not in use it folds vertically and is stored at the ceiling between the joists (Skyfold, 2007). An electrical room will be located adjacent to the exhibition space where surveillance cameras as well as controls for the autolift system and lighting are removed from public access.

With flexibility and adaptability as the primary design criteria, an access floor will allow exhibits that require power to be placed anywhere in the space. For an exhibition requiring several smaller spaces, mobile partitions have been custom-designed. The partitions would be twelve inches wide and eleven feet high. Given the height of the panels, several possibilities for providing lateral stability have been explored. The partitions could be attached to the joists with cables or a magnetic system could be embedded in the access floor. Two sides of the partitions would be punctured with a grid of holes allowing steel rods to be inserted that could support two-dimensional works or shelves that would support three dimensional artefacts. An item fulfilling the need for horizontal surface was designed for the exhibition space which could be used as seating, a planter for interior vegetation, a low pedestal or a high pedestal to display objects.

²⁷ Skyfold is a member of the US Green Building Council.

To demonstrate the flexibility of the exhibition space, the three exhibition examples discussed in section 3.2. of the precedent analysis, *Sustainable Condo*, *Big & Green: Toward Sustainable Architecture in the 21st Century*, and *The American Lawn: Surface of Everyday Life*, have been laid out in plan view in the exhibition space at the Ecological Design Centre. Sustainable Condo would occupy half of the exhibition space, and the opposite side would be closed off with the Skyfold system (figure 48, p. 145). Big & Green would require the use of the entire space and the mobile panels to create six different rooms (figure 49, p. 145). Although this exhibition has its own cardboard infrastructure and surfaces for three-dimensional displays, two-dimensional displays could be mounted on the mobile partitions. For the American Lawn exhibition, the space would be divided into seven spaces with the mobile partitions and the custom-designed horizontal surfaces are located throughout for displays or seating (figure 50, p. 145). Many of the individual exhibits require power, making use of the access floor, and exhibits requiring a darker space, such as television screens or projections, could be located below the mezzanine. Because it is anticipated that exhibitions with many different forms of media will be common at the Ecological Design Centre, the perspective view of the exhibition space depicts elements of the *American Lawn: Surface of Everyday Life* exhibition and how they are integrated with the custom designed elements of the Ecological Design Centre (figure 53, p.148). The exhibition mezzanine will overlook the main exhibition space and will be used to showcase the work of local professionals, design students, or primary and secondary students that focuses on design and sustainability.

Although opportunities for daylighting would be desired in the exhibitions space to conserve energy, it has also been acknowledged that many exhibitions require a high amount of control over lighting. The clerestory windows would be outfitted with electrochromic

glazing which provides an active means of controlling light and energy and has the capacity to reduce costs for lighting, heating and cooling (Fox, 1999, p.100). Electrochromic glass is categorized as 'switchable' glazing, which allows a window to be manually switched from clear to fully darkened, and maintained at any level of tint in between. The windows run on very low voltage and require energy only to change their condition, not to maintain any particular state (Fox, 1999, p.101). Zeno light fixtures will be incorporated throughout the space for general illumination. Axis Picolo Medio T5 fluorescent light fixtures, designed for energy efficiency and reduced energy consumption, will be suspended on tracks below the joists which are located five feet on centre. The Picolo Medio fixtures provide direct and a small amount of indirect light and could be adjusted to suit the exhibition on display (Axis, n.d.).

The exhibition space will have two opportunities for loading. One is through the original loading dock on the existing building which is adjacent to the exhibitions preparation area and can be used for most exhibitions. The second overhead loading door is on the east wall of the exhibition space and would be used in the event that an exhibition has very large components or must be delivered in one piece. A ramp leading down to this loading door also serves as an emergency exit.

Ideas Forum

The Forum will provide visitors with a 'voice' and allow them to share their ideas and priorities about design and sustainability in a multipurpose space which will accommodate presentations, discussions, seminars, or workshops. Glimpses into the forum will be provided to visitors as they enter the building along the ramp. These windows would be outfitted with

electrochromic glazing which would allow the space to be completely darkened depending on the type of activity or event occurring in the forum. Although this space has not been detailed to the same extent of other spaces, some general design considerations are outlined here. The floor surface follows the same slope as the ramp, providing better views to the front of the forum than if all seating was on a single plane. A large ceiling mounted screen and lectern would be located at the front of the forum and a projection booth would be located at the back. Strip lighting recessed into the walls will illuminate the two access paths which flank the centre seating rows. The seating provides tablet arms that can be folded down in front of the seat if not needed.

Services Core

The core of the building will consist of the loading dock, washrooms, and other support services. The existing loading door opening will be retained and is adjacent to the exhibition preparation area which requires plumbing and horizontal work surfaces. Additional spaces will be provided for janitorial/maintenance staff, garbage holding, and a recyclables sorting area that would be centrally located for convenience. The original freight elevator and secondary stairway to the basement are also located in this core which facilitates transporting items to basement storage facilities and loading supplies to the café on the second floor. General illumination throughout the core (as well as staff offices) would be provided with Axis Piccolo Medio T5 fluorescent light fixtures.

Staff Offices

The staff workspaces will be located at the rear of the building and make use of the original entrance to the building. The concept was to create an open and flexible space that could accommodate future change in staff structure and work requirements. The Haworth Nexus Low Profile Access Floor would be installed above the existing concrete slab to accommodate voice, power and data. The system provides easy access to technology and flexibility to facilitate future reconfigurations. As the Nexus floor adds only two and a half inches to the vertical height of the floor ramping is not required. Haworth's TecCrete® flooring panels which are designed for the Nexus system provide the appearance of concrete with superior acoustic control (Haworth, 2007). The DIRT™ movable wall system will be specified to enclose the meeting room and the executive director and human resource coordinator's offices. The movable walls work with the access floor system to incorporate technology. This flexible wall system eliminates waste that would be generated when reconfigurations or renovations are necessary. A variety of coordinating components could be ordered to enclose other workspaces to varying degrees as needed in the future. The structural components of the DIRT™ movable walls are made of aluminum which contains recycled content and is recyclable (DIRT, 2005). The system is compatible with 3-Form panels. The meeting room is divisible so as to be used as one large room or two rooms and will be equipped with ceiling mounted projectors and wall mounted projection screens. A single millwork unit will house office supplies and stationary as well as a small kitchenette. Staff washrooms will be equipped with showers and lockers which encourage staff to consider environmentally sound modes of transportation.

Roof Garden Café and Green Cuisine Demonstration Area

The Roof Garden Café will provide refreshments such as light meals, snacks, and beverages in an atmosphere that is conducive to reflection, relaxation, and socialization (figure 54, p.149). To enhance the facility's mission, the menu has been inspired by the *Nouvelle Cuisine* approach to cooking and food presentation.²⁸ Baked goods will be supplied by local bakeries and herbs are grown on site in the roof garden during the summer months. The cafe is not licensed but features a range of smoothies, juices, and specialty coffees. Liquor permits could be obtained for special events and a catering service would be provided.

As *Nouvelle Cuisine* is characterized by less intrusive service, minimal table service would be provided (Wikipedia, 2007). Menu items will be displayed on LCD screens on the wall behind the service counter and can be reprogrammed as the menu changes. Patrons would place their order and pay at the service counter where they would be given a small sustainable object, such as a material sample, which would serve to identify their order to the serving staff. When seated at a table with the object visible, their food would be delivered and the object would be collected for the next patron. A variety of seating configurations and levels of privacy will be provided. Counter seating will overlook the showroom and would accommodate visitors who seek brief refreshment. Several sizes of booths will be provided along the south wall and will be separated by planters with vegetation. The Ecological Design Centre's objective to educate visitors through multisensory and interactive methods will be enhanced by the Green Cuisine Demonstration Area in the café. This area will feature

²⁸ *Nouvelle Cuisine* was a reaction to 'French cuisine classique' and uses fresh ingredients, without heavy sauces and overcooked vegetables, to create dishes that are light, simple, and elegant. Strong emphasis is placed on visual appeal and the food should excite all five senses. Herbs and spices are used extensively with light sauces to compose distinct tastes (Wikipedia, 2007).

a dynamic chef who provides demonstrations of healthy cooking practices and energy efficient appliances while offering samples and tips. A mirror above the demonstration counter will provide views of cooking processes. As the demonstration counter would be on wheels, it could be removed and the area could serve as a stage for a presenter or show.

The café provides views to the adjacent green roof where limited exterior seating would be available. A green roof is a waterproof protective covering featuring a top layer of plants embedded in a growing medium that conceptually replaces the ecology destroyed at grade by the building footprint (Solomen, 2003, p.149). Featuring numerous environmental benefits, green roofs have the capacity to: slow, reduce, and cleanse storm-water runoff because their permeable surface absorbs and retains water, allowing much of it to evapotranspire, and only slowly releases the remainder into stormwater conveyance systems (Solomen, 2003, p.149); contribute toward alleviating the heat island effect as they can reduce roof temperatures by as much as 90% (Flynn, 2003, p.104); increase energy savings as they moderate a building's internal temperature (Solomen, 2003, p.150); nourish wild flowers, grasses, and other plants that in turn provide habitat for birds and insects (Flynn, 2003, pp.104-105); and provide aesthetic and psychological relief from monotonously concrete and asphalt urban centres (Solomen, 2003, p. 150). The Ecological Design Centre will feature a semi-extensive green roof system, which has a shallow bed, about six inches deep, and supports only hardy, low-growing vegetation, but is lightweight and requires minimal maintenance (Solomen, 2003, p.152) (figure 57, p. 151).²⁹

Visitors will be able to tour the green roof in the summer months on a stone path that meanders through the vegetation to learn about this sustainable design feature. The green

²⁹ An extensive green roof system is opposed to an intensive system which has a much deeper bed and can grow more varieties of plants or small trees but imposes a higher load on the building thus requiring additional structural support (Solomen, 2003, p.152).

roof will allow visitors to further experience this component of the water management system which is first featured in the lobby. The opportunities to grow produce and herbs in the roof garden will also educate visitors about the health, environmental, and economic benefits of selecting food that has been grown locally or organically. Maintenance paths will be located along the perimeter of the garden. The roof garden vegetation will also be visible from street level as the area will be enclosed with a transparent guardrail.

6.0. CONCLUSION

The state of the natural environment and the ability for future generations to maintain a similar quality of life as our own is dependent on the choices made and actions taken by the current population. Fortunately, an exploration into sustainability through the lenses of sociology and psychology has demonstrated an emerging value structure amongst Canadians wherein ecology and quality of life have become prominent issues. Reconciliation of our ecological values with the current state of the environment requires that the public have access to information which informs them about evaluating alternatives and making sustainable choices. The objective of this practicum has been to design a venue which facilitates the dissemination of knowledge about green design and sustainability by employing modes of communication that are effective in the contemporary condition.

An overview of educational theory, including learning processes, constructivism and postmodern pedagogy, revealed that learning is enhanced when the maximum possible modalities are provided. Opportunities for active exploration, multi-sensory experiences, social interaction, and reflection are conducive to the internalization of knowledge and its future application. Exposition was selected as a method of disseminating information because it has the capacity to address many of these dimensions of learning as opposed to other modes of communication such as graphic media which limits the potential for learning by excluding senses other than vision.

Exposition and museums as informal learning typologies have been examined to discern how their methods of communication have evolved to accommodate the requirements and preferences of contemporary learners. Adapting to the postmodern context, exposition

facilities have established a framework of information, experience, and customer service. Exhibition facilities are integrating new information technologies into their exhibits, creating environments which appeal to the senses and emotions, and offering opportunities for refreshment, relaxation, and socialization. While exhibits have become much more experiential, exhibition spaces are also evolving to establish a relationship with their content and allow visitors to actively engage with the physical, social, and cultural contexts surrounding the subject matter.

The approach to interior design has been informed by the conceptual ideas of change and connection inspired by ecology and technology. In an effort to establish a dialogue about design and sustainability and connect the public with their environment and community, the Ecological Design Centre will provide multi-sensory, interactive, and reflective experiences through individual exhibits and the building as a whole. Architecture and interior design are integrated with the educational content by using the building itself as a learning resource. Building processes and systems are made transparent and sustainable materials and furniture are used throughout.

To ensure that the centre's subject matter remains current and to encourage return visits, exhibits will be continuously changing. Flexibility is a crucial component of sustainability that has been considered in the preliminary stages of the design process. Designing a technological and spatial infrastructure that is easily adapted to accommodate a wide range of current programmatic needs and anticipated changes in exhibition and learning styles will hopefully increase the longevity of the facility. Designing for adaptability decreases the quantity of waste that would be generated through demolition and reduces the need to extract resources for new construction. The Ecological Design Centre will exemplify

that sustainability and green design contribute not only to environmental conservation but also correlate with a higher quality of life and will provide the means by which it may be achieved.

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APPENDIX A
PROGRAMME

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1.0. Venue Profile

Hours of Operation and Capacity

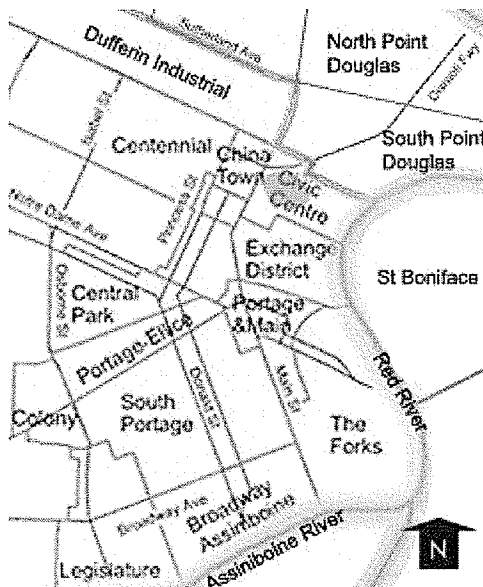
Hours of operation must accommodate the schedules of the public; therefore the facility will be open weekends and early evenings as well as weekdays. The Eco-Elements Showroom and Design Exhibition Space will be open from 10am to 8pm Monday to Friday, 10am to 6pm Saturday, and noon to 6 pm on Sunday. The Forum space will be open for designated events only and would not be accessed by the general public when events are not occurring. Staff offices would be occupied during typical business hours, 8:30 am to 4:30 pm but these hours would be extended for maintenance staff. The Roof Garden Cafe will be open 11am to 9pm Monday to Saturday and 12 pm to 6pm Sunday with demonstrations occurring intermittently throughout these hours. The facility will be open for extended hours for special events. The Ecological Design Centre would have a capacity of 400 people including visitors and staff, dispersed throughout the exhibition spaces, Forum, Cafe, offices, and core. The capacity dictates the number of water closets required and is addressed in section 5.0 of the program.

2.0. Site Analysis

Art as a Catalyst for Revitalization

The site of the Ecological Design Centre is located in a neighborhood of the city known as the Civic Centre, north of downtown and the historic Exchange District, east of China Town, south of Point Douglas, and separated from St. Boniface by the Red River (figure 19). This area of North Main Street has been stricken with poverty from early on in Winnipeg's history. Efforts to revitalize the impoverished area began with the relocation of Winnipeg City Hall (1962), the Centennial Concert Hall in (1967), and the Manitoba Museum, Planetarium, and Science Centre (1973). However, revitalization of the area slowed

Figure 19: Map of downtown Winnipeg



Note: Adapted from City of Winnipeg (2006). Maps.
<http://www.winnipeg.ca/census/2001/>

until 2005 when developer Richard Walls opened 'The Edge Artist Village & Gallery', live/work space for artists, with the hope of transforming the area into an Art district. Subsidized housing and studio space allow artists to prosper who may have previously been plagued by poverty. There exists several other arts facilities in the direct vicinity which help to solidify the area as an Arts District, such as Oseredok Ukrainian Cultural Centre, Mentoring Artists for Women's Art (MAWA), the Martha Street Art Studio, and the Manitoba Museum, Science Centre, and Planetarium (figure 20).

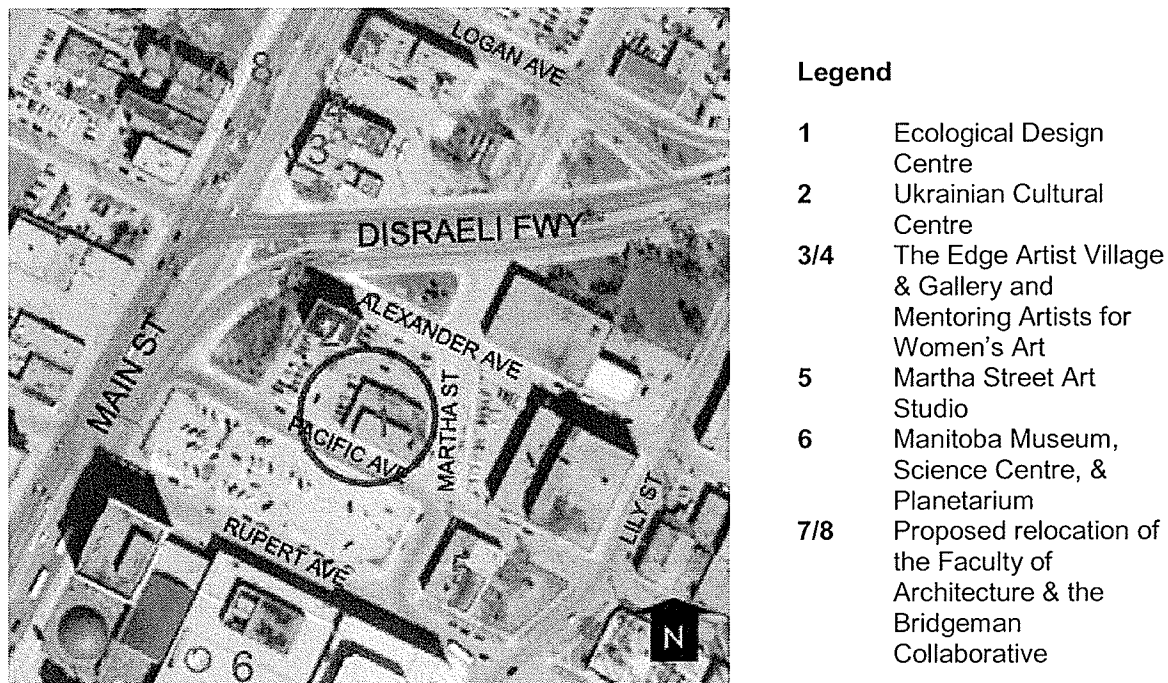
Proximate Organizations

The Master of Interior Design practicum of student Lise Boucher proposes to relocate the Faculty of Architecture, which is currently located at the Fort Garry Campus in the South end of Winnipeg, to the West side of Main Street just North of Logan Avenue (figure 20).

Proximity to the Faculty of Architecture strengthens the connection between students and the community for which they will be designing. Students can become involved with the community by exhibiting their work and volunteering as facilitators in the exhibition spaces.

There are many other arts organizations including galleries, museums, and the theatre district, and due to the large crossover rate of museum and gallery attendees, this could benefit the facility. There is potential for collaboration with the Exchange District Business Improvement Zone (BIZ) wherein seasonal walking tours could use the built environment to explore new proposals and successful projects.

Figure 20: Proximate arts and cultural organizations in the Civic Centre neighbourhood



Note: Map from Google Earth and adapted by author

Figure 21: View of site from Main Street.

The proposed building and parking lot for development are in the centre and the Ukrainian Cultural Centre is on the left.

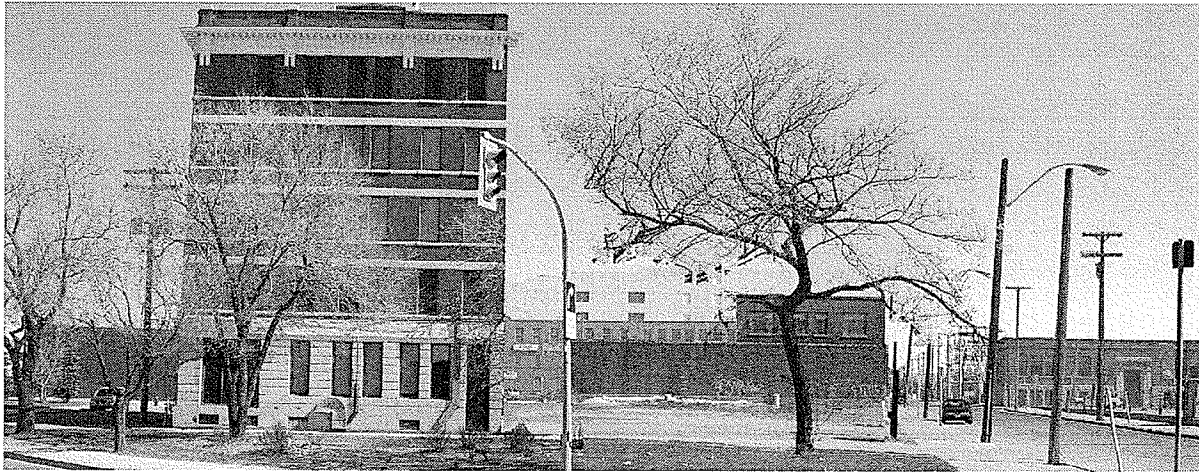


Figure 22: Ukrainian Cultural Centre



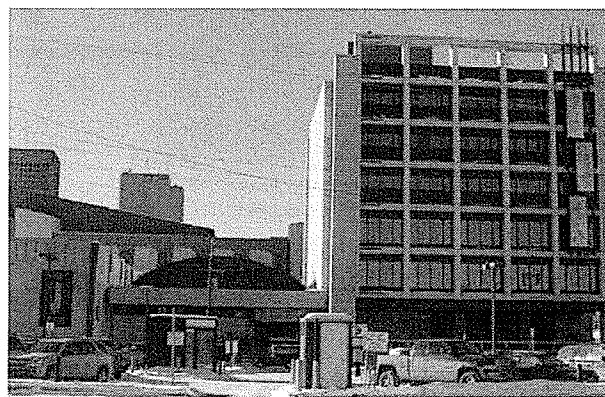
Figure 24: Martha Street Art Studio



Figure 23: The Edge Artist Village & Gallery and Mentoring Artists for Women's Art



Figure 25: Manitoba Museum, Science Centre & Planetarium



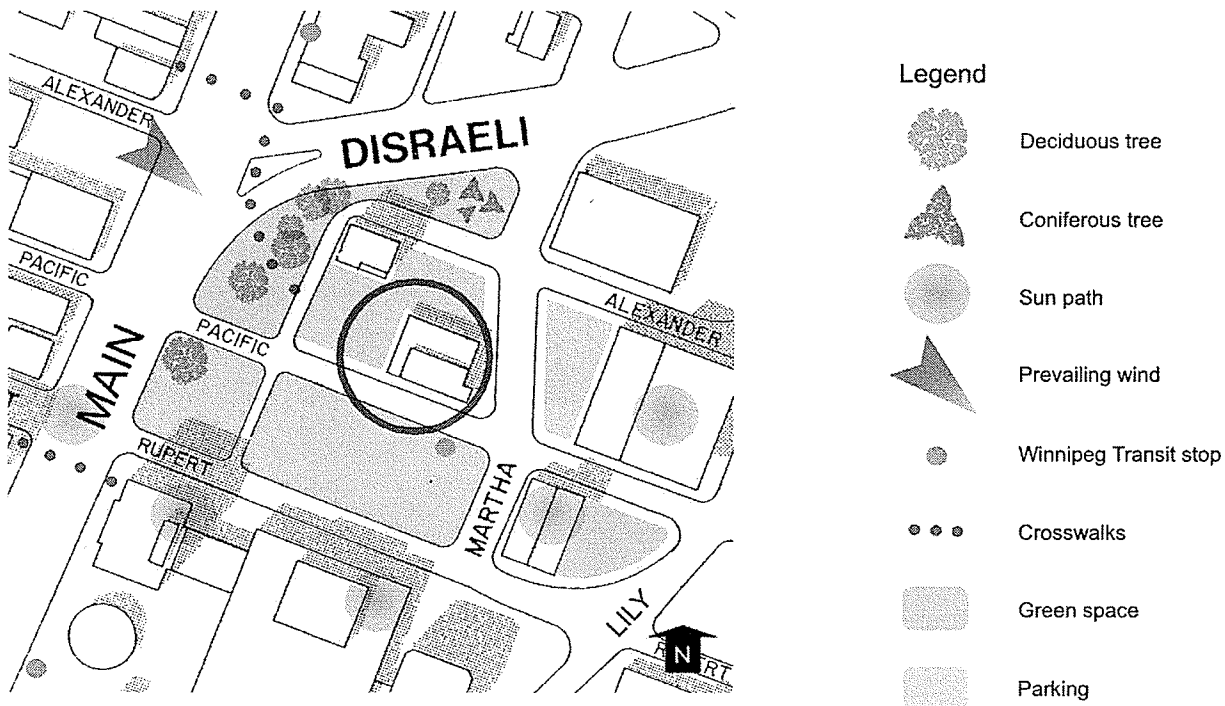
Climate (latitude 49° 55' N, Longitude 97° 13' W)

Winnipeg is subject to a continental climate with clearly defined seasons, summers are hot and dry and winters are cold but sunny. The daily average low temperature occurs in January and is recorded at -17.8°C and the daily average high temperature of 19.5°C occurs in July. The highest amount of precipitation occurs in June with 89.5 mm falling in Winnipeg. Known as the “sunshine capital of Canada”, Winnipeg experiences over 2,300 hours of sunshine annually with the most sunshine recorded in July (Environment Canada, 2007).

Vehicular and Pedestrian Circulation

The site is bounded by two primary traffic arteries, Main Street and the Disraeli Freeway which can be crossed at designated pedestrian crosswalks (figure 26). For visitors arriving by vehicle, ample surface parking is available in paid lots as well as two hour metered or free parking on Alexander Avenue, Martha Street, Pacific Avenue, Rupert Avenue, and Lily Street. Several Winnipeg Transit routes traverse the area, with one bus stop located adjacent to the building on Pacific Avenue and several other stops located within a two minute walk.

Figure 26: Schematic analysis of site elements



3.0. Building Analysis

Use of an Existing Building

A site with a vacant existing building was preferable when evaluating potential sites because new buildings comprise only two percent of the total building stock at any one time (Smith, 2005, p. 118). Sixty six percent of the buildings standing in the year 2050 have already been built today, which means there will be a large market for energy efficient renovations (Young, 2007, p. F7). Therefore this facility can serve as a model for existing buildings wishing to implement sustainable features through a renovation.

History of 16 Martha Street

The existing building on the site, 16 Martha Street, was built for Keystone Fisheries in the 1950s. This information was gathered from the building plans for a proposed addition in the 1960s (which was never constructed) but the exact date and the architect is unknown. The building is currently owned by the Ukrainian Cultural Centre but it is vacant and serving as a warehouse. Although the building could be demolished, I propose to salvage it because it has maintained its structural integrity and could better be used as a model to educate the public about the benefits of adaptive re-use.

Structure, Components, and Fenestration

Consisting of three levels, the building has a full main floor and basement, and the second floor covers half the footprint of the main floor. The building has a cast-in-place concrete structure, which includes concrete columns and floor slabs. The exterior walls are

composed of concrete columns and clay tile infill with exterior red clay brick and a cement plaster interior facing. The interior partition walls are either concrete or wood frame with plaster facing. The built-up coal tar roof provides a terrace which is accessible from the second level. Vertical circulation includes a cast-in-place stairway at the front entrance and another at the rear of the building as well as a hydraulic freight elevator which services all levels. The stairwell and main entrance (east facade) has a two-story window composed of twelve inch glass blocks and all three levels have ample fenestration to allow natural daylight. On the north side of the building is a loading dock with two overhead doors for trucks which could accommodate exhibition delivery and pick-up. Although plumbing has been removed, the remnants of washrooms are located in the basement and on the second floor.

Building Constraints

The building is not universally accessible as the single entrance is via a staircase. Ceilings are only eleven feet high to the underside of the concrete slab which could pose some limitations. The building's concrete structure could also be a constraint as it may reduce the potential to alter the physical space of the building.

Building Photographs

Figure 27: 16 Martha Street – View of East and South façades from Pacific Avenue and Martha Street

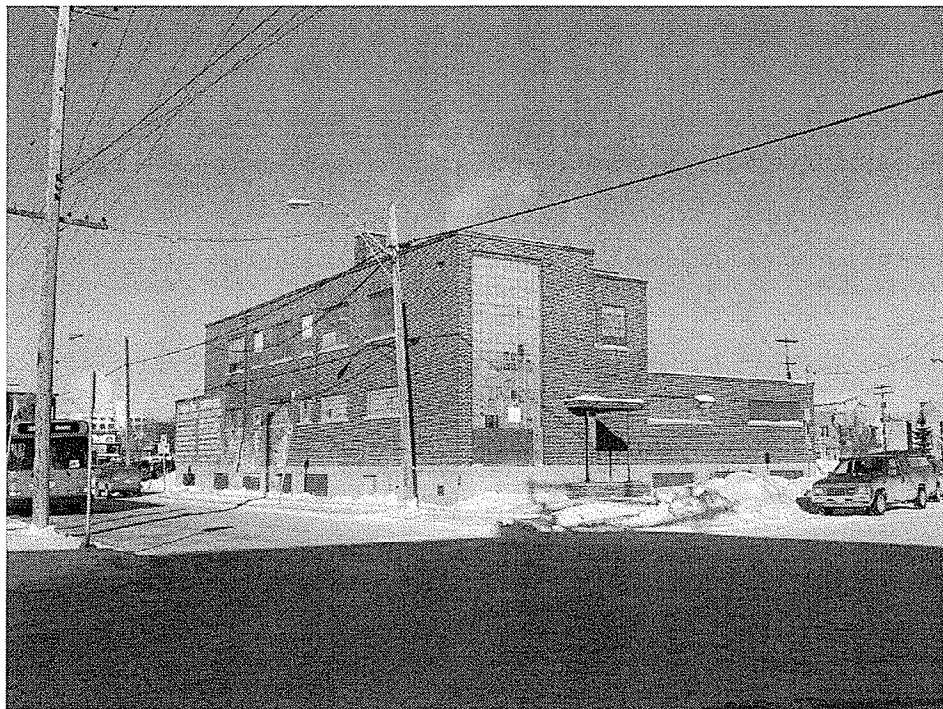


Figure 28: 16 Martha Street – View of North and East façades from Alexander Avenue and Martha Street

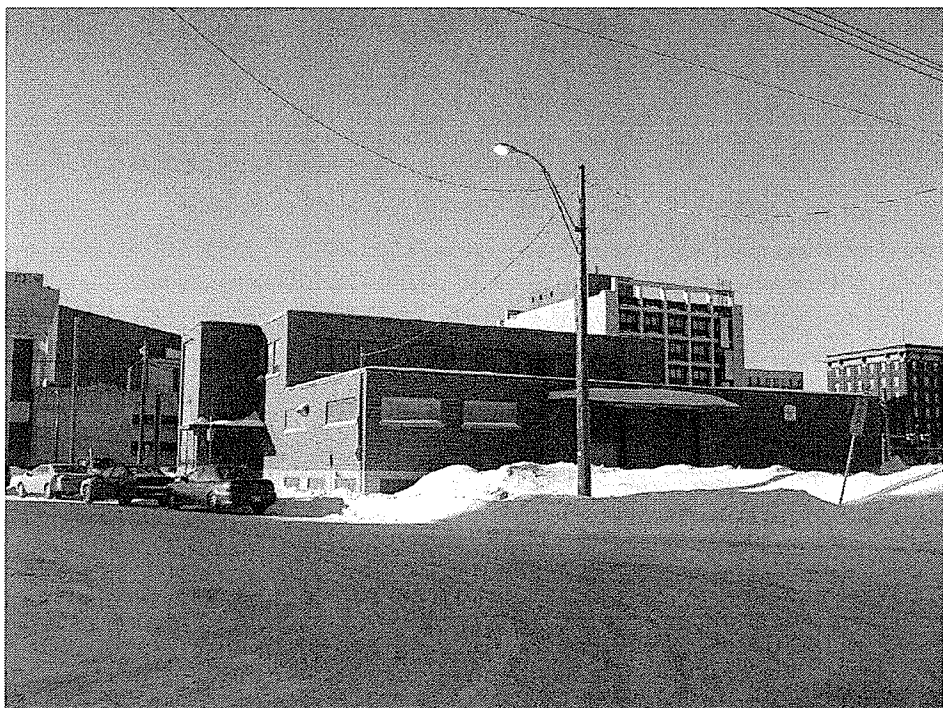


Figure 29: 16 Martha Street – Main floor interior view



Figure 30: 16 Martha Street – Second floor interior view



Table 1: Existing Building Areas

Space	Area
Main Floor	6150 sq.ft.
Second Floor	2475 sq.ft.
Basement	6150 sq.ft.
Total (Main & Second Floors)	8672 sq.ft.

Building Drawings

Figure 31: 16 Martha Street – Main Floor Plan (N.T.S.)

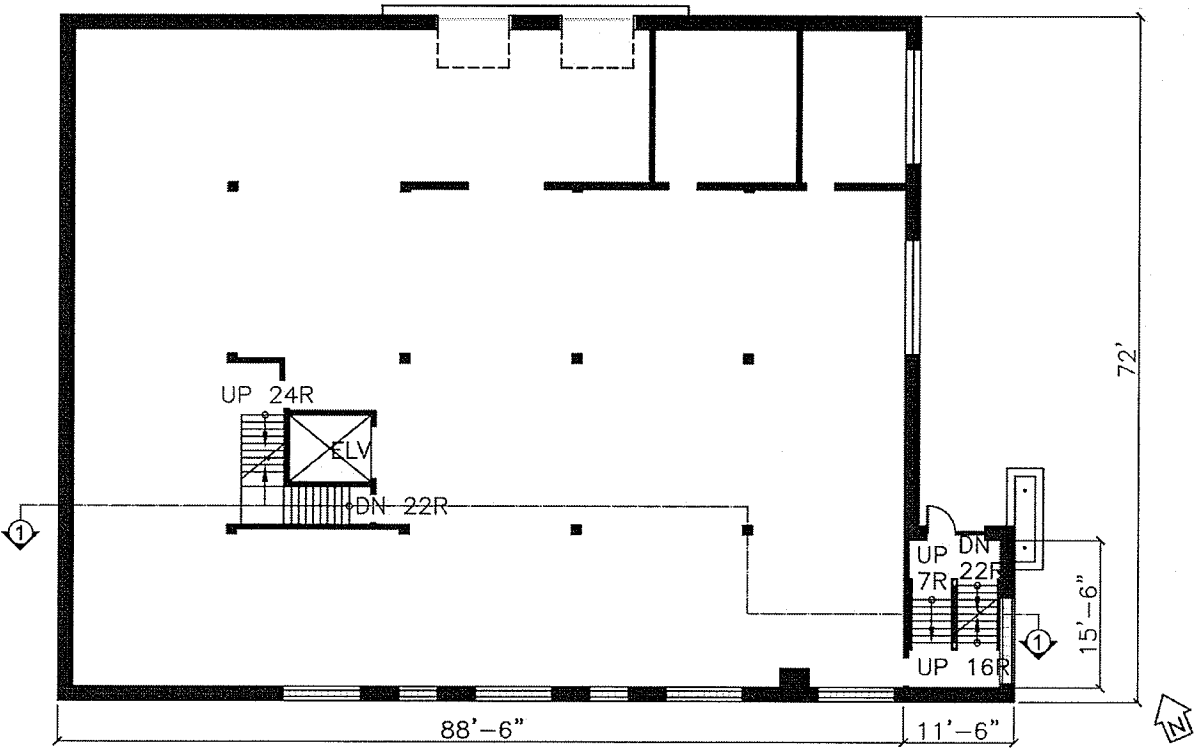


Figure 32: 16 Martha Street – Second Floor Plan (N.T.S.)

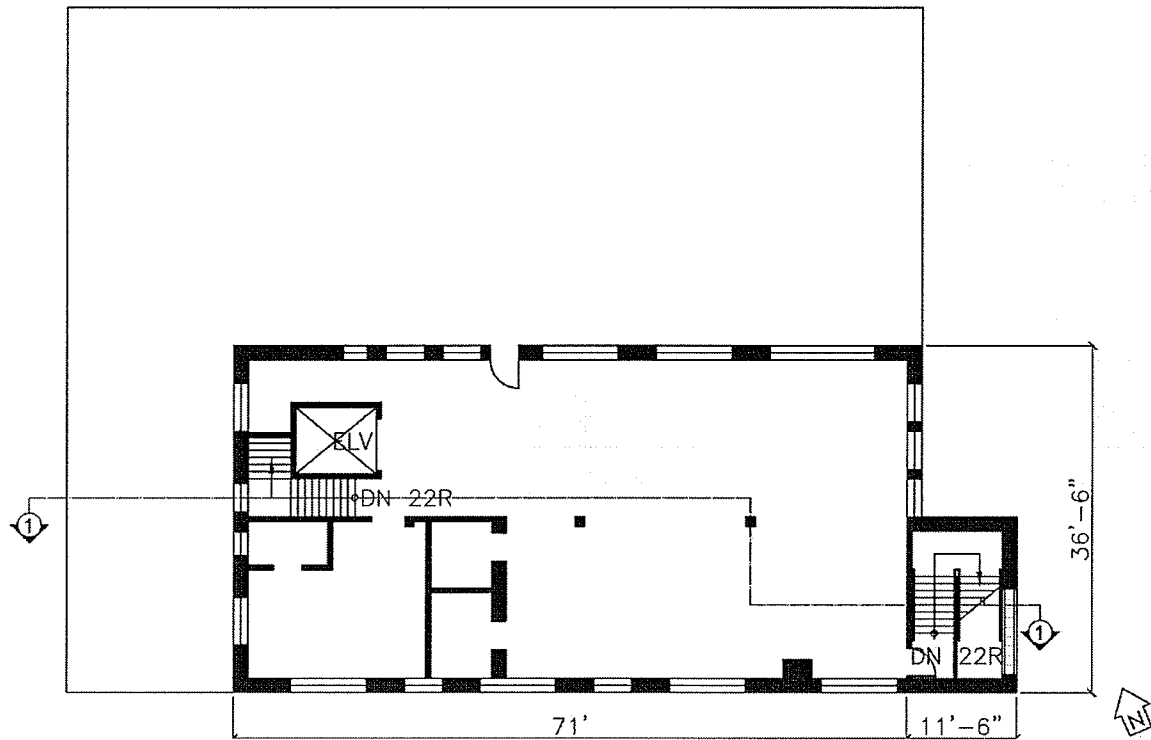


Figure 33: 16 Martha Street – Basement Floor Plan (N.T.S.)

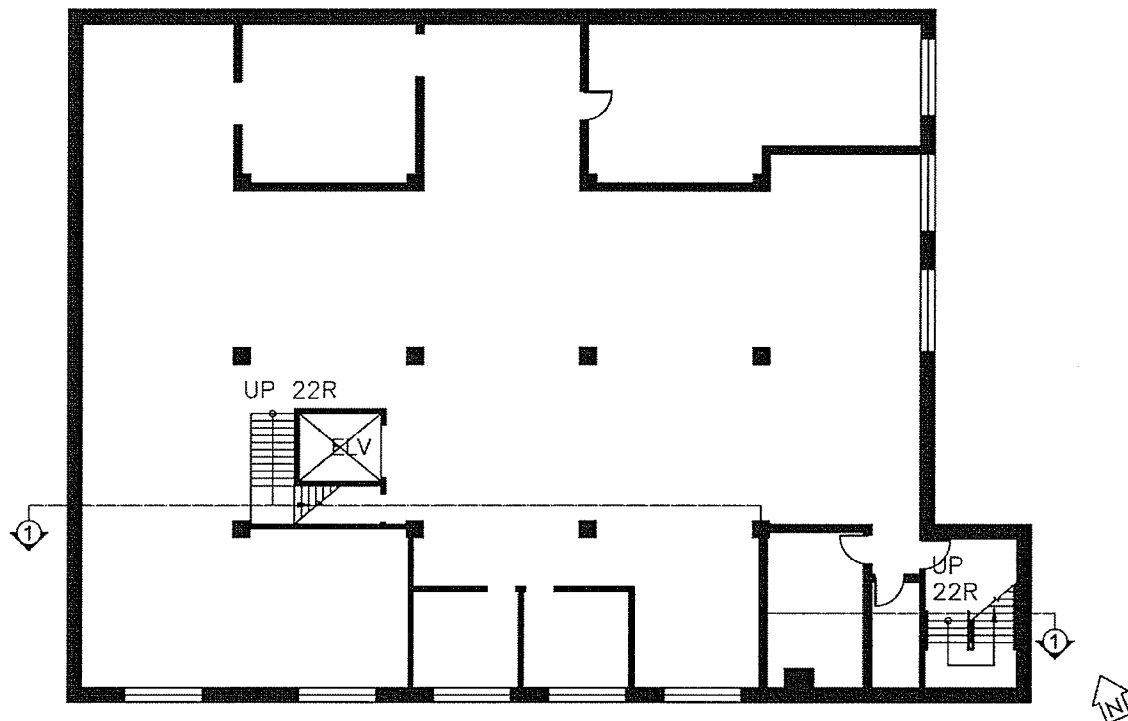


Figure 34: 16 Martha Street – Section 1-1 (N.T.S.)

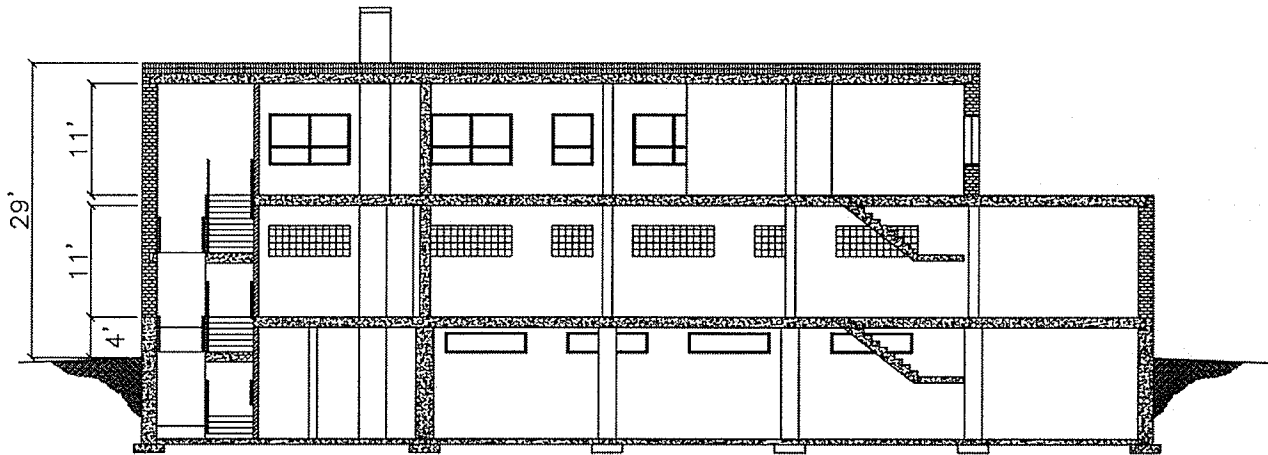


Figure 35: 16 Martha Street – East Elevation (N.T.S.)

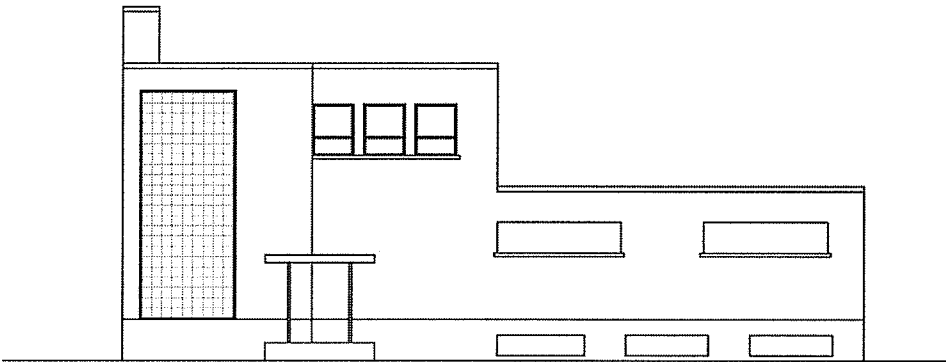


Figure 36: 16 Martha Street – South Elevation (N.T.S.)

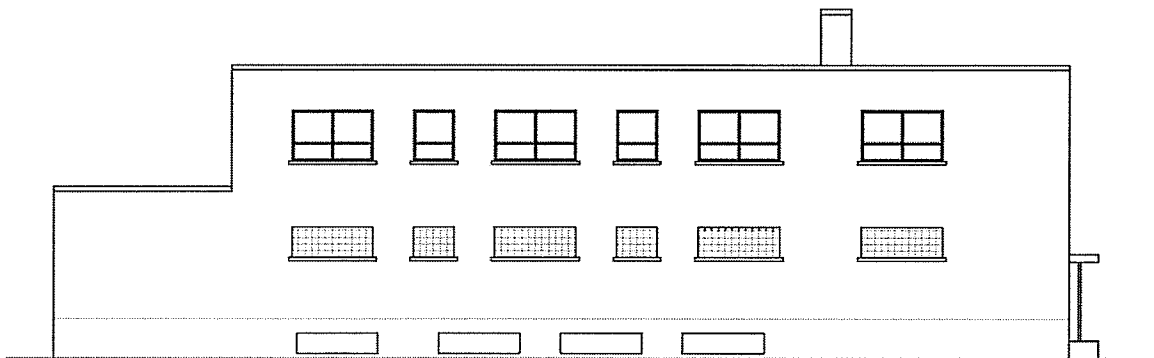


Figure 37: 16 Martha Street – West Elevation (N.T.S.)

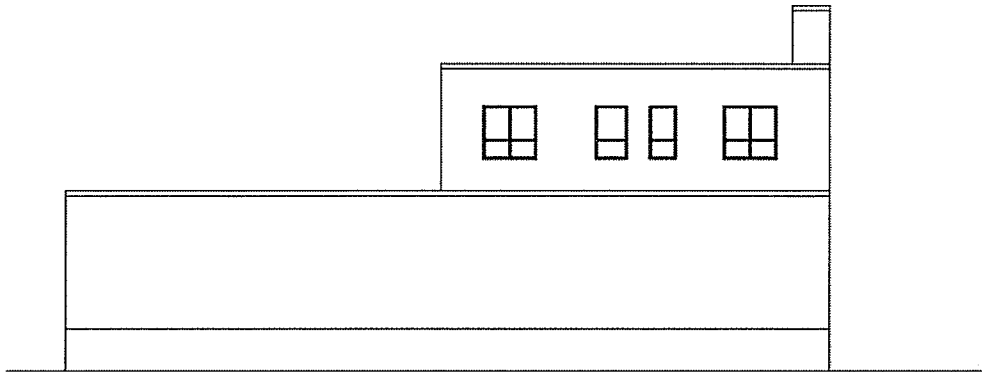
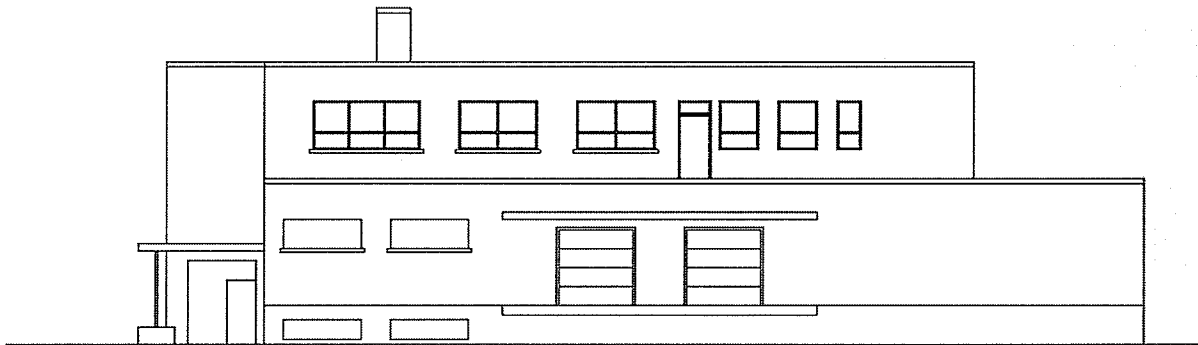


Figure 38: 16 Martha Street – North Elevation (N.T.S.)



4.0. User Requirements

Primary User Group

Description

The target market for the Ecological Design Centre is adults. This user group may be seeking specific information related to a green environmental design approach or they may be looking for a cultural, educational, or leisure experience. Secondary students and post-secondary students (aged 14-25) also constitute part of the primary user group and may have a specific learning agenda or may be seeking information for an assignment and would require quiet space with horizontal worksurfaces for study. Primary students and/or youth groups (aged 4-13) are also included in the group of primary users, however, the Ecological Design Centre would not offer programming specifically for children and their visits would be infrequent. Joint initiatives with organizations such as the Manitoba Children's Museum, schools, or youth groups would yield groups of children accompanied by chaperones who have prepared a structured program for the children. The facility could be used to educate children about basic design and sustainability through hands-on activities and discussions, to integrate design into the curriculum, and to encourage problem solving through design.

To provide more specific details about the target market, statistics and values of the general Winnipeg population, statistics have been gathered and information has been retrieved from the home renovation industry and also from museum and art gallery attendance data. As of 2001 (the most recent data available), Winnipeg had a population of 619,544, and almost 10% of the population was aboriginal and 13.4% was of another visible minority. The average household income in Winnipeg was \$53,176 and 18.3% of the

population had obtained a university degree (City of Winnipeg, 2001). Because the general public comprises diverse characteristics, the facility needs to be inclusive of all income levels, ethnic backgrounds, levels of education and skill (the non-professionals as well as the professionals), and age groups.

Environmental Values

Although most Manitobans have expressed concern for the environment, they have not necessarily adapted their own lifestyles to reflect these values. Strategic council polls have showed that environmental issues have become the second biggest voter concern for Manitobans after health care. More than four out of five Manitobans support the Kyoto accord to limit climate change, but fewer than two of four Manitobans reported they have a good or excellent understanding of the agreement (Bueckert, 2006). These statistics reinforce the need for a facility that supplies knowledge to an eagerly seeking public.

Interest in Home Renovation

As a repercussion of their financial limitations, residents of Winnipeg are known for being bargain conscious and seeking savings whenever possible. Therefore they are not only motivated by their environmental concerns but also by their budgets to economise, suggesting that products and practices which conserve energy or water would be appealing. The financial limitations of Winnipeg residents may also explain why the Do-It-Yourself (DIY) home renovation industry has been particularly successful in the prairie region. According to an article in the Winnipeg Free Press, the prairie region is enthusiastic about home renovations as 75% of Manitoba and Saskatchewan homeowners plan to renovate their

home in the next year (Bryksa, 2006). While the industry typically catered to males in the past, home improvement has become a popular hobby for women as well. One article states that it is “women who are fueling today’s [home improvement] market”(Veitch, 2007). With increasing numbers of single females purchasing homes and achieving financial stability in their careers, women are enjoying the feeling of empowerment they receive from creating visible and valuable improvements to their homes (Veitch, 2007). This information reinforces how integral it is to educate Canadians about sustainable options for their home and small business design projects.

Museum and Gallery Attendance

Hill Strategies Research, in conjunction with data from Statistics Canada, compiled a report in 2003 documenting the attendance of Canadians at museums and art galleries. Data was compiled with respect to provincial and national attendee characteristics including income, education, age, and gender. Key findings of this study that are influential for this practicum are reported here.

Contrary to the national trend, museum attendance rates in Manitoba do not increase uniformly with household income, although the highest income group had by far the highest museum attendance rate for the province. Attendance rates in Manitoba increased at all education levels. One third of residents who have completed only secondary education visited at least one museum in the year recorded, while nearly one half of those with a bachelor’s degree or higher visited at least one museum. Attendance decreased slightly with age, as residents between the ages of 30 and 44 had the highest attendance rate, and residents over 60 had the lowest rate. A slightly higher proportion of women than men visited at least

one museum or gallery in 1998. The data also concluded that Manitobans who visit museums are active attendees at other performing arts events, cultural festivals, or sporting activities and participate more in their communities than non-visitors (Hill Strategies, 2003). Although an analysis of these data suggest characteristics of the primary user group, the facility should also attempt to attract those outside of these brackets. Because of the diverse population of Winnipeg, the exhibitions must accommodate a range of learning styles and various levels of prior skill and knowledge. To maximize the potential for positive learning or leisure experiences, the facility must provide a balance between concentration and relaxation and between education and entertainment.

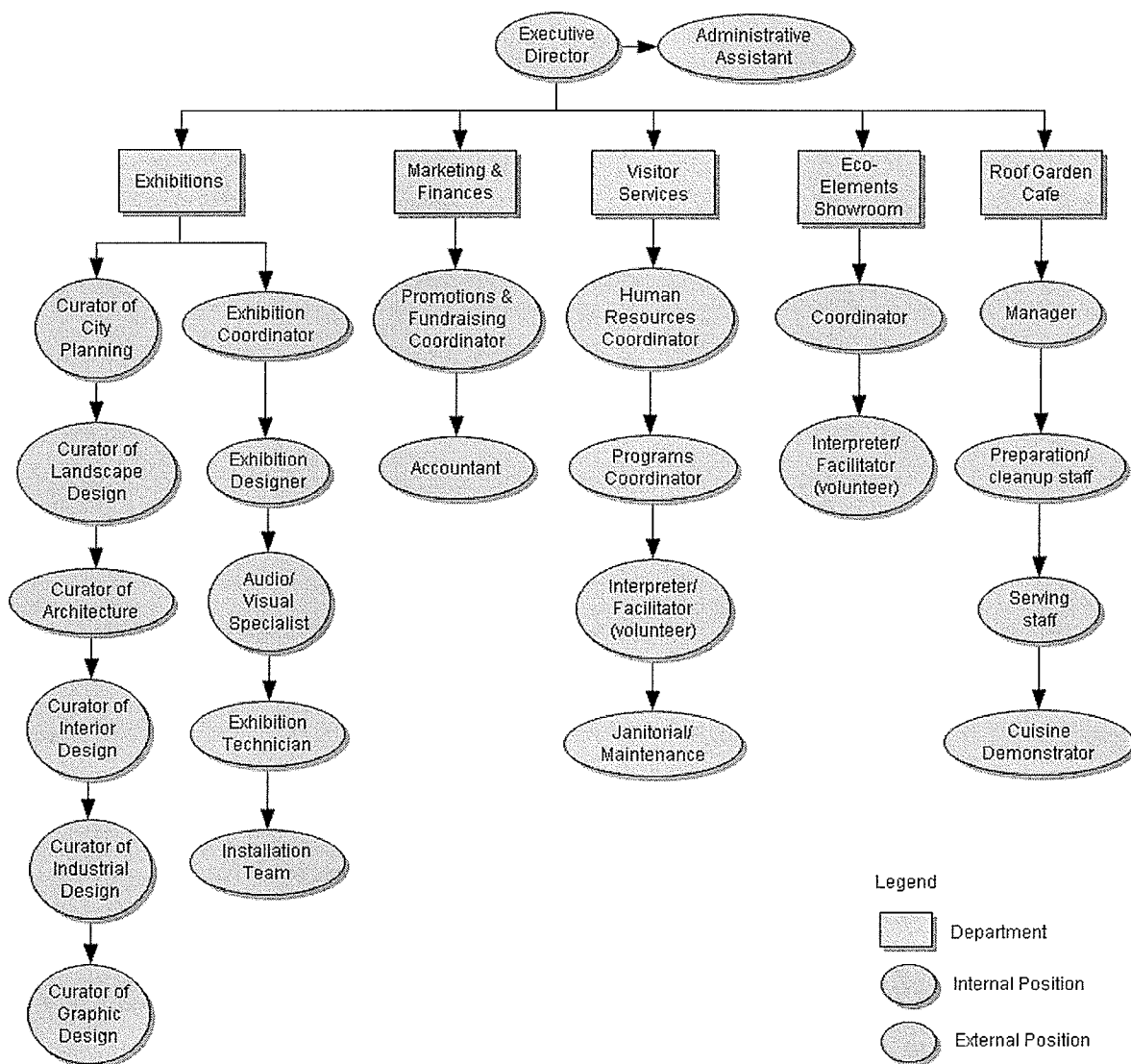
Secondary User Group

Organizational Profile

The secondary user group comprises the staff that will manage and operate the Ecological Design Centre. The facility's business functions are divided into five areas which include: Exhibitions, Marketing & Finance, Visitor Services, Eco-Elements Showroom, and Food Service (figure 39). A brief description of staff positions and responsibilities is included in table 7. The curatorial staff will include professionals from each of the design disciplines (planners, landscape architects, architects, interior designers, industrial designers, and graphic designers) but will not be accommodated in house. The installation team consists of exhibition designers, interior designers, graphic designers, and other specialists who are contracted on an as-needed basis and work with the in-house exhibition designer to realize small and large-scale exhibitions. By recruiting a large number of volunteers to assist visitors with exhibitions, displays in the showroom, and guided tours, the facility would spend less

on income. Opportunities would also be provided for students in the Faculty of Architecture, or anyone else with an interest in design and sustainability, to share their expertise with the community.

Figure 39: Staff Organizational Structure



5.0. Spatial Requirements

Lobby

The lobby is the primary entrance to the facility where visitors may be greeted by volunteers, oriented and may obtain information about current and future events and exhibitions.

Table 2: Lobby – Space, Character, and Technology Requirements

Size/Volume	Adjacencies	Activities	Subspaces	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
- 1,000 sq. ft.	<ul style="list-style-type: none"> - Showroom - Design Exhibition Space - Café - Forum - Wash-rooms 	<ul style="list-style-type: none"> - Observing & orienting - Assessing & planning - Ticket purchasing - Reflecting - Socializing - Upcoming and current exhibition/ Event advertisement 	<ul style="list-style-type: none"> - Payment transaction - Seating - Information - Coat storage 	<ul style="list-style-type: none"> - Positive first and last impression - Transparency to exterior and other spaces - Transition - Universally accessible 	<ul style="list-style-type: none"> - Seating - Plasma screen video display - Electronic ticket dispensers 	<ul style="list-style-type: none"> - Supply, return and exhaust - Plumbing for water feature - Fluorescent ambient lighting - Accent lighting for water feature, ticket dispensers & coat storage

Eco-Elements Showroom

The Eco-Elements Showroom is a display area where visitors interact with materials and products. Also included is a reference area with books and journals related to design and areas where visitors can digitally retrieve more information or sources for specific products. A large portion of the funding for the facility is generated through the manufacturers who display their products in this space. The products and materials are organized into five sections:

- Construction Materials: concrete, masonry, wood, metals
- Finish Materials: floor, walls and ceiling treatments and millwork
- Furniture, Fixtures and Equipment: includes appliances and electronics
- Mechanical: plumbing and heating, ventilation and air conditioning systems (HVAC)
- Electrical and Communications: lighting and information communication technology

Table 3: Eco-Elements Showroom – Space, Character, and Technology Requirements

Size/Volume /Occupancy	Adjacencies	Activities	Subspaces	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
- 2000 sq.ft. - Max. occupancy: 30 people (including staff)	- Lobby - Design Exhibition Space	- Hands-on exploration with materials and products - Reading, researching, or studying (digital or hard copies) - Accessing internet	- Construction & finish materials - Furniture, fixtures & equipment - Mechanical display - Electrical display - Book and Journal display - Reading and study area - Digital information stands	- Facilitate exploration - Provide visual connection to lobby/ exterior for product display -	- Custom designed display system - Shelving for books and journals - Computer terminals at standing and sitting height - Lounge seating with tablets	- Access floor for a flexible electrical system and supply, return, and exhaust - Fluorescent ambient lighting with dimming and division capacities - Adjustable track lighting for displays

Design Exhibition Space

The Design Exhibition Space accommodates a range of small and large scale temporary exhibitions focusing on contemporary issues in design, architecture, planning, and sustainable development. Topics could include Energy, Water & Material Consumption; General Health & Well-being; Land-use; Humanitarian & Social Design; Annual 'Best' Canadian Design Projects; Ergonomics & Health; and work by students and staff in the Faculty of Architecture. Exhibitions have a three month duration at the Ecological Design Centre, after which they are transported and reinstalled at other facilities within the city, and eventually circulate around the province and prairie region to increase financial feasibility.

Table 4: Design Exhibition Space – Space, Character, and Technology Requirements

Size/Volume/ Occupancy	Adjacencies	Activities	Subspaces	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
<ul style="list-style-type: none"> - 5000 sq.ft. - 16 ft. high (min.) ceilings - Max. occupancy: 200 people 	<ul style="list-style-type: none"> - Lobby - Exhibition Preparation 	<ul style="list-style-type: none"> - Interacting: viewing, touching, operating, hearing, smelling, experiencing - Socializing - Discussing - Presenting 	<ul style="list-style-type: none"> - Custom designed break-out spaces with multi-media capacity & seating 	<ul style="list-style-type: none"> - Flexibility - Divisibility - Transparency - Open, column-free space - Facilitate interaction & collaboration - Engage all senses - Environmental control to meet national museum standards for travelling exhibitions 	<ul style="list-style-type: none"> - Custom designed exhibition system with vertical and horizontal display capacities - Demountable wall partitions to divide space for two separate exhibitions and to further divide those separate spaces - Plasma screen video display 	<ul style="list-style-type: none"> - Access floor for a flexible electrical system and supply, return, and exhaust - Ambient lighting with dimming and division capacities - Adjustable track lighting

Ideas Forum

The Ideas Forum is a multipurpose space which accommodates presentations, discussions, seminars, or workshops on issues related to design and sustainability. The forum should be visible from the lobby to encourage visitors intending to view the exhibitions to also partake in the discussions. Zones of increased involvement should be provided where visitors can observe from the distance, or become active participants as they desire.

Table 5: Ideas Forum – Space, Character, and Technology Requirements

Size/Volume /Occupancy	Adjacencies	Activities	Subspaces	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
<ul style="list-style-type: none"> - 1200 sq.ft. - Max. occupancy: 75 	<ul style="list-style-type: none"> - Lobby - Design Exhibition Space 	<ul style="list-style-type: none"> - Presenting - Discussing - Collaborating - Note taking with laptop computers or paper 	<ul style="list-style-type: none"> - Presentation area - Seating rows - Storage for supplies and a/v equipment 	<ul style="list-style-type: none"> - Facilitate interaction & collaboration - Acoustic and visual separation when required - 2 spaces for wheelchairs 	<ul style="list-style-type: none"> - Seating with hinged tablet surfaces - Ceiling mounted projector - Wall mounted smart board 	<ul style="list-style-type: none"> - Supply, return, and exhaust - Ambient lighting with dimming capabilities - Adjustable track lighting at front for presenter - Electrochromic glass for light and privacy control - Power & data at each seat and at front for presenter

Roof Garden Café and Green Cuisine Demonstration Area

The Roof Garden Café provides light meals, snacks, and beverages. Baked goods are supplied by local bakeries and herbs are grown on site in the roof garden during the summer months. The cafe is not licensed but features a range of smoothies, juices, and specialty coffees. Liquor permits could be obtained for catered events. The space promotes reflection, socialization and also can be used for informal seminars and lectures. The Culinary Demonstration Area features a chef who provides demonstrations of healthy cooking practices and energy efficient appliances.

Table 6: Roof Garden Café and Green Cuisine Demonstration Area – Space, Character, and Technology Requirements

Size/Volume /Occupancy	Adjacencies	Activities	Subspaces	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
<ul style="list-style-type: none"> - 3000 sq.ft. - Max. occupancy: 75 (including staff) 	<ul style="list-style-type: none"> - Lobby - Wash-rooms - Loading - Roof Garden 	<ul style="list-style-type: none"> - Preparing, serving & consuming food and drinks - Reflecting and relaxing - Socializing - Discussions - Catered events and business lunches - Demonstrations 	<ul style="list-style-type: none"> - Service Counter - Seating - Cooking and appliance demonstration counter - Food Preparation - Dish washing - Storage (dry, refrigerated & frozen) 	<ul style="list-style-type: none"> - Visible from Lobby - Flexibility - Levels of privacy - Informal and casual - Furniture and fixtures should relate to the facility's mission - Atmosphere should be conducive to reflection for visitors to ponder and internalize new knowledge 	<ul style="list-style-type: none"> - Tables & chairs - Booths - Demonstration counter with electrical outlets - Mirror above counter to view cooking processes 	<ul style="list-style-type: none"> - Supply, return & exhaust - Plumbing in food preparation/ dish area & front service counter - Electrical at service & demonstration counters - Natural lighting - Ambient lighting with dimming capacities - Task lighting at service & demonstration counters

Staff Offices

Table 7: Staff Offices – Space and Technology Requirements

Position	Description	Size	Adjacencies	Furniture/ Fixtures/ Equipment
Executive Director	- Represents organization & oversees all areas - Liaises with donors	120 sq.ft. enclosed	- Admin. Assistant	- Workstation - Meeting table - Storage unit
Administrative Assistant	- Assists all departments - Directs telephone & email inquiries	80 sq.ft.		- Workstation
Exhibitions Coordinator	- Seeks potential exhibits and coordinates scheduling	100 sq.ft.	- Exhibition designer and curators	- Workstation
Showroom Coordinator	- Serves as contact for product manufacturers	100 sq.ft.	- Showroom	- Workstation - Guest seating
Exhibition Designer	- Works with manufacturers and contracted designers to design exhibitions and displays in the showroom	100 sq.ft.	- Exhibition coordinator and curators	- Workstation
Curatorial Staff	- External staff who provide expertise and consulting	200 sq.ft. (hotelling stations)	- Exhibition coordinator and designer	- Workstation - Large storage unit for reference materials
Audio/Visual Specialist & Technician	- Integrates audio and visual, digital, and virtual components with physical components	100 sq.ft.		
Exhibition Technician	- Services and maintains exhibitions & displays	100 sq.ft.		- Workstation
Programs Coordinator	- Designs and executes programs or facilitates execution of program by an external specialist/professional - Arranges guest speakers, seminars, and presentations - Coordinates catered or special events	100 sq.ft.		- Workstation
Promotion/ Fundraising Coordinator	- Maintains or contracts design of web-site, digital and print media - Fundraising	100 sq.ft.		- Workstation
Accountant	- Manages budget (revenue & expenses)	100 sq.ft.		- Workstation
Human Resources Coordinator	- Manages staff and volunteers - Completes payroll	100 sq.ft. enclosed		- Workstation - Storage unit
Interpreter/ Facilitator	- Orients visitors upon arrival - Assists visitors with exhibitions or displays - Executes programs	n/a		- Access to shared meeting room or curatorial office

Auxiliary Space

Table 8: Auxiliary Space – Space and Technology Requirements

Space	Size	Adjacencies	Design Criteria	Furniture/ Fixtures/ Equipment	Mechanical & Electrical
Supplies/ Office equipment	50 sq.ft.	- Central to all staff workspaces	- Storage for stationary and office supplies	- Photocopier, printer, fax, scanner	- Exhaust - Electrical for equipment
Refreshment Counter	50 sq.ft.	- Washrooms (plumbing wall) - Staff workspaces - Meeting Room	- Counter with upper and lower storage - Durable finishes	- Sink, microwave, coffee machine, bar fridge	- Plumbing - Electrical receptacles at counter height
Meeting Room	300 sq.ft.	- Staff Offices	- Divisible into two separate rooms - Access to natural light	- 2 Tables - 14 Chairs - Ceiling mounted projector - 2 Wall mounted smart boards - Demountable partition wall	- Ambient fluorescent lighting with dimming capabilities - Task lighting
Washrooms	2 @ 125 sq.ft.	- Staff workspaces	- Showers, change area & lockers		- Plumbing - Electrical at counter height
Loading Dock	300 sq.ft.	- Exhibition Preparation	- Holding for garbage & recyclables - Durable finishes		
Exhibition Preparation	400 sq.ft.	- Loading Dock	- Durable finishes	- Horizontal work surface - Storage for supplies	- Plumbing
Storage/ Collection	500 sq.ft.	- Exhibition Preparation - Loading Dock	- Climate, temperature & humidity controlled		
Janitorial/ Maintenance	100 sq.ft.		- Storage hooks for mops and brooms		- Plumbing
Mechanical/ Electrical	200 sq.ft.		- Located in basement		

Washrooms

Table 9: Washrooms – Water Closets and Area

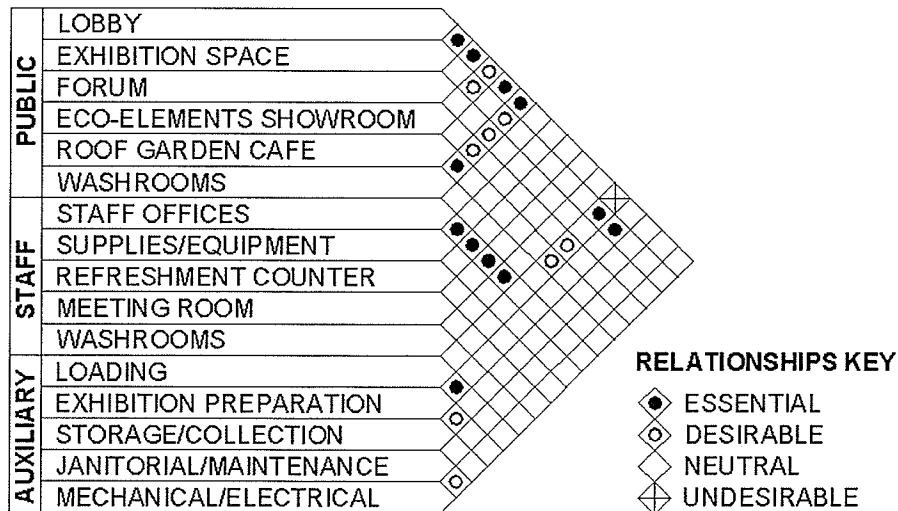
Level/Occupancy	Water closets/Urinals	Area
Primary washroom (main floor) - Max. Occupancy on main floor: 275 people	- Women: 6 water closets (1 must be accessible) - Men: 1 accessible water closet, 1 urinal	500 sq.ft.
Secondary washroom (second floor/mezzanine) - Max. occupancy on second floor: 100 people	- Women: 3 water closets (1 must be accessible) - Men: 1 accessible water closet, 1 urinal	300 sq.ft.
		Total: 800 sq.ft.

Total Area and Adjacency Matrix

Table 10: Program Area Requirements

Space	Area
Public	12,200 sq. ft.
Staff	1,300 sq. ft.
Auxiliary	2,150 sq. ft.
Circulation (25%)	3,912 sq. ft.
Total	19,562 sq. ft.

Figure 40: Spatial Adjacency Matrix



6.0. Building Code, Access, Life Safety, and Universal Design

Classification Requirements

The Ecological Design Centre would be classified as a Group A, Division 2 Assembly Occupancy. According to the National Research Council (NRC) National Building Code of Canada (1995), the following codes are applicable to the Ecological Design Centre.

Exits

- 1) Every floor area intended for occupancy shall be served by at least 2 exits
 - 2) The least distance between 2 required exits from a floor area shall be
 - a) one half the maximum diagonal dimension of the floor area, but need not be more than 9m for a floor area having a public corridor, or
 - b) one half the maximum diagonal dimension of the floor area, but not less than 9m for all other floor areas
- The building must be sprinklered
 - Two exits are required and the maximum distance of travel to a fire exit is 150' from any point in the building
 - Stairways are required at each end of the building
 - One passenger elevator is required

Barrier-Free Design

Barrier-Free Path of Travel

- 1) Every barrier-free path of travel shall provide an unobstructed width of not less than 920 mm for the passage of wheelchairs
- 2) Interior and Exterior walking surfaces that are within a barrier-free path of travel shall:
 - a) have no opening that will permit the passage of a sphere more than 13mm in diameter
 - b) have any elongated openings oriented approximately perpendicular to the direction of travel
 - c) be stable, firm, and slip-resistant
 - d) be bevelled at a maximum slope of 1 in 2 at changes in level not more than 13 mm and
 - e) be provided with sloped floors or ramps at changes in level more than 13 mm.
- 3) A barrier-free path of travel is permitted to include ramps, elevators, or other platform elevating devices where there is a difference in level.

Doorways and Doors

- 1) Every doorway that is located in a barrier-free path of travel shall have a clear width not less than 800 mm when the door is in the open position.
- 2) Door operating devices shall be of a design which does not require tight grasping and twisting of the wrist as the only means of operation

Ramps

- 1) A ramp located in a barrier-free path of travel shall
 - a) have a width of not less than 870 mm between handrails
 - b) have a slope not less than 1 in 12
 - c) have a level area not less than 1500 by 1500 mm at the top and bottom

Occupancy Requirements

- 1) In an assembly occupancy, within rooms or areas with fixed seats, there shall be two designated wheelchair spaces for 100 fixed seats and shall be
 - a) clear and level, or level with removable seats
 - b) not less than 900 mm wide and 1525 mm long to permit a wheelchair to enter from a side approach
 - c) arranged so that at least 2 designated spaces are side by side
 - d) situated, as part of the designated seating plan, to provide a choice of viewing location and clear view of the event taking place

Counters

- 1) Every counter more than 2 m long serving the public shall have at least one barrier free section in conformance with sentence 2).
- 2) A barrier-free counter surface shall not be more than 865 mm (2'-10") above the floor.

Traveling Exhibition Standards

- The Exhibition space must meet national museum standards for exhibiting traveling exhibitions, and the borrowing of works of art from other institutions, which typically require environmental control as part of their loan agreements
- Requirements for temperature and relative humidity are:

Winter:

- Temperature: 20°, no more than $\pm 1^\circ$ change in a 24-hour period.
- Relative humidity: 40% set point, no more than $\pm 5\%$ change in a 24-hour period

Summer:

- Temperature: 20°, no more than $\pm 1^\circ$ change in a 24-hour period.
- Relative humidity: 55% set point, no more than $\pm 5\%$ change in a 24-hour period

APPENDIX B
DESIGN DRAWINGS

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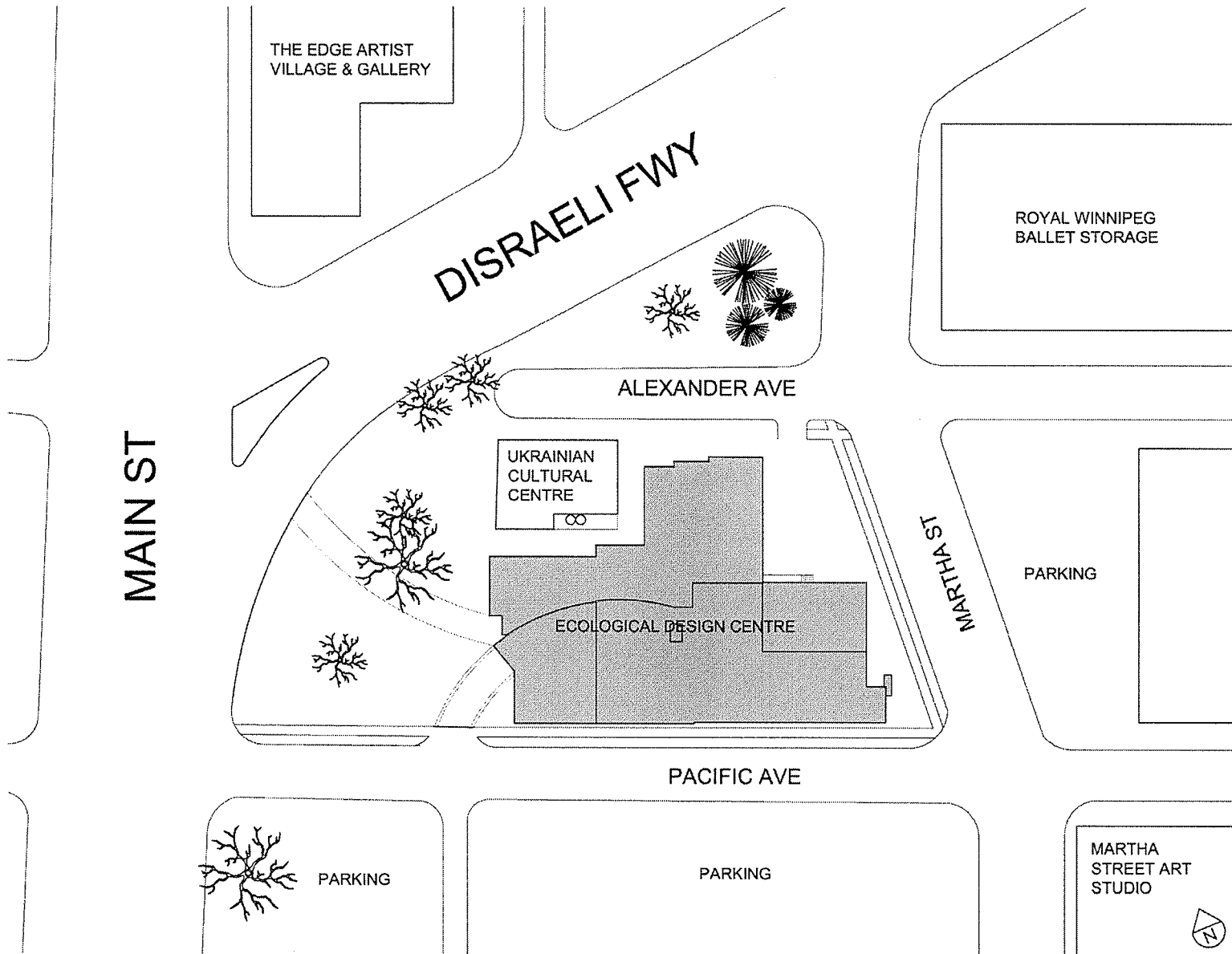


Figure 41: Site Plan

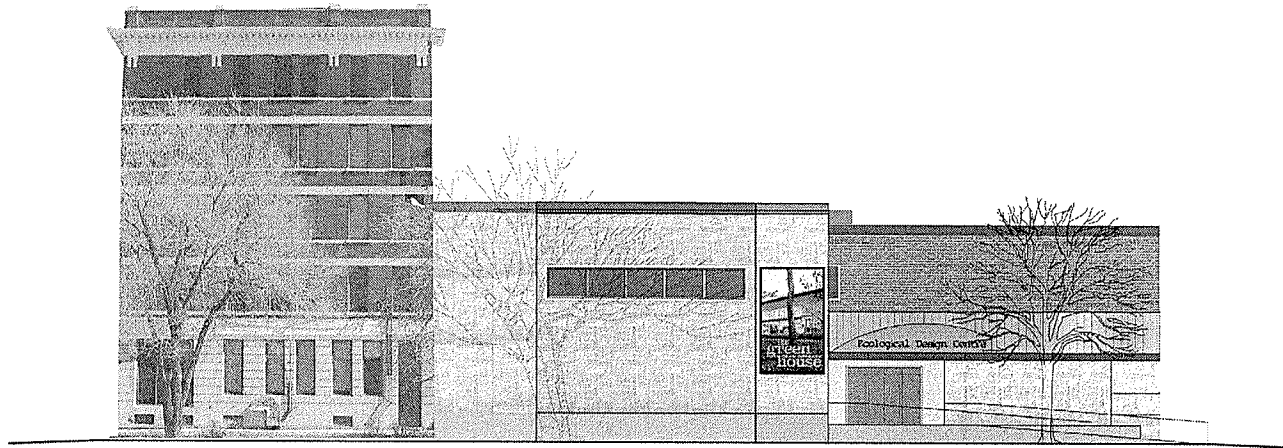


Figure 42: West Elevation - View from Main Street

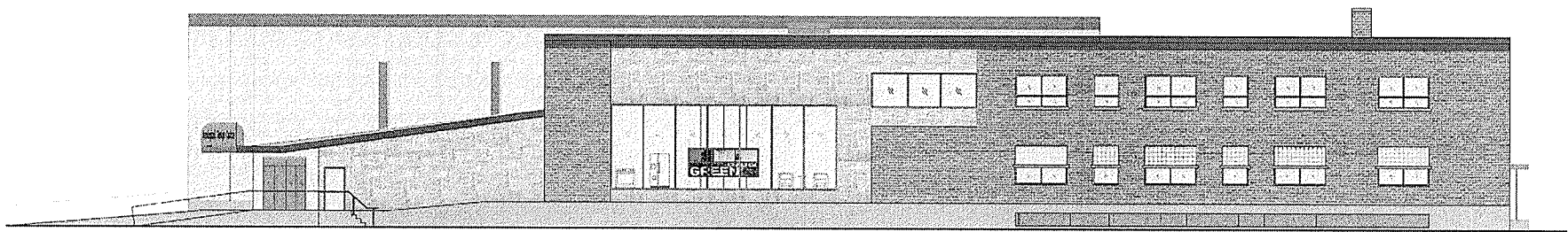


Figure 43: South Elevation - View from Pacific Avenue

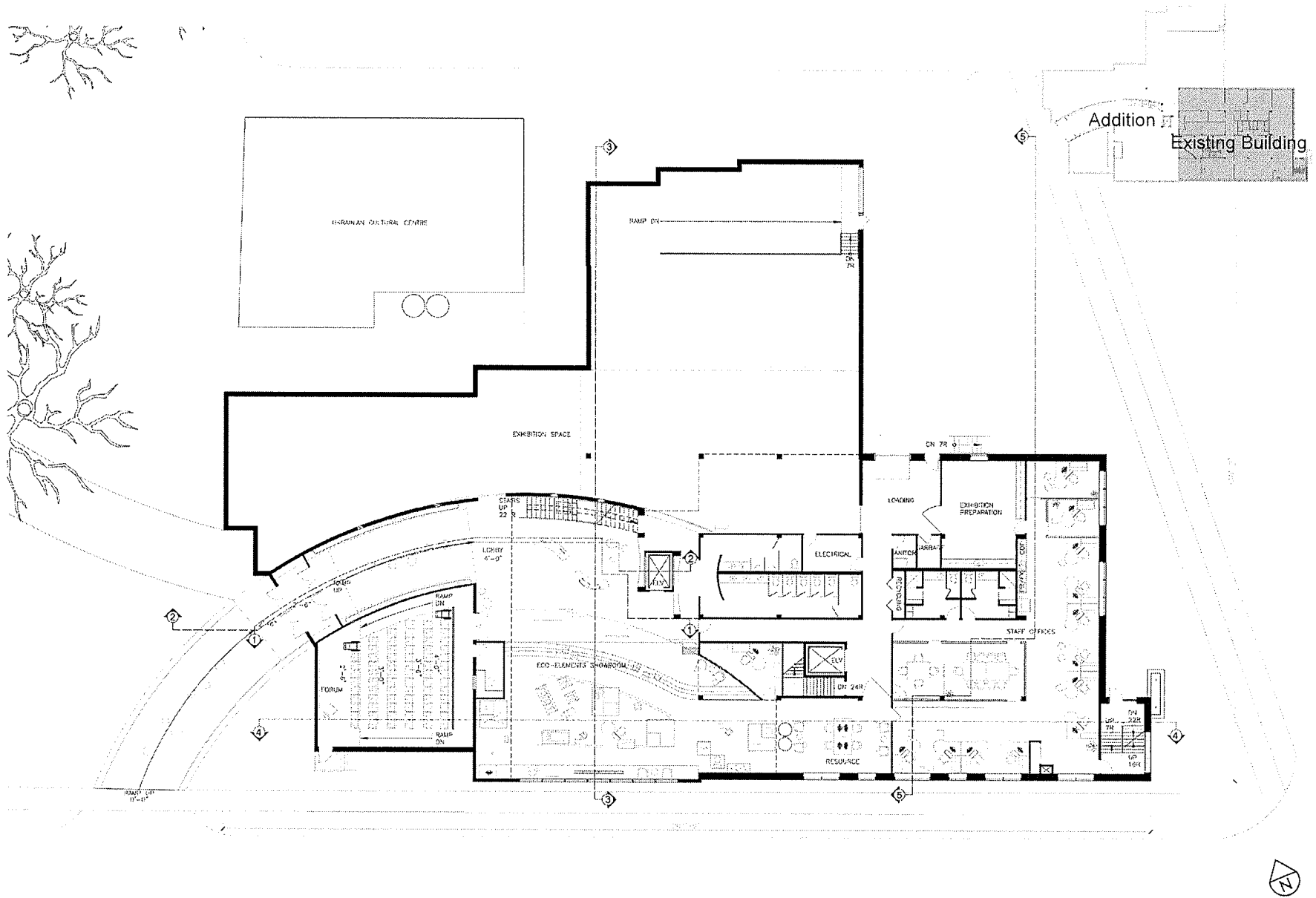


Figure 44: Main Floor Plan

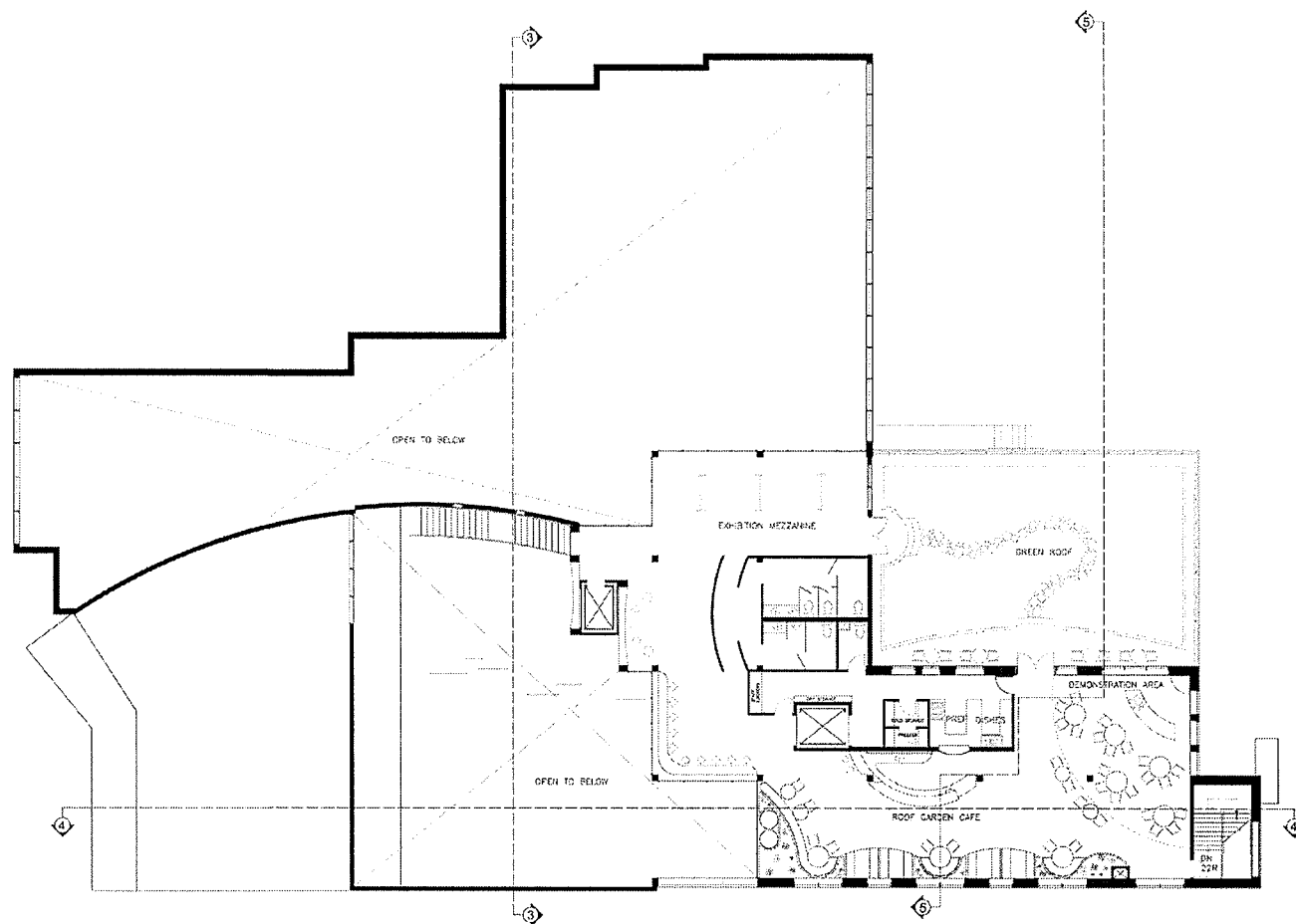





Figure 45: Second Floor Plan

Lighting Legend

-  Armstrong Infusions Accent Canopy
-  Compact fluorescent lamp
-  Axis Picolo Medio fixture with T5 fluorescent lamps

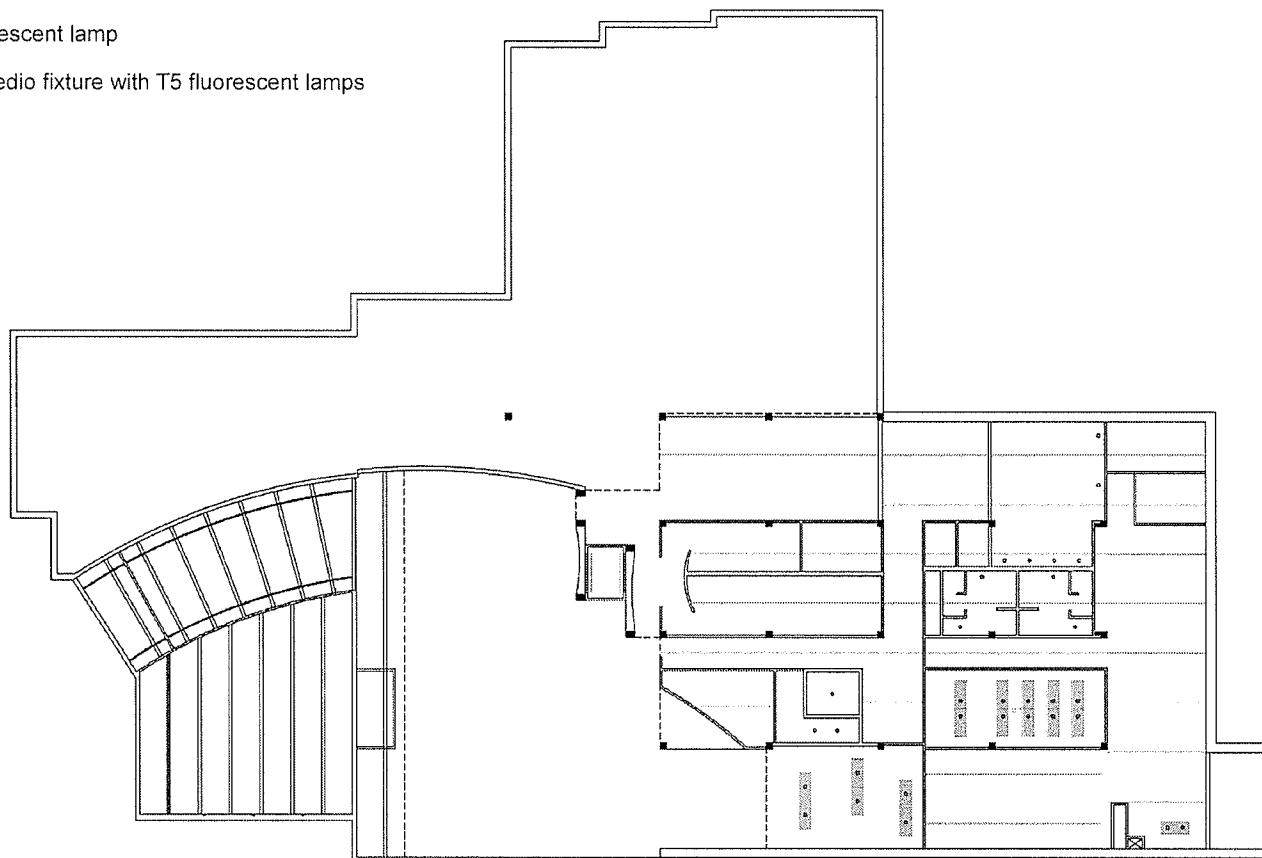


Figure 46: Reflected Ceiling Plan - Main Floor

Lighting Legend



Zeno suspension fixture with compact fluorescent, HID Metal-Halide and halogen lamps



Axis Pico Medio fixture with T5 fluorescent lamps
(suspended from joists at 5' O.C.)



Metal ceiling grid suspended 8'-6" above floor



Compact fluorescent lamp

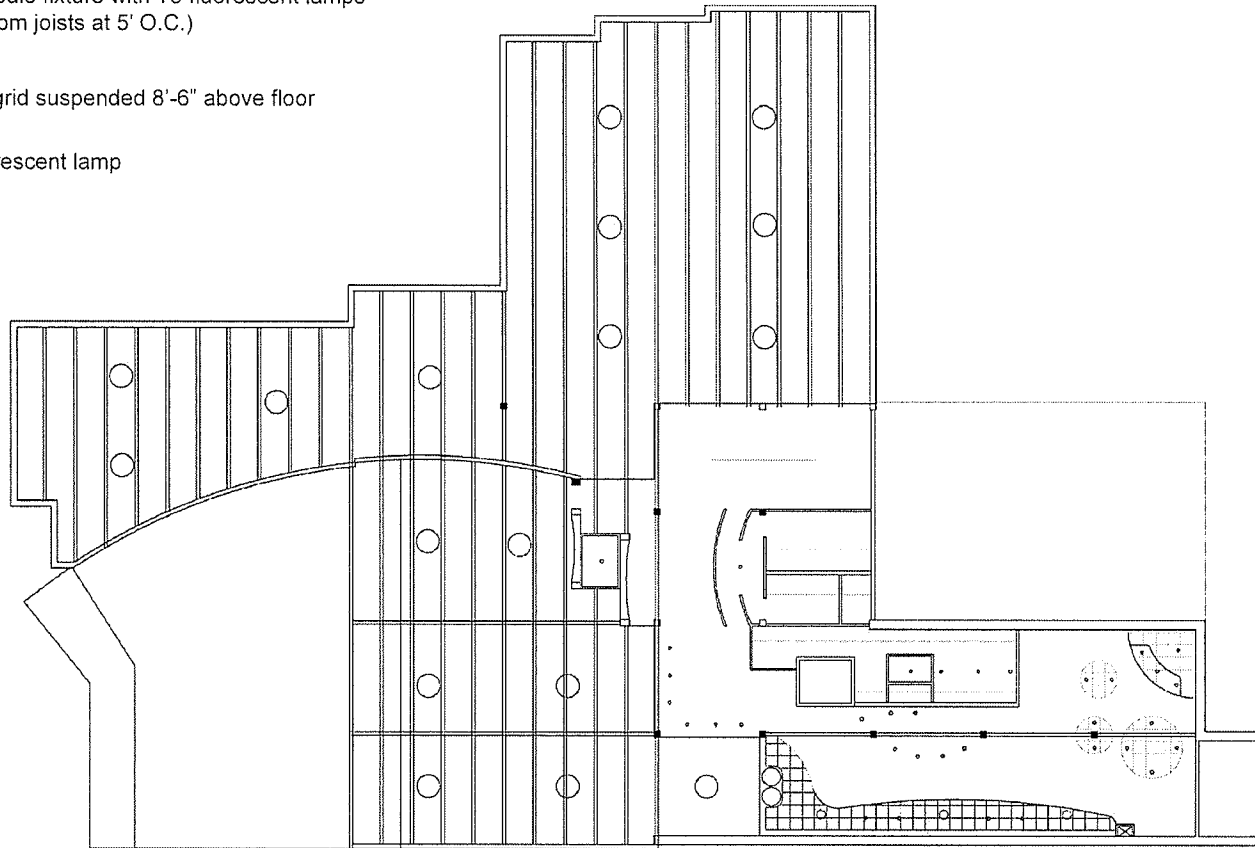


Figure 47: Reflected Ceiling Plan - Second Floor

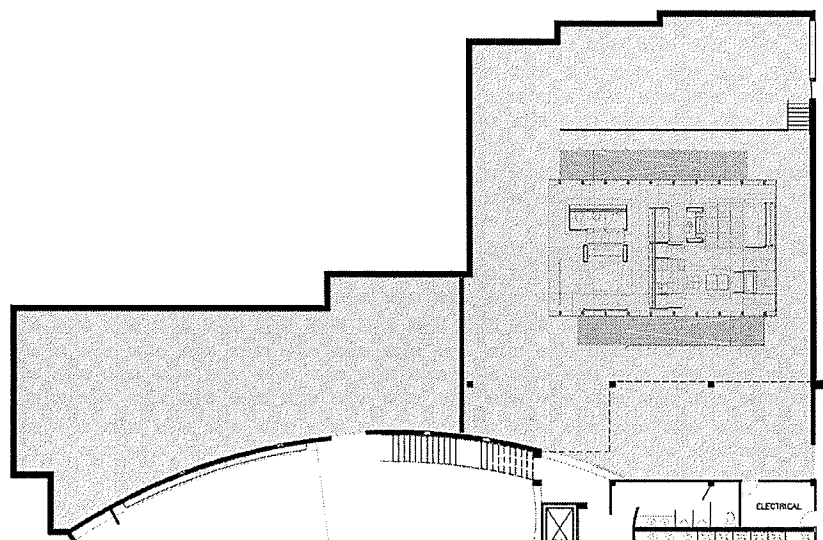


Figure 48: Exhibition Space with Sustainable Condo

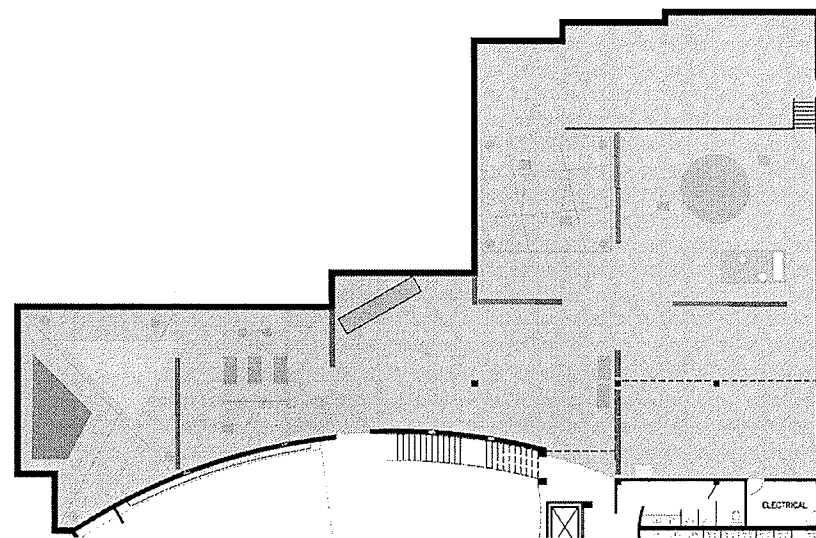


Figure 49: Exhibition Space with Big & Green: Toward Sustainable Architecture in the 21st Century

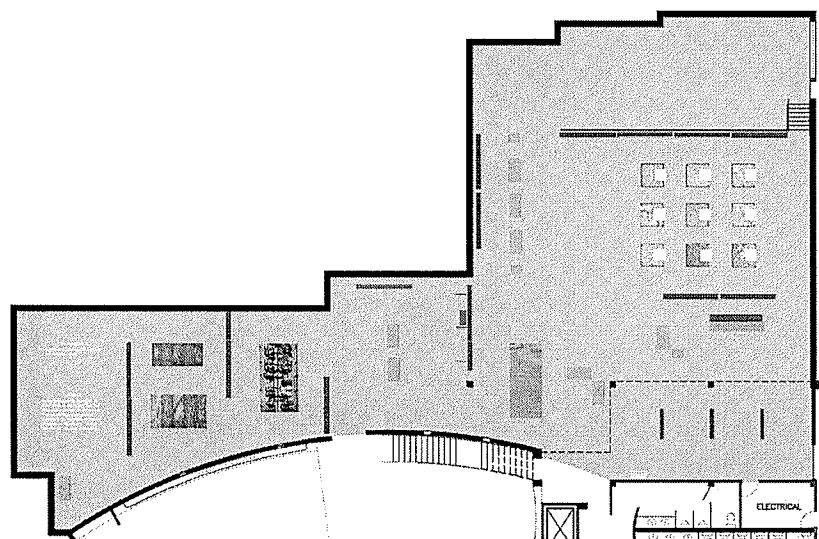


Figure 50: Exhibition Space with American Lawn: Surface of Everyday Life

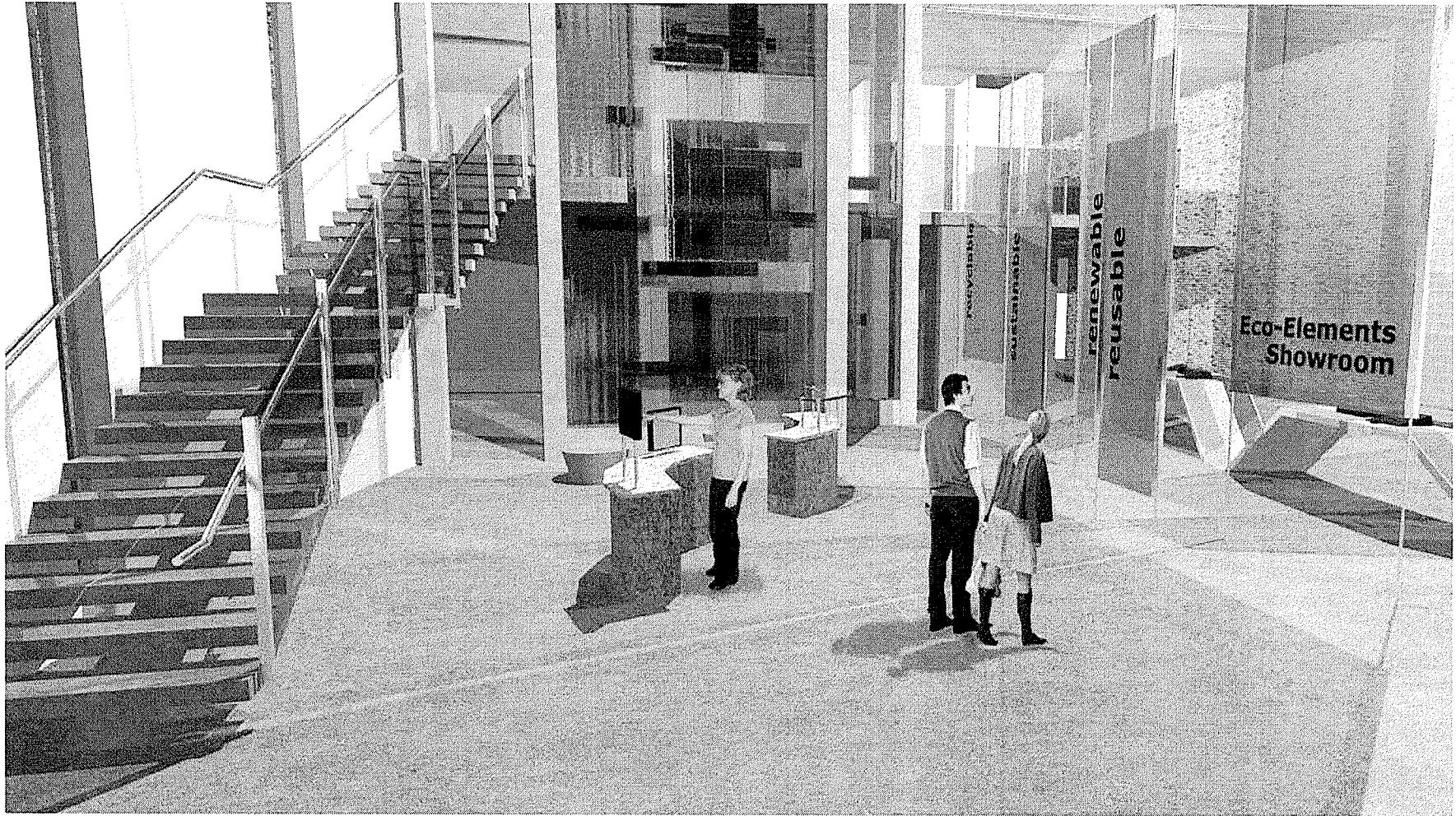


Figure 51: Lobby

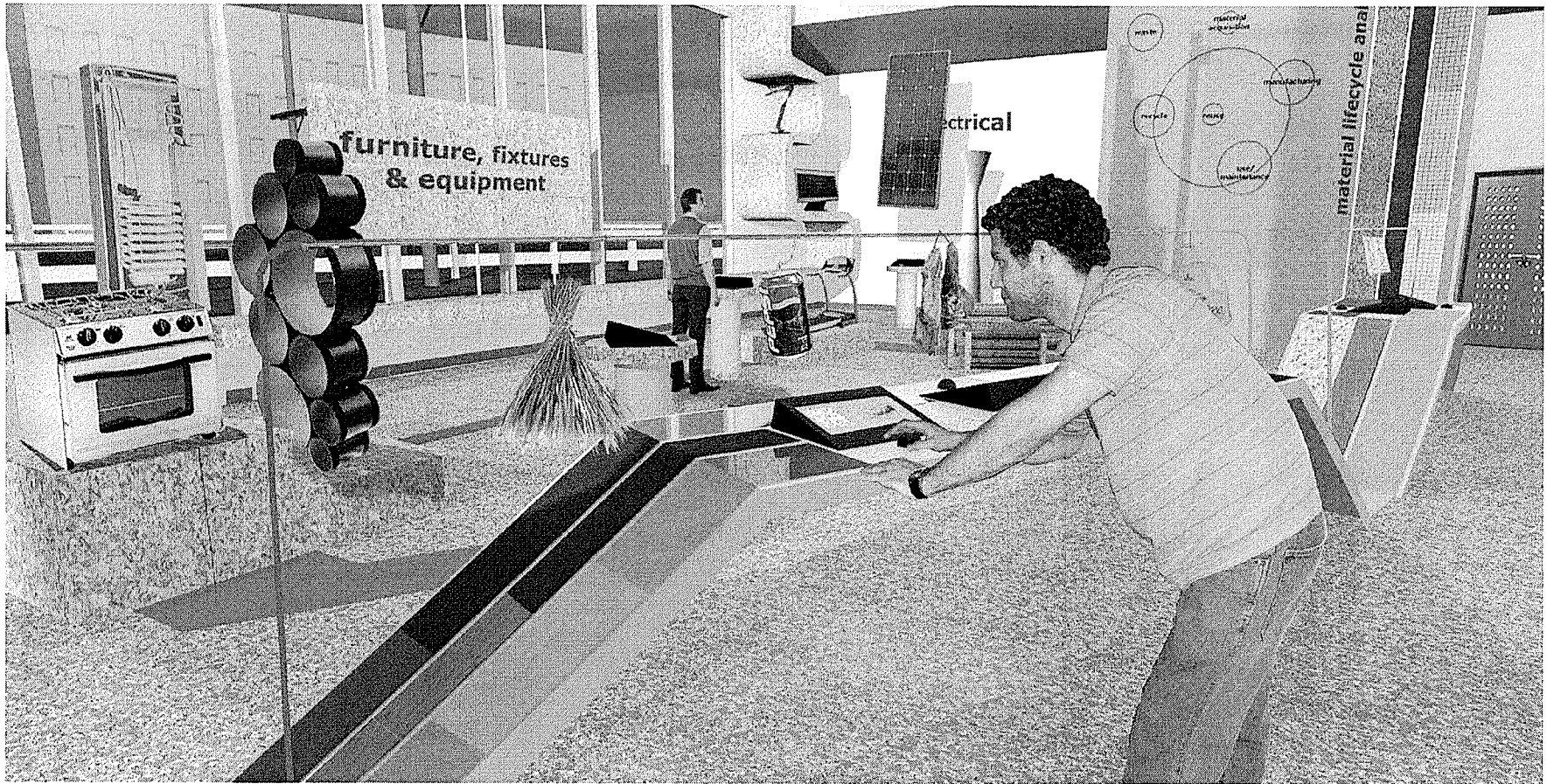


Figure 52: Eco-Elements Showroom

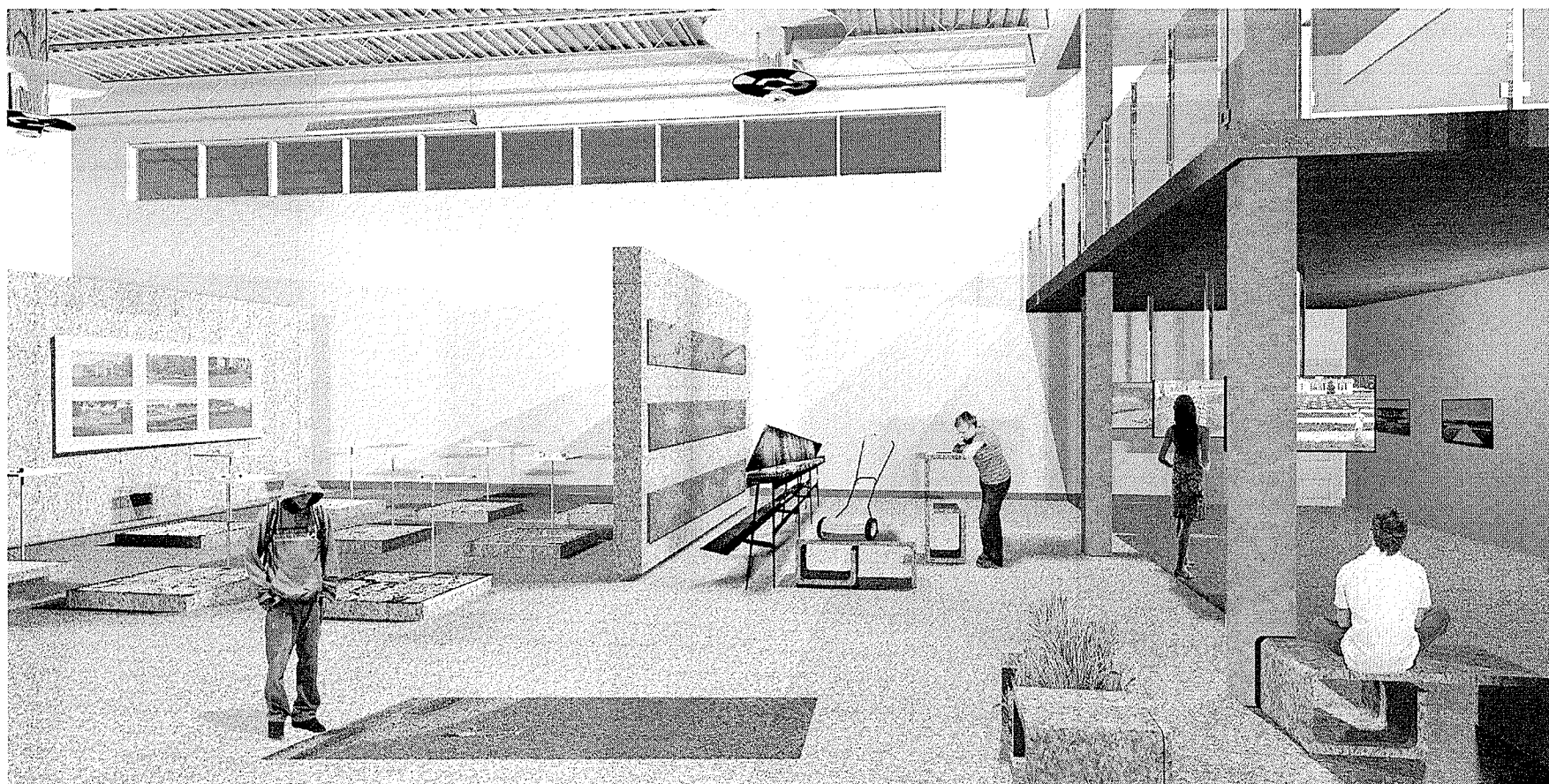


Figure 53: Design Exhibition Space



Figure 54: Roof Garden Café

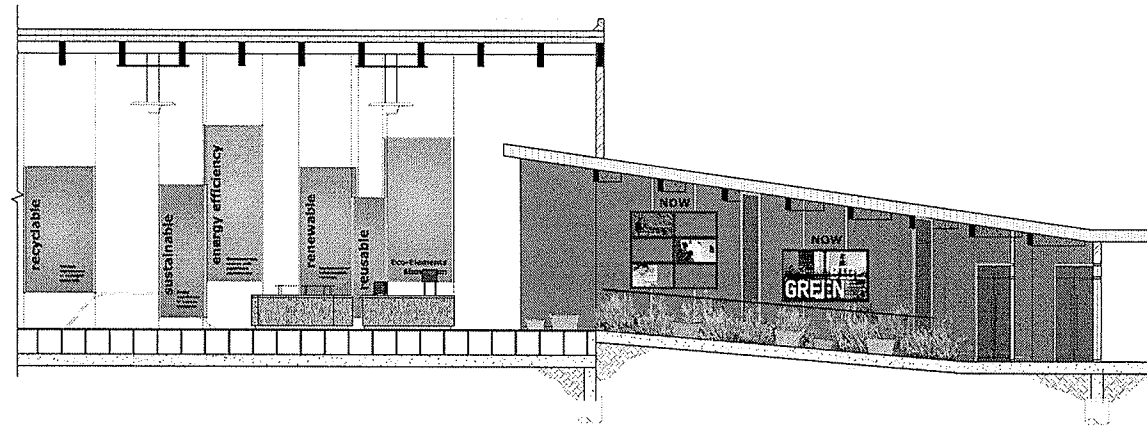


Figure 55: Section 1-1 Entrance & Lobby

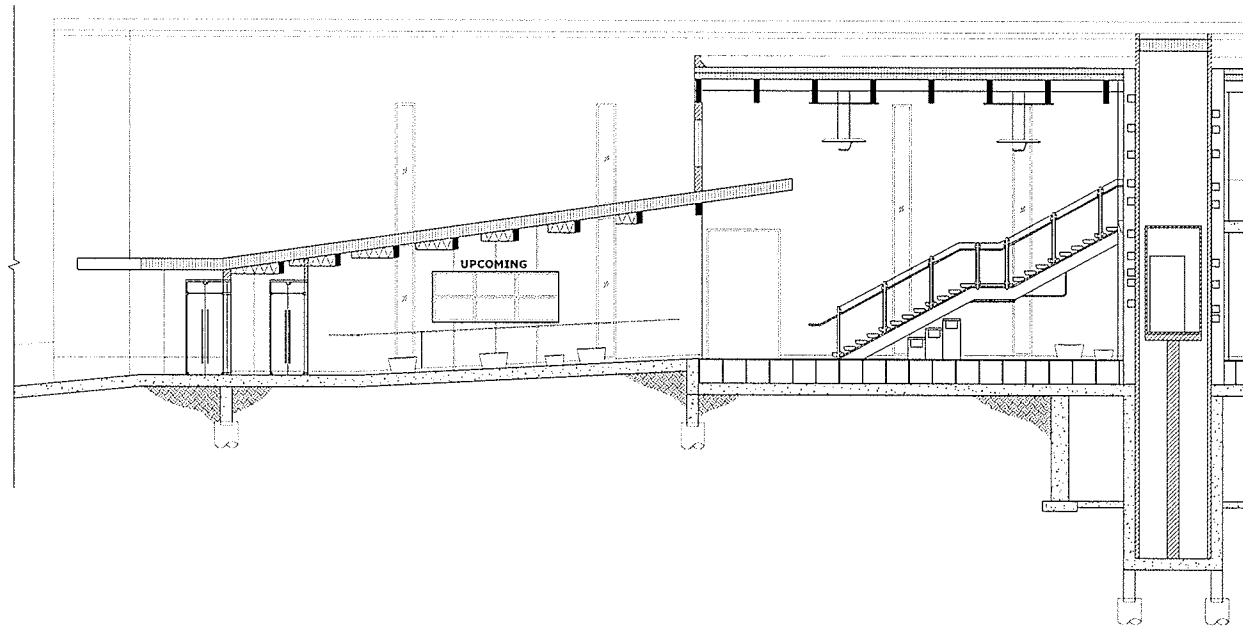


Figure 56: Section 2-2 Entrance & Lobby

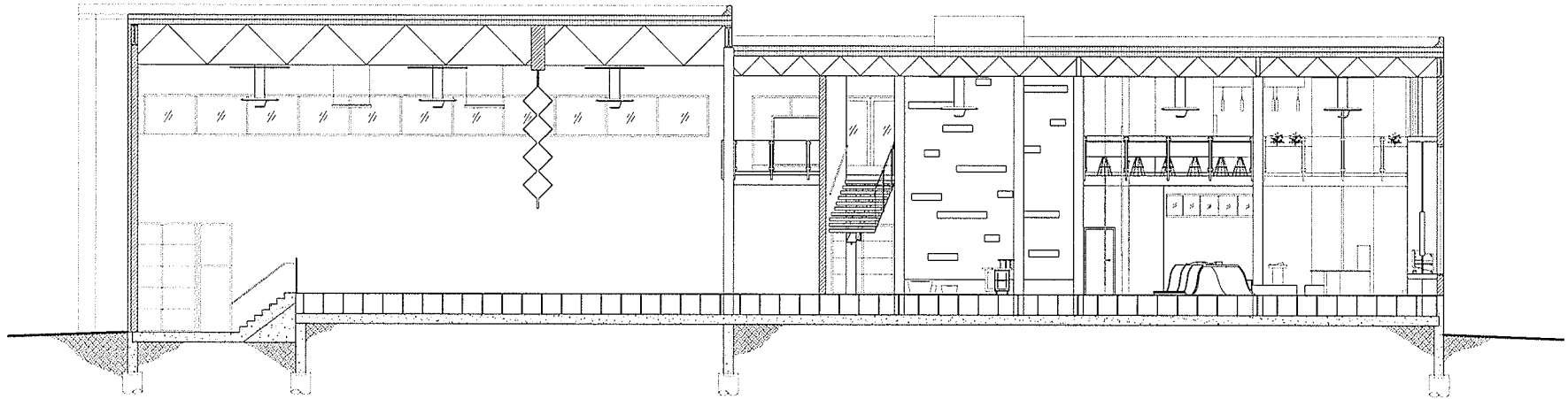


Figure 57: Section 3-3 Exhibition Space, Lobby & Showroom

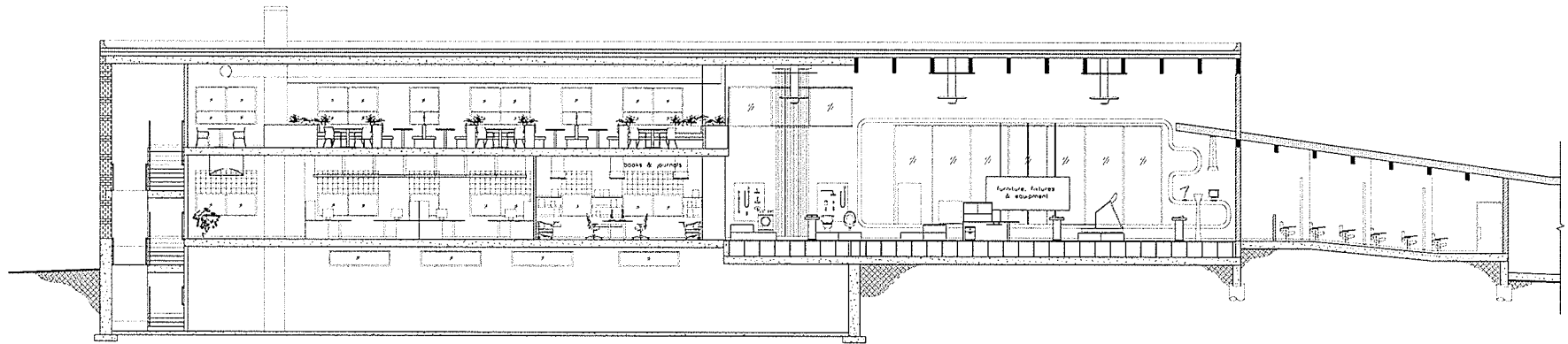


Figure 58: Section 4-4 Café, Offices, Showroom & Forum

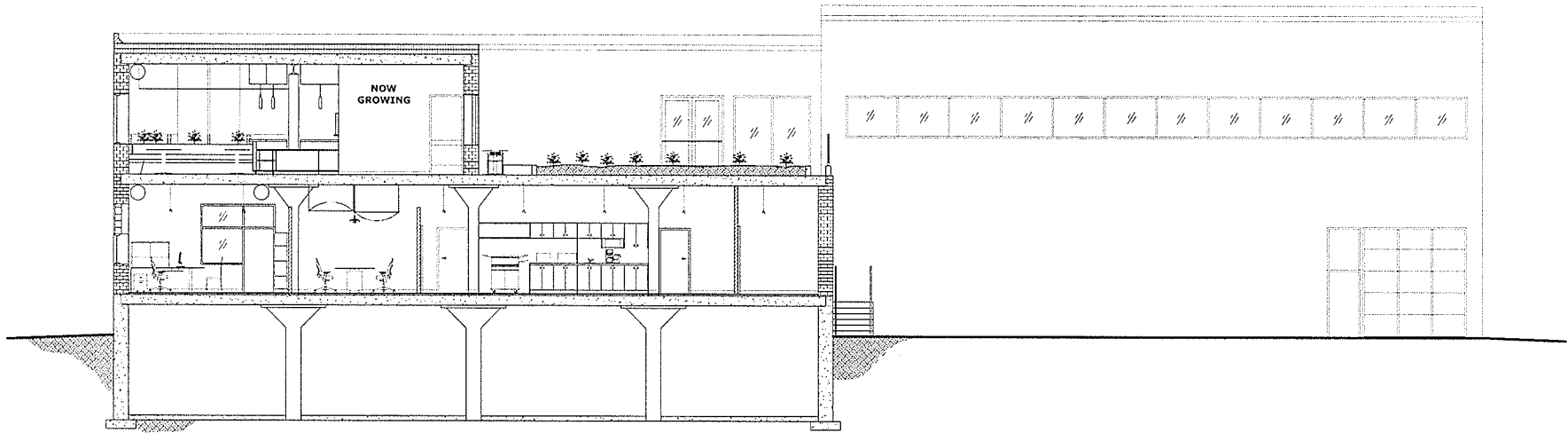


Figure 59: Section 5-5 Café, Roof Garden & Offices

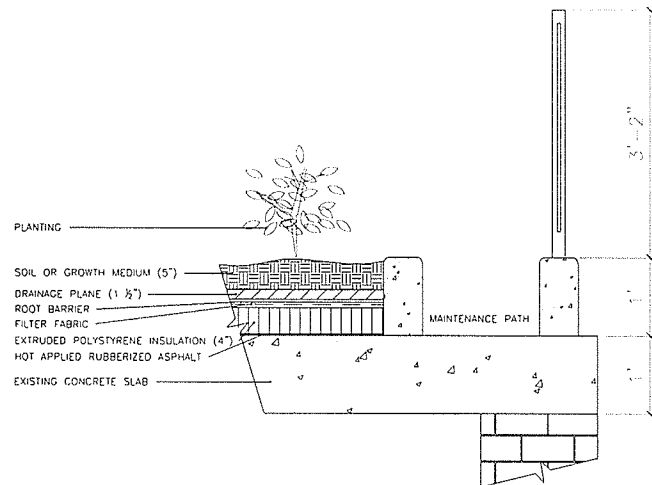


Figure 60: Section of Semi-Extensive Green Roof System

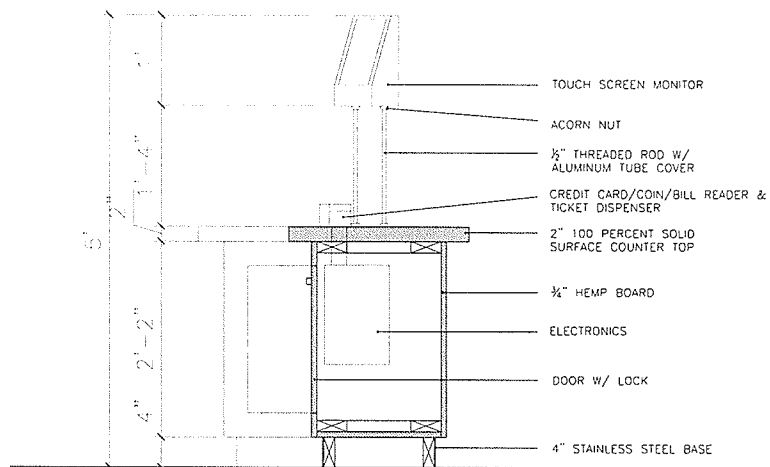


Figure 61: Electronic Ticket Dispensing Station Detail

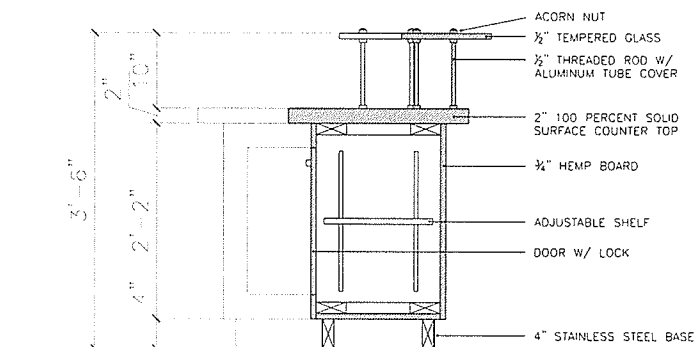


Figure 62: Orientation Centre Detail

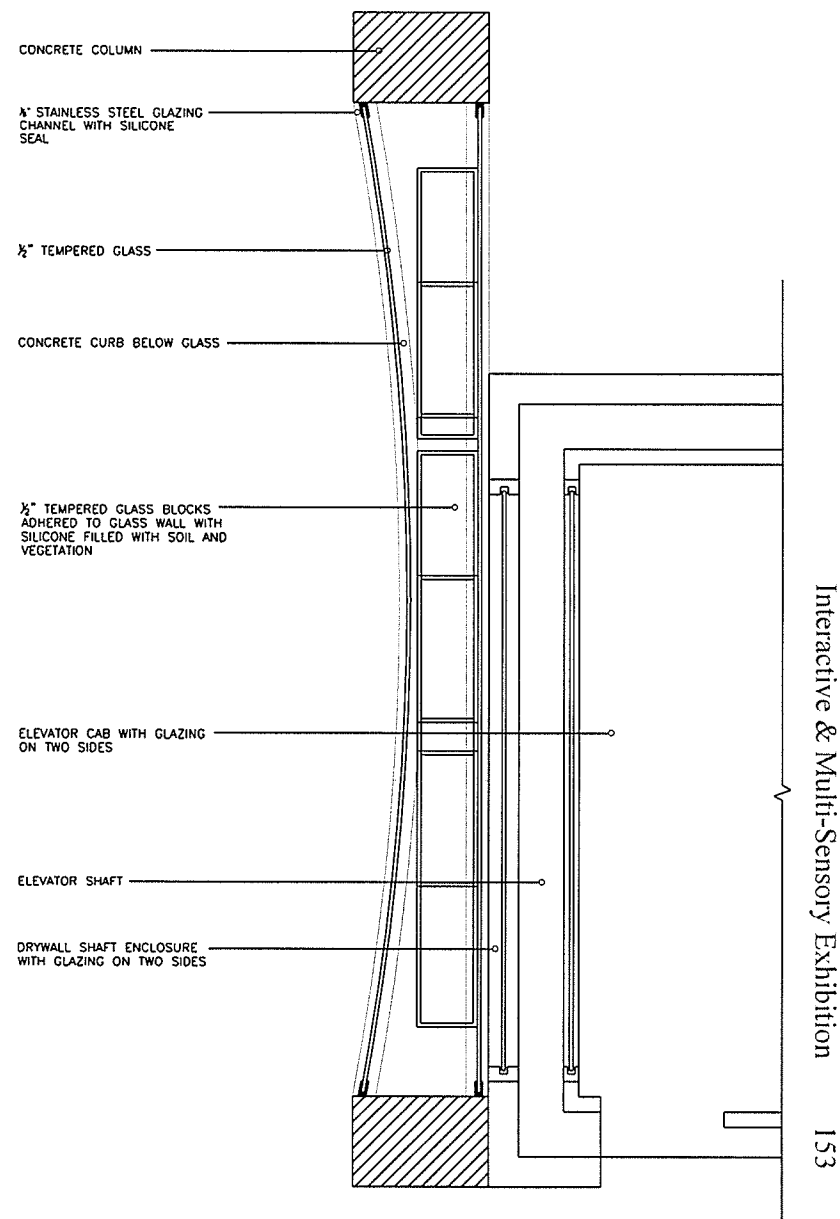


Figure 63: Water Management System Detail

APPENDIX C
FURNITURE, FINISHES, AND LIGHTING

Furniture, Finishes, and Lighting Overview

As noted earlier, all furniture, finishes and lighting were selected based on their environmental benefits and performance attributes. When evaluating the sustainability of a material, raw materials, manufacturing and distribution processes, and the green qualities of the end product must all be considered. Preference was given to materials that have been acquired from local, renewable or recycled sources and have been manufactured, packaged, and distributed through environmentally sound methods. Many of the manufacturing companies are ISO 14001 Certified, which is the internationally recognized mark of commitment to environmentally responsible practices. Materials were also selected based on performance criteria such as quality, durability, and ease of maintenance as well as end-of-life potential to be recycled or remanufactured to divert waste from landfills. Many materials and all furniture is Greenguard Certified, meaning that each piece has been tested for its chemical emissions performance and found to emit low amounts of chemicals and particles in interior environments (Greenguard Environmental Institute, 2007).

The material, furniture, and lighting collages presented below correspond with the schedules which indicate the product name, colour and manufacturer, the location of the item in the Ecological Design Centre, the environmental benefits, and the performance criteria. Only information regarding the green properties of the actual products has been recorded in the schedules because information related to manufacturing and distribution processes is quite extensive for many of the items. Information about the manufacturing and distribution processes can be found on the individual websites of the materials and web addresses are provided with manufacturer information.

Figure 66: Lobby, Exhibition Space, Eco-Elements Showroom, and Forum – Furniture, Finishes, and Lighting

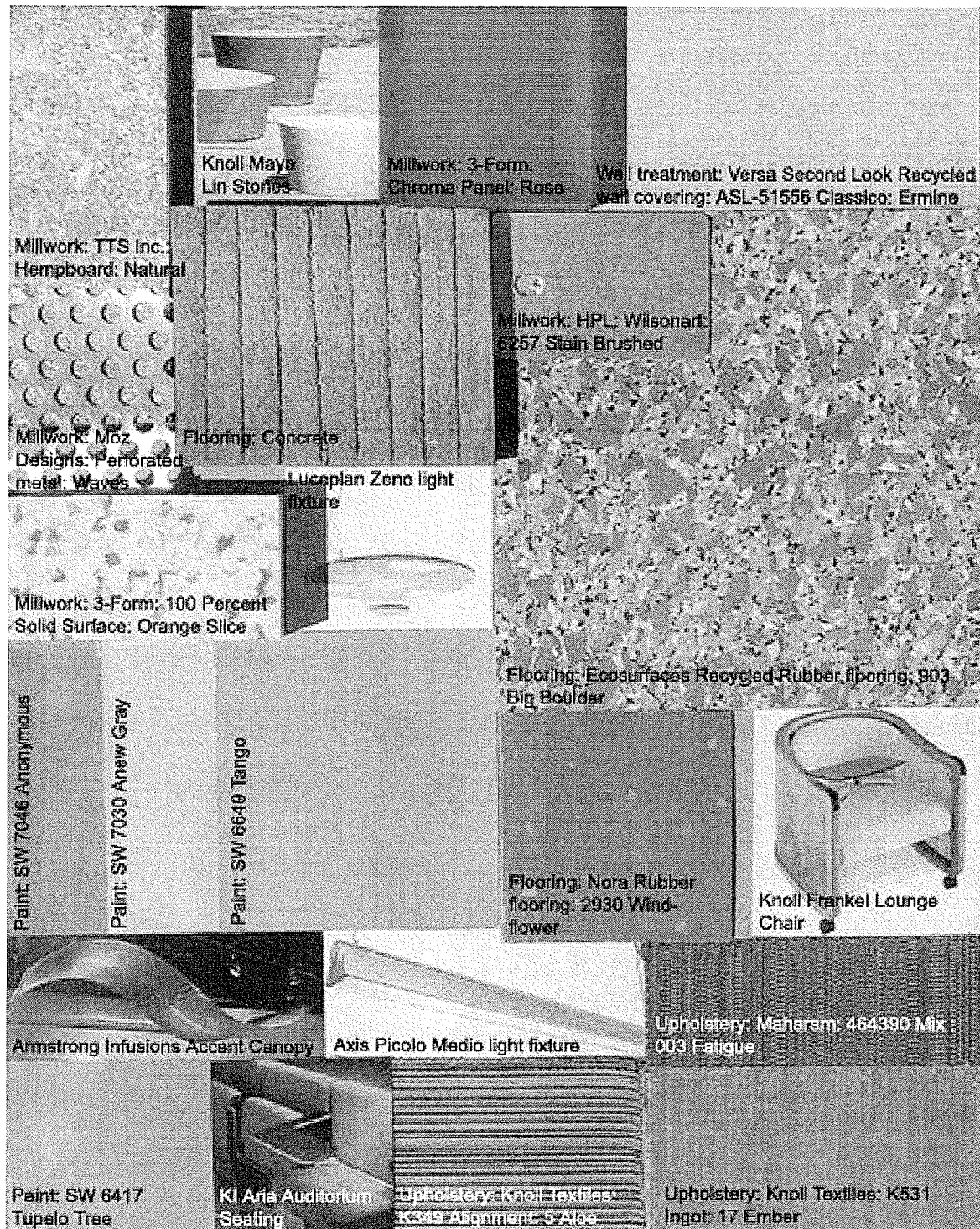


Table 11: Lobby, Exhibition Space, Eco-Elements Showroom, and Forum – Schedule

	Product & Manufacturer	Location in Project	Environmental Benefits	Performance Attributes
Flooring	Concrete floor	Exterior Ramp, Entrance, and Lobby	- High thermal mass of concrete reduces strain on heating and cooling systems by moderating the temperature changes inside the building	- Durable - Low maintenance
	Eco-Surfaces Recycled Rubber Flooring Ecorocks # 903 Big Boulder Eco-Surfaces Manufactured by Dodge-Regupol Inc. 119 South Tree Drive Lancaster, PA 17603 Ecosurfaces.com	Exhibition Space and Eco-Elements Showroom	- Made from 100% post-consumer SBR tire rubber & 30% post-industrial EPDM - Low VOC emissions	- Slip-resistant - Durable - Low maintenance
	Nora Rubber Flooring Noraplan® Environcare™ # 2930 Windflower Freudenberg Building Systems, Inc. 94, Glenn Street Lawrence, MA 01843 USA Norarubber.com	Eco-Elements Showroom	- Made from natural rubber (a renewable raw material) - Greenguard Indoor Air Quality Certified	- Wear resistant - Slip-resistant
Wall Treatment	Sherwin- Williams Paint Harmony® Interior Latex Low Odour Coatings SW 7046 Anonymous SW 6649 Tango SW 7030 Anew Gray SW 6417 Tupelo Tree The Sherwin-Williams Company 1530 St James St Winnipeg, MB R3H0L2 Sherwin-williams.com	Entrance Lobby Exhibition space and Showroom Forum	- Meets or exceeds GS-11 criteria for coatings used in LEED certified buildings - Low odor and no-VOC formula	- Long-term durability - Anti-microbial (inhibits growth of mildew)
	Versa Second Look Recycled Wallcovering # ASL-51556 Classico Ermine Versa Wallcovering P.O. Box 32159 Louisville, KY 40232 Versawallcovering.com	Wall along stairs	- Manufactured with a minimum of 10% post-consumer recycled content (vinyl wallcovering) - Low VOC emissions - Recyclable	- Wear resistant

Millwork	<p>3-Form 100 Percent Solid Surface Orange Slice</p> <p>3-Form Inc. 2300 South 2300 West, Suite B Salt Lake City, UT 84119 3-Form.com</p>	Counter surfaces of electronic ticket dispensing station and orientation centre	<ul style="list-style-type: none"> - Made from 100% post-consumer recycled HDPE - Greenguard Indoor Air Quality Certified - Recyclable 	<ul style="list-style-type: none"> - Durable - Easily maintained
	<p>3-Form Chroma Resin Panel Rose Moss Titanium</p> <p>3-Form 2300 South 2300 West, Suite B Salt Lake City, UT 84119 3-Form.com</p>	Panels dividing lobby from Eco-Elements showroom	<ul style="list-style-type: none"> - Made from ecoresin™, a composite co-polyester containing more than 40% post-industrial recycled material (colour is infused into panels at a depth of 250 microns, making it integral to the material while also allowing it to be resurfaced and re-coloured) - Greenguard Indoor Air Quality Certified - Recycling program reclaims panels at no cost to customer 	<ul style="list-style-type: none"> - Colour schemes and patterns can be easily changed.
	<p>Moz Designs Perforated Decorative Metal Waves – Clear</p> <p>Moz Designs Inc. 711 Kevin Court Oakland CA, 94621 Mozdesigns.com</p>	Electronic ticket dispensing station and orientation centre	<ul style="list-style-type: none"> - Greenguard Indoor Air Quality Certified 	
	<p>TTS Hemp Board Natural</p> <p>TTS Inc. 9527 49 Avenue Edmonton, AB Ttsfpl.com</p>	Electronic ticket dispensing station, orientation centre, displays in showroom and exhibition space	<ul style="list-style-type: none"> - Made from a renewable resource (hemp) - Formaldehyde-free - Greenguard Indoor Air Quality Certified 	
	<p>Wilsonart High Pressure Laminate # 6257 Stain Brushed</p> <p>Wilsonart International 2400 Wilson Place Temple, TX Wilsonart.com</p>	Electronic ticket dispensing station and orientation centre base	<ul style="list-style-type: none"> - Greenguard Indoor Air Quality Certified 	

Upholstery	Knoll Textiles K349 Alignment # 5 Aloe Knoll Textiles East Greenville, PA 18041 Knolltextiles.com	KI Aria Auditorium Seating in Forum	- 100 % recycled polyester (post consumer and post industrial)	
	Maharam Mix 464390 # 003 Fatigue	Frankel Lounge Chairs in Eco- Elements Showroom	- Natural fibre content (54% wool) - Heavy metal free dyes and chemical-free finishing	
	Knoll Textiles K531 Ingot # 17 Ember	Frankel Lounge Chairs in Eco- Elements Showroom	- 100% post-industrial recycled polyester	
Furniture	Maya Lin Stones Knoll Inc. Knoll	Ramp, entrance and lobby	- Greenguard Indoor Air Quality Certified	- For use indoors or outdoors.
	Frankel Lounge Chair Knoll	Eco-Elements Showroom	- Greenguard Indoor Air Quality Certified	
	KI Aria Auditorium Seating KI Green Bay, WI 54302 KI.com	Forum	- Greenguard Indoor Air Quality Certified	- Tablet surface
Lighting Fixtures and Systems	Luceplan Zeno Suspension light fixture Luceplan USA Inc. 26 Broadway, New York, NY Luceplan.com	Lobby, Exhibition Space, Eco- Elements Showroom	- Optical conduits collect exterior light and convey it to the fittings - Compact fluorescent bulbs, HID Metal-Halide and halogen lamps are also incorporated into the fixture to supplement natural light	- Can also be manually adjusted by user
	Axis Pico Medio light fixture Axis Lighting 360 Beaubien Ouest Montreal, QC Axislighting.com	Exhibition Space, Staff Offices, Service Core	- Designed for energy efficiency and reduced energy consumption - Recycled content - Designed for disassembly (parts can be recycled through the AXIS SIXA Program) - T5 or T5HO Lamps - Sensors and dimming capability	- Glare-free direct light and a small amount of indirect light
	Armstrong Infusions Accent Canopy In Channelled Sunset Armstrong World Industries Lancaster, PA 17604 Armstrong.com	Eco-Elements Showroom	- Can be specified with recycled content	

Figure 67: Staff Offices – Furniture, Finishes, and Lighting

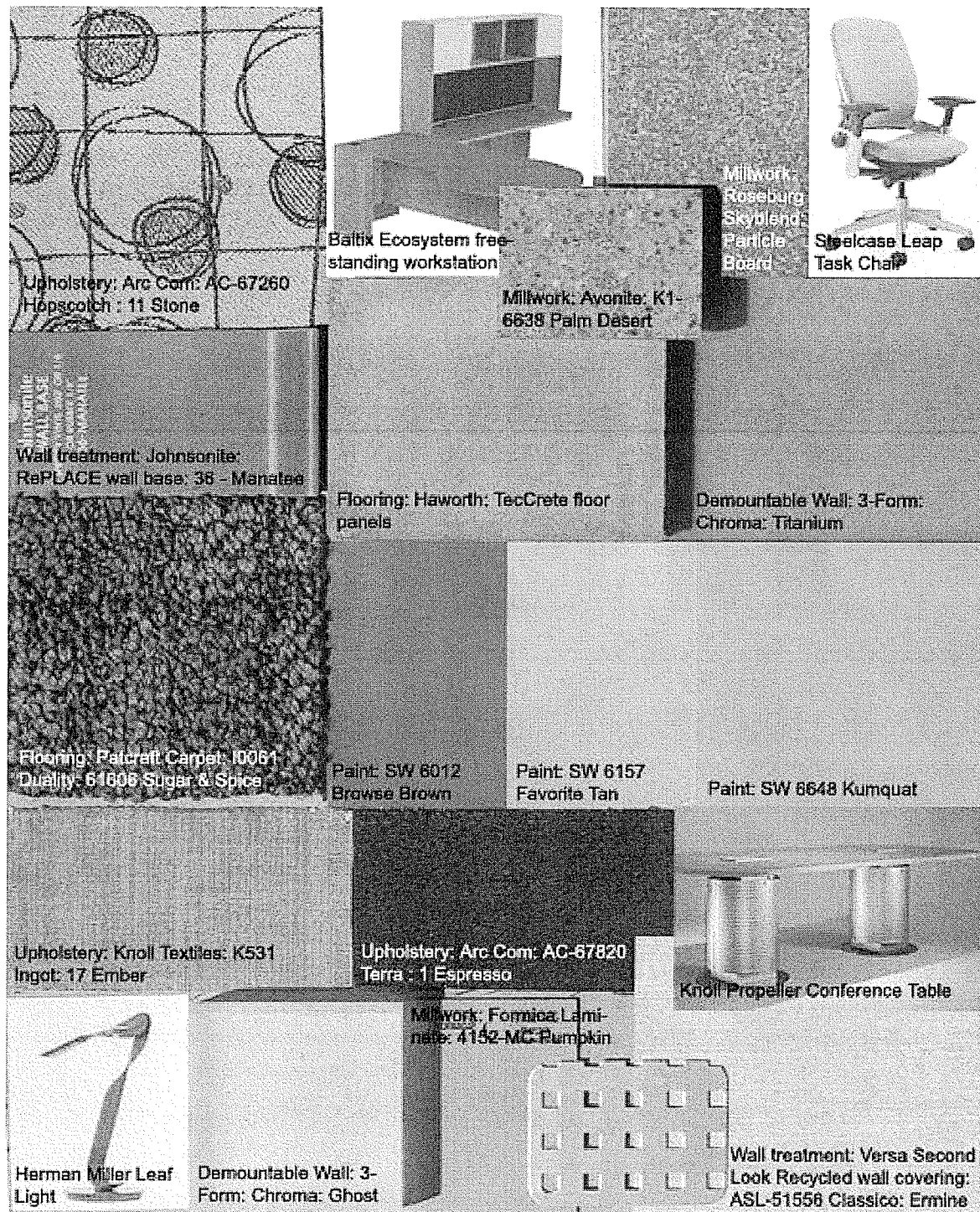


Table 12: Staff Offices – Schedule

	Product & Manufacturer	Location in Project	Environmental Benefits	Performance Attributes
Flooring	Haworth TecCrete® access floor panels (for Nexus Low profile access floor system) Haworth 10 Smed Lane SE Calgary, AB Haworth.com	Staff offices	- Access floor	- TecCrete® panels provide the appearance of concrete with superior acoustic control
	Patcraft Carpet I0061 Duality # 61606 Sugar & Spice Patcraft Commercial Carpet Dalton, GA Patcraft.com	Meeting Room	- 25-40% recycled content and minimized use of raw materials - ECOWORX® backing (alternative to PVC and a Cradle to Cradle product) - Patcraft reclaims Ecoworx-backed products at no cost to the customer, and recycle it into more EcoWorx - Low VOC emissions	
Wall Treatments	Johnsonite RePLACE Demountable Wall Base # 36 Manatee Johnsonite A Tarkett Company 16910 Munn Road Chagrin Falls, OH Johnsonite.com	All walls	- Recycled content - Uses no adhesives and can be recycled through Johnsonite's RESTART materials reclamation program - Low-emitting	- Durable - Easily maintained
	Sherwin- Williams Paint Harmony® Interior Latex Low Odor Coatings SW 6648 Kumquat SW 6012 Browse Brown SW 6157 Favorite Tan The Sherwin-Williams Company 1530 St James St Winnipeg, MB R3H0L2 Sherwin-williams.com	East Wall North wall All other walls	- Meets or exceeds GS-11 criteria for coatings used in LEED certified buildings - Low odor and no-VOC formula	- Long-term durability - Anti-microbial (inhibits growth of mildew)

	3-Form Chroma Ghost Titanium	- DIRRT Movable Walls	- Made from ecoresin™, a composite co-polyester containing more than 40% post-industrial recycled material (colour is infused into panels at a depth of 250 microns, making it integral to the material while also allowing it to be resurfaced and re-coloured) - Greenguard Indoor Air Quality Certified - Recycling program reclaims panels at no cost to customer	
Millwork	Skyblend Particle Board Roseburg Forest Products 10599 Old HWY 99 S. Roseburg, OR 97470 Skyblend.com	- Supplies/office equipment and refreshment counter	- Made from a renewable resource (straw) - Low emission - No Urea Formaldehyde	- Durable
	Avonite Solid Surface Recyled Collection # K1-6638 Palm Desert Avonite Surfaces 7350 Empire Drive Florence, KY 41042 Avonite.com	- Supplies/office equipment and refreshment counter	- Made from reclaimed solid surface	- Durable - Easily maintained
	Formica # 4152-MC Pumpkin (micro dot finish) Formica™ Brand Laminate Canada 25 rue Mercier St. Jean sur Richelieu Quebec J3B 6E9 Formica.com	- Supplies/office equipment and refreshment counter	- Greenguard Indoor Air Quality Certified	
Upholstery	Arc Com Hopscotch AC-67260 # 11 Stone Arc-Com Fabrics, Inc. 33 Ramland South Orangeburg, NY 10962 Arc-com.com	- Meeting room chairs	- 100% Recycled Polyester - 100% Recyclable	
	Knoll Textiles K531 Ingot # 17 Ember	- Task chairs	- 100% post-industrial recycled polyester	

	Arc Com Terra AC-67820 # 1 Espresso	- Guest Chairs	- 100% Recycled Polyester - 100% Recyclable	
Furniture	Baltix Ecosystem™ freestanding workstation Baltix Sustainable Furniture 2160 Daniels Street Long Lake, MN 55356 Baltix.com	- Staff workspaces	- Manufactured from renewable resources (wheat and sunflower board) and recycled plastic - No harmful adhesives, VOCs or formaldehyde. - Materials can be recycled and/or reused at end of life	- Durable - Flexible and moveable - Ergonomic
	Steelcase Leap® Task Chair Steelcase Grand Rapids Steelcase.com	- Staff workspaces and meeting room	- Greenguard Indoor Air Quality Certified - 30% recycled content - 98% recyclable	- Ergonomic design increases productivity
	Knoll Propeller® Conference Table	- Meeting Room	- Greenguard Indoor Air Quality Certified	- Plexus boxes with plugs and jacks for data and power - Tables can be ganged for a large group
Lighting	Leaf Light by Yves Behar Polished aluminum finish Herman Miller Inc. 855 East Main Ave. Zeeland, Michigan 49464- 0302 Hermanmiller.com	- Staff workspaces	- Energy efficient LED technology - Greenguard Indoor Air Quality Certified - Recyclable	- Upper blade pivots to provide direct or ambient lighting

Figure 68: Roof Garden Café and Green Cuisine Demonstration Area – Furniture, Finishes, and Lighting

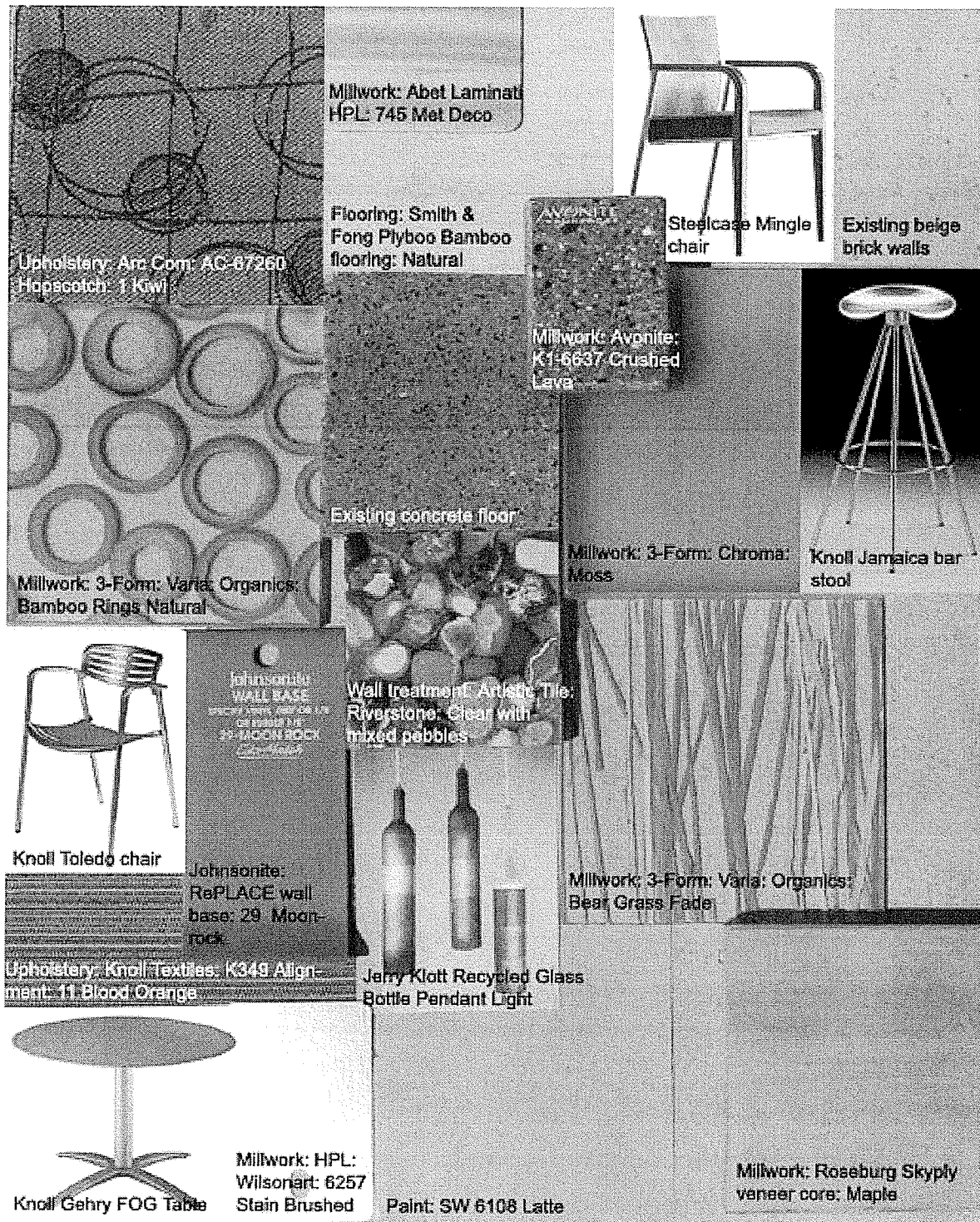


Table 13: Roof Garden Café and Green Cuisine Demonstration Area – Schedule

	Product & Manufacturer	Location in Project	Environmental Benefits	Performance Attributes
Flooring	Existing Concrete Floor with RetroPlate™ concrete polishing system RetroPlate System Provo, Utah 84605 Retroplatesystem.com	- Roof Garden Café and exhibition mezzanine	- Use of existing floor requires no new resources or products	- Easily maintained - Provides greater abrasion resistance, impact strength, and light reflectivity
	Smith & Fong Plyboo Bamboo flooring Natural Plywood BP-3872N Smith & Fong 375 Oyster Point Blvd. #3 So. San Francisco, CA 94080 Plyboo.com	- Green Cuisine Demonstration Area	- Made from a renewable resource	- Easy installation - Durable
Wall Treatment	Johnsonite RePLACE Demountable Wall Base # 29 Moonrock Johnsonite A Tarkett Company 16910 Munn Road Chagrin Falls, OH Johnsonite.com	- All walls	- Recycled content - Uses no adhesives and can be recycled through Johnsonite's RESTART materials reclamation program - Low-emitting	- Durable - Easily maintained
	Existing Beige Brick	- Structural walls		
	Sherwin- Williams Paint Harmony® Interior Latex Low Odor Coatings SW 6108 Latte The Sherwin-Williams Company 1530 St James St Winnipeg, MB R3H0L2 Sherwin-williams.com	Wall behind service counter	- Meets or exceeds GS-11 criteria for coatings used in LEED certified buildings - Low odor and no-VOC formula	- Long-term durability - Anti-microbial (inhibits growth of mildew)
	Artistic Tile Riverstone Clear with mixed pebbles Artistictile.com	- Wall behind service counter	- Natural resource	

Millwork	<p>3-Form Chroma Moss</p> <p>3-Form 2300 South 2300 West, Suite B Salt Lake City Utah 84119 3-form.com</p>	- Bulkhead above service counter	<p>- Made from ecoresin™, a composite co-polyester containing more than 40% post-industrial recycled material (colour is infused into panels at a depth of 250 microns, making it integral to the material while also allowing it to be resurfaced and re-coloured)</p> <p>- Greenguard Indoor Air Quality Certified</p> <p>- Recycling program reclaims panels at no cost to customer</p>	
	<p>3-Form Varia - Organics Bear Grass Fade Bamboo Rings Natural</p>	Service counter Booth dividers	See above	
	<p>Avonite Recycled Collection # K1-6637 Crushed Lava</p> <p>Avonite Surfaces 7350 Empire Drive Florence, KY 41042 Avonite.com</p>	Service counter and demonstration counter	- Made from reclaimed solid surface	<p>- Durable</p> <p>- Easily maintained</p>
	<p>Abet Laminati High Pressure Laminate # 745 – Met Deco</p> <p>Abet Inc. 60 West Sheffield Ave. Englewood, NJ 07631 abetlaminati.com</p>	Demonstration Counter	- Low VOC emissions	<p>- Durable</p> <p>- Easily maintained</p>
	<p>Roseburg Skyply Veneer Core Maple</p> <p>Roseburg Forest Products 10599 Old HWY 99 S. Roseburg, Oregon 97470 Rfpc.com</p>	- Booth table tops and service counter vertical surfaces	<p>- Low emission</p> <p>- No Urea Formaldehyde</p>	
Textiles	<p>Arc Com Hopscotch AC-67260 # 1 Kiwi</p> <p>Arc-Com Fabrics, Inc. 33 Ramland South Orangeburg, NY 10962 Arc-com.com</p>	- Booth seating	<p>- 100% recycled polyester</p> <p>- 100% recyclable</p>	
	<p>Knoll Textiles K349 Alignment # 11 Blood Orange</p>	- Chairs	- 100% recycled polyester (post consumer and post industrial)	

Furniture	Mingle™ Multi-use/guest chair Steelcase	- Café and Demonstration area	- Greenguard Indoor Air Quality Certified	
	KnollStudio® Jamaica® Barstool Knoll	- Counter seating	- Greenguard Indoor Air Quality Certified	
	KnollStudio® Toledo Stacking Chair Knoll	- Roof garden seating	- Greenguard Indoor Air Quality Certified - 100% Recyclable	- Suitable for exterior use
	KnollStudio® Gehry FOG® Café Table Knoll	- Café and roof garden	- Greenguard Indoor Air Quality Certified	- Suitable for exterior use
	Jerry Klott Recycled Glass Bottle Pendant Light Re:Modern re-modern.com	- Service Counter	- Made from recycled, reassembled wine bottles	