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INDUSTRY CORNER

DESIGN FOR SOCIAL SUSTAINABILITY AT SEATTLE'S CENTRAL LIBRARY

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Question: What is the most important question you can ask?
Answer: Is the universe a friendly place or not?
—Albert Einstein

INTRODUCTION

As a culture we hold dear social values such as public good, health and well-being, quality of life, diversity, and equity. The focus of this article is how Seattle's Central Library, a Silver LEED™ project, integrates social benefit into its design. While LEED provides credit opportunities for some social issues, many are not addressed by the LEED System. The Seattle project provides a rich example of how to integrate a broader range of social sustainability into green design thinking. Issues for consideration include: design to encourage social interaction, accessibility, economic development, cultural arts, and improved staff efficiency and ergonomics. This discussion searches for lessons learned that might inspire the emergence of new LEED credits.

PROJECT BACKGROUND AND OVERVIEW

Since its opening in May of 2004, the Seattle Central Library by OMA Architects (Rem Koolhaas) and LMN Architects, has become one of the more famous buildings in North America. That's been mostly due to its daring form, soaring spaces, and unique interpretation of library functionality. A fact that has received little attention is that it is a green building with a LEED™ Silver certification. With inspiration to spare, the Library also sets new standards for greening public libraries, with a focus on social sustainability issues.

The new downtown facility was built in 2004 on the same dense urban site the previous library occupied. The building met the City of Seattle's Sustainable Building Policy, the first LEED-based policy in the nation, which was adopted in 2000. The mandate leveraged the largest public building boom since the Seattle Fire of 1888. The City currently owns 10 LEED Certified projects including the Library, with 30 more future LEED Certified projects in various stages of design, construction, or planning.

The Library is exemplary not only in social performance, but in many aspects of green design. According to a study commissioned by the Cascadia Region Green Building Council, its actual energy use is 50% below ASHRAE 90.1[1] and water use is 20% below the standard baseline.[2] Innovations of note include:

Unique high performance glazing system with aluminum curtain wall. Approximately 50% of the building exterior glazing is comprised of three layers

Seattle Central Library. (Photo courtesy of the Seattle Public Library.)

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of glass with an expanded aluminum metal mesh, sandwiched between the two outer panes. This metal mesh serves as a micro-shading device while allowing ample daylighting and unobstructed views. The two inner layers of glass contain Krypton gas, with low-e coating on the outermost glazing.

Rainwater collection system coupled with stormwater detention tank. The 40,000 gallon tank utilizes the required stormwater detention tank and increases its size by about 50% to accommodate additional storage capacity for landscape irrigation. This effectively lowers cistern cost, and makes double-duty use out of a single system that was already required by code (the detention portion).

Innovative strategies to minimize material use, which lowers both cost and resource use. These include:

Minimal finish materials, such as: a) exposed structural concrete as finish, b) galvanized aluminum railings, c) spray-on fireproofing as ceiling finish, and d) plexiglass panels that serve triple function as bottom-of-return-air plenum, finish ceiling, and light-fixture lens for the fluorescent tubes hidden above.

Minimization of structural elements, such as: a) vertical columns, almost completely eliminated by using perimeter platform trusses and sloping columns that don't require girders and provide counterbalancing;[3] b) specially detailed diamond-patterned steel grid exterior framework that provides glass curtain wall support, seismic and lateral bracing, and interior finish. The steel diamond system was designed with special connections that allow for stabilization of interior floors without carrying any gravity loads, which also allowed the elimination of fireproofing according to Seattle code.[4]

Central Library, Main Lobby "living room." (Photo courtesy of the Seattle Public Library.)

As we can see, this project is of interest for a variety of green building features. These will be discussed in further detail in a forthcoming book about the City of Seattle Green Building Program and four city-owned green buildings. This discussion focuses on how LEED and the Central Library handle social issues.

LIBRARY FAST FACTS

LEED™ Rating: Silver, with 34 points
Location: 1000 Fourth Ave., Seattle Washington
Floor Space: 362,987 square feet
Number of Floors: 11
Building Budget: $162,342,500
Building Population: 328 staff, 5400 visitors/day on average
Opening Date: May 23, 2004
Owner: City of Seattle
Project Leadership: Deborah Jacobs, City Librarian, and Library Board
Architect: Office for Metropolitan Architecture (OMA, Netherlands), Partners in Charge Rem Koolhaas and Joshua Ramus, Joint Venture with LMN Architects (Seattle), Partner in Charge John Nesholm, Project Director for LEED, Sam Miller.
Mechanical & Electrical, IT Engineer: Arup
Structural & Civil Engineer: Magnusson Klemencic Associates (MKA) with Arup
General Contractor: Hoffman Construction Company
Project Manager: Alex Harris
Acoustical Engineer: Michael Yantis Associates
Landscape Architect: Inside/Outside with Jones and Jones
Environmental Graphics: Bruce Mau Design
Facades: Dewhurst Macfarlane & Partners
Interiors: OMA/LMN, Inside/Outside
ADA: McGuire Associates, Karen Braitmeyer
Lighting: Kugler Tillotson Associates

BENCHMARKING FOR SOCIAL ISSUES

As broadly defined, sustainability addresses three primary dimensions: environmental, social or human, and economic. The environmental aspects of green building have received most of the focus as the movement has unfolded, perhaps because they are easier to quantify and may include materials or technologies with a visible "wow" factor. Social aspects are harder to define as value propositions within the triple bottom line, and are often thought of as "externalities."

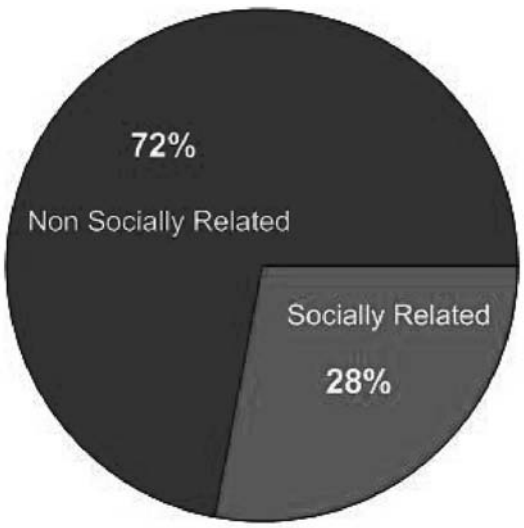
This article centers primarily on social sustainability as it relates to LEED for New Construction (LEED NC), the tool applied to the Central Library project. While there is certainly some attention to social issues in LEED NC, when looked at in total the system focuses the majority of its credits on the environmental aspects of sustainability. Of the 69 total possible credits, 20 of these directly benefit people (about 28% of the possible credits).

Each credit in the LEED Reference Guide starts with a stated intent. The intent of the credit provides a reference point to tell *why* we should do something. This effectively creates a philosophical and motivational framework for LEED. The stated credit intent also provides guidance for credit rulings. Credit rulings are necessary when interpretation of a LEED credit is unclear, or when a project requests that credit be given upon a different basis than that of the specific credit requirement. A credit may be given if the USGBC reviewer determines that the stated intent of the credit has still been met.

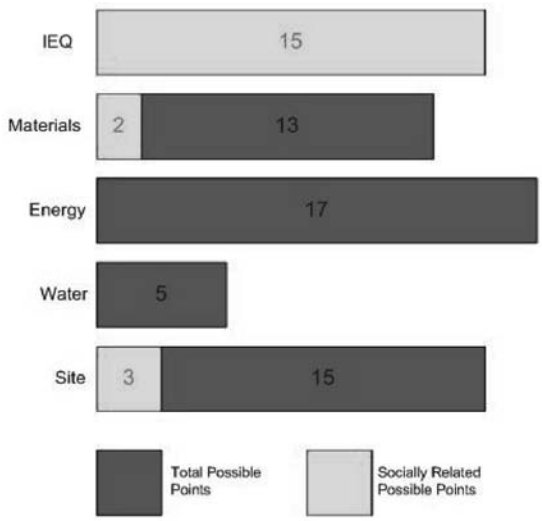
Sixteen LEED NC credits contain a *stated intent* related to the human species. These include all of the Indoor Environmental Quality related credits, with the stated intent to promote well-being, comfort, and/or productivity of building occupants or construction workers. Four additional credits benefit society even though their *stated intent* does not. Sustainable Site Credit SS 2 and SS 4.2 encourage walking and bicycling, which directly improve human health by helping to reduce obesity. These are secondary benefits of the two credits, and not the stated intent or motivation for providing the credit. The stated intents for the credits include "reduce pollution," "protect greenfields," and "preserve habitat and natural resources."[5]

Materials and Resources Credits MR 5.1 and 5.2 give credit for "increasing demand for materials and products that are extracted and manufactured within the region." This has a direct effect on the local economy, by focusing purchasing within a 500-mile radius of the project site, instead of outsourcing purchases to other cities or even countries. Of course, this also has the effect of matching construction materials with local resources, and reducing associated environmental impacts from transporting materials

Socially related credits in LEED.



Socially related LEED credits by category.



over long distances. The latter benefits to the environment, versus the societal benefit of local economic development, are stated as the intent.

Table 1 outlines the 20 LEED NC credits with either a clearly stated, or an implied link to social benefit. In addition, the last column shows which of these credits the Central Library was able to achieve.

The Central Library gained half (10) of the socially-linked credits. The urban infill credit was automatically gained by virtue of the site location. The bicycle amenity credit was fairly easy to gain, while there have turned out to be some challenges for use of the secured bicycle racks, which are located in underground parking that is difficult to access. Indoor air quality was a particular focus for this project because the previous building performed poorly in this area. Three of the five credits for indoor air quality were achieved. One of these, the credit for low VOC adhesives, was narrowly missed. While the correct specifications were in place for all adhesives to meet the credit requirement, one contractor failed to comply.

Natural daylighting within the Central Library is outstanding, with the building's entire exterior skin comprised of 10,000 individual pieces of glass. In a city where the weather is often dreary and grey, daylight is softened and diffused by the triple glazing system, creating ample light that is not too bright and with reduced glare. Even the level of the building where book processing occurs has daylight, allowing a function that often occurs in the basement to enhance the working environment for staff. The daylighting design was modeled using glare and solar studies.

TABLE 1. LEED NC credits with clearly stated social intent* or implied links to social factors**.

Focus of Credit(s)	LEED Section	Number of Credits	Points Achieved at Central Library
Indoor air quality*	Indoor Environmental Quality	IEQ credits 1 through 5* 9 total points possible	3 points for IAQ construction mgmt and low emitting carpet
Visual and thermal comfort*	Indoor Environmental Quality	IEQ credits 6 through 7 4 total points possible	1 point for temperature & humidity monitoring
Access to daylight and views*	Indoor Environmental Quality	IEQ credits 8.1 and 8.2 2 total points possible	1 point for views from 90% of regularly occupied areas
Light pollution reduction* (to improve access to the night sky)	Sustainable Sites	SS Credit 8 1 total point possible	1 point for exterior lighting design
Development density**	Sustainable Sites	SS Credit 2 1 total point possible	1 point for urban infill and minimum density
Community connectivity with pedestrian access to basic services**	Sustainable Sites	SS Credit 2	(Alternate pathway for SS Credit 2)
Bicycle amenities**	Sustainable Sites	SS Credit 4.2 1 total point possible	1 point for secure bicycle storage + changing rooms/ showers for 5% of occupants
Regional materials and products**	Materials and Resources	MR Credit 5.1 1 total point possible	1 point for 10% of materials extracted, processed, & manufactured regionally
Regional materials and products**	Materials and Resources	MR Credit 5.2 1 total point possible (additional 10% for a total of 20%)	1 point for additional 10% of materials extracted, processed, & manufactured regionally

The tally of access to daylight for 90% of the regularly occupied areas made the case that the book stack areas were not "regularly occupied" because their use is primarily for shelving or retrieving books, not reading. (The project requested a Credit Interpretation Request for this.) Other spaces that were not counted as "regularly occupied" include parking, IT spaces, computer labs, and an auditorium. A total of 141,819 square feet was counted as regularly occupied, and only about 15,000 square feet of this failed to meet the daylight/view criteria. The masterful design of large, open interior spaces, with few walls to block access to light, was a key factor as well.

INTEGRATING CORE SERVICE TO THE COMMONS

The commons refers to the larger backdrop of society and its collective good. The Seattle Central Library performed very well in areas where the commons was served, but for which there were no available LEED credits. These areas include: design process, design to foster social interaction, diversity, accessibility, and the arts. Other social aspects discussed in this article include how the project addresses technology and local economics. It is important to view how Seattle is a community that highly values the commons.

Seattle has an amazing cohort of people with a natural bent for knowledge and creativity. In 2005, Seattle was found to be the "most literate" city in the US, according to a study done annually at Central Connecticut University. This is measured by a combination of number of bookstores per capita, educational attainment, newspaper circulation, number of local journals and magazines published, library holdings and usage, and Internet resources. An impressive 80 percent of all Seattle residents have a library card.[6] So perhaps it is no surprise that Seattle voters approved the largest public library bond in US history in 1998, a $196.4 million package that provided funding for 26 branch libraries, three bookmobiles, a talking book and Braille library, and the Central Library. Voter support for investment in libraries indicates that citizens value public access to local culture and knowledge, which contributes to literacy.

Adult literacy is included as one of the indicators of sustainability in a groundbreaking report by Sustainable Seattle, a nonprofit organization whose mission relates to developing assessment tools to monitor community progress toward long-term sustainability. The study lays out a variety of indicators in the categories of Environment, Population and Resource Use, Economy, Community Health, and Youth and Education. "Literacy—an indicator of society's ability to communicate among its members—is an essential component of a sustainable society and of building an active, informed citizenry."[7]

DESIGN AS A SOCIAL PROCESS

The design process is perhaps one of the least examined or understood aspects of the design professions. Nearly always the product, not the process, is what we celebrate. And too often, design teams striving to create sustainable buildings fail to understand that the process, as well as the product, may not fit previous norms. Sustainable design requires an integrated design process, which often involves questioning assumptions, engagement with the client and a broad range of participants, and additional research to examine issues such as emerging technologies, code barriers, or interrelationships between building systems. In addition, collaborative design teams often undertake an iterative and active dialogue, as professionals from different disciplines coach one another.[8] In many ways the process of design for the Central Library distinguishes it as much as the amazing building that resulted. By its very nature, design process can represent the social side of sustainability because it is all about the people involved—their vision, creativity, and collaborative skills.

With the Central Library, an extra three months was taken prior to schematic design to conduct research regarding the future of libraries. This research, as well as time spent with the Library Board revealed that two of the distinguishing features of library evolution were changing: functionality and integration of technology. A team of librarians and architects traveled on data-gathering missions to other libraries in Paris, Berlin, the Netherlands, Vancouver, B.C., San Francisco, Phoenix, Denver, and Los Angeles. In addition, fact-finding sessions were held to assess new directions in technology. Locations and organizations surveyed included the Microsoft campus, the home of Bill Gates, MIT Media Lab, Amazon.com, and *Wired* magazine.[9] This process served to question assumptions regarding the core purpose of the project, and assess fundamental concepts for how needs could be met.

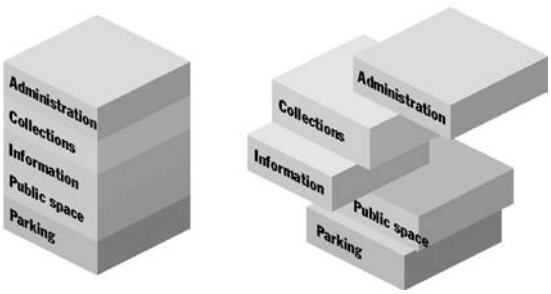
A series of focus groups and collaborative sessions were held with library workers and patrons, including children, teens, elders, and people with disabilities. Members of the public were invited to join one of 10 different working groups to provide programming and design input. These sessions revealed that libraries are no longer just places to read—they serve as meeting places, lecture halls, Internet way stations, and homeless day shelters. These social functions were allowed to take a central role in the design concept.

A group of 37 library workers met extensively with the design team throughout an entire year. The extra effort to explore user and occupant needs is critical, but often missed with pressing deadlines and tight consulting budgets. At the same time, casting the net broadly to such input usually creates conflicting demands. To their credit, and related to their mission to serve all, the Library responded to every e-mail and phone call it received from citizens about the building project. In the end, Deborah Jacobs, the Head Librarian, provided needed leadership to make tough decisions related to competing priorities. She also has been hailed as a visionary client, without whose courage and resolve this innovative project would not have been possible.

The integrated design process for such a complex project required some convergence, then divergence, and subsequent re-convergence, of the large team. Independent sub-teams were formed to design for different functions, effectively creating individual design concepts within the whole. The program was delineated into five major programmatic areas: collections, public space, administration, information, and parking. Each programmatic theme was developed with its own floor or floors. Once design for each floor was completed, these were stacked on top of one another. The floors were then skewed such that the resulting form eliminated most vertical facades, folding the facade into many planes. Some refer to the building as a giant origami. This folding effect increased the resulting surface area of the facade, which enabled bringing more light into the interior spaces. The building effectively forms a huge light-catcher by wrapping all the resulting facades in glazing.

The building form may at first glance appear nonsensical, until one realizes that the interior space planning, daylighting, and view concept were allowed to inform the overall building shape and mass. The final form was created by draping a skin over a model of the facility program. The structure makes much more sense once its interior spaces have been experienced first-hand. This is a building to be experienced from the inside out, not the outside in. Such expert articulation of a design program takes time, and is not a process to be hurried through. Hundreds of poorly designed buildings that fail to deliver on their client's functional needs may have benefited from a more robust schematic design period.

Conceptual drawing of Central Library program. (Kristopher Lee and Mark Knowlin/*The Seattle Times.* Used with permission. Copyright 2007.)



DESIGN FOR SOCIAL CAPITAL DEVELOPMENT

Social capital is a term used to describe the worth of human relationships, well-documented by Robert Putnam in his groundbreaking book *Bowling Alone*. "Whereas physical capital refers to physical objects and human capital refers to the properties of individuals, social capital refers to connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them. . . . civic virtue is most powerful when embedded in a dense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital." [10]

Social capital can be fostered by providing civic and public spaces that "set the stage" for social interaction, and provide fertile ground to nurture the development of these relationships. An increase in the provision of publicly accessible social space in the built environment can be thought of as contributing to social capital development. As social space is dis-

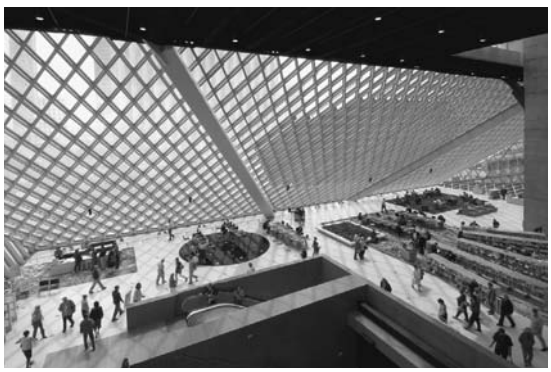
appearing from the public realm, the library can create anew a place for the theatre of public life. Rem Koolhaas noted "It's . . . a very interesting and sobering assertion of what public space can offer at the time when public space is disappearing from view. And that's true not only in America, but also in Europe. Initiatives for the public are shrinking to the point of insignificance, with the private becoming totally dominant."[11] Libraries can be thought of as a civic gathering place of the community, but they can serve social needs to a greater or lesser degree depending on how they provide space for these uses. Defined narrowly, libraries may not deem that it is part of their responsibility to provide social space.

The clients for the Central Library made providing high quality, enduring social space a priority. But how to do this successfully? The design research teams uncovered that many libraries were initially designed to include social space, but ultimately failed because these spaces were eventually overtaken by the growth of the library collection. Conversely, libraries that tried to design for maximum flexibility often ended up with cookie-cutter spaces devoid of individual character. To counteract these tendencies, the design team physically separated the majority of the stacks from social areas, at the same time providing ample space to expand the library collection by 25% within the existing space.

While it is true that this project could have made better use of the street edge pedestrian environment, it is also clear that most of the emphasis is on interiors. But after all, this is a city where the weather is often miserable. Perhaps the lingering is all intended to happen inside the vast building that at times feels like a "winter garden." Renowned Landscape Architect Walter Hood noted of the building, "What I love about it is that people are using it like a public plaza."[12] And indeed, the building seems to provide the social functions that a plaza might—meeting friends for coffee, playing games, people-watching, or just passing the time. Conde Nast Traveler commented: "A colossal atrium functions as the city's most resplendent indoor public park, replete with views of Puget Sound."[13] The views are indeed spectacular, providing orientation to the surrounding neighborhood and a sense of place within the urban context.

Even the furniture was selected with comfort and social gathering as a high priority. Libraries experience significant challenges with the durability of traditional upholstered furniture, so most libraries today tend to use furnishing of wood or hard plastic. Deborah Jacobs advocated for human comfort, and in the end the sleek Quinze & Milan line was chosen. This unique product from Belgium utilizes a trademarked monolithic foam (with no bromated flame retardants) that enables the elimination of the mix of wood, steel, foam, and fabric in more traditional upholstered furniture. This simplification of materials and integral design allows easier end-of-life

Central Library, Lobby as a public plaza. (Photo courtesy of the Seattle Public Library.)



Central Library, "Living Room" comfortable seating. (Photo courtesy of the Seattle Public Library.)

recycling. The furniture delivers comfort with better durability than most upholstery.

Following is a list of some of the spaces within the building that serve social functions that are not typical or traditional for libraries. Many of these spaces can be rented to the public for after-hours events, and have been the setting for weddings and many social events such as business receptions.

Norcliffe Foundation "Living Room"—30,000 square foot main lobby with 50 foot ceilings, one of the most exciting spaces in the building. It provides generous seating, and is used for a variety of functions, including a café, book store, reading room and space for chess games.

Public meeting rooms—(8) and a computer training lab, ranging in capacity from 8 to 160 people. These are available to the community for a fee, with a price break for nonprofit organizations. Kitchen space for catered events is nearby.

Microsoft Auditorium—seats 275+ people, with programming such as author readings, musical and theatrical performances, and urban sustainability lecture series. It is available for a fee.

Kreielsheimer Foundation Performance Arts Room—small music practice rooms with digital keyboards and music stands, often used by youth.

Eulalie and Carlo Scandiuzzi Writers' Room—a special room available to those working on book or research projects, provides desk space and locker storage (available by application).

Betty Jane Narver Reading Room—12,000 square foot grand reading room seats 400 on the 10th floor. The amazing views of Elliot Bay and the surrounding city, as well as the 40 foot ceilings, creates the feeling of reading in the clouds. (Not a separate space in the original program, this space emerged during early design.)

Some critics may feel that social needs have been served at the expense of more traditional library functions, such as research. There are few quiet areas adjacent to the stacks to do research, and in fact noise has been cited as a problem at the library by some librarians and patrons. While the tradition of librarians shushing patrons is out of fashion, there is still a need for and expectation of libraries as places where one can at least seek out quiet. The design solution at Seattle's Ballard neighborhood branch library addresses conflicting uses gracefully by providing a glass-walled "quiet room." While the above examples may not seem relative to the vast world of private sector building development, similar concepts can be applied in any office environment. For example, small "quiet" rooms like the one at Ballard Library might be welcome additions to open plan office spaces where acoustical privacy can be an issue.

On the other hand, open office plans can contribute to social interaction and communication, widely recognized as critical components of workplace collaboration and team problem-solving. Office design can recognize the distinct value provided by social capital within a business or corporate setting. In Franklin Becker's fascinating book *Offices at Work* (and previous book *Workplace by Design* co-authored with Fritz Steele) the author provides a strong foundation and guidelines for creating socially-based workplaces. The principles laid out provide tips on how to design office spaces that foster social interaction, such as:

- Include coffee areas or TVs that act as people magnets.
- Create circulation pathways that promote leisurely chatting, such as wider corridors punctuated with informal meeting or sitting spaces.
- Foster contact with design strategies that increase eye contact and visibility, such as low panels, transparent spaces, and interior glazed walls.[14]

DIVERSITY BY DESIGN

Diversity is one of our most basic social values. Public facilities, and in particular libraries, tend to automatically serve very diverse populations by virtue of their free access for all. However, diverse populations can be served to varying degrees, depending on how a building is programmed and designed. The Central Library puts additional emphasis on five different social groups: the differently-abled, the homeless, teens, children, and non-English speakers.

Barrier-free Book Spiral

One of the most innovative features of the Library is the unique barrier-free design for the nonfiction book stacks. Dubbed the "book box," it contains the

volume of 3.5 floors of books arranged within the Dewey Decimal classification system. Instead of using separated floors, the stacks are organized using a continuous spiral linking Levels 6 through 9. This not only removes barriers for strollers and wheelchairs, it also enables maximum flexibility for its function. Adding books to the collection does not require moving books to a separate floor if one floor/shelf becomes full; this serves to always keep subject areas grouped. The gently sloped spiral allows wheelchairs free access to book storage levels. This could have provided an additional benefit as an emergency exit in the event of a fire. Those in wheelchairs are at a disadvantage because elevators are normally recalled to the lobby in a fire. However, the ramp only carries a passenger down from the 9th to the 6th floor, so at the 6th floor level, a person in a wheelchair must still find another way to exit the building.

The Library design team worked closely with two accessibility consultants, both in wheelchairs themselves, and with a group of disabled citizens in order to get expert input on the book spiral design. Two successive design concepts were built as full-scale warehouse mock-ups and tested with wheelchairs, book carts, and strollers. The original concept was for a single continuous spiral ramp at a 1:30 gradient. In the end, a better solution for wheelchairs was arrived at: an alternating system of 1-foot ramps at 1:12 and a 5-foot flatter section at 1:50. This accommodated wheel stopping and flat sections where shelves are placed. This strategy was vetted with the Department of Justice to ensure it met all ADA requirements before being finalized. Some accessibility barriers, such as table heights and signage, were corrected after the library opened, but these minor detail adjustments are to be expected.

LEED can take design performance to higher levels than those that are achieved simply by complying with ADA requirements. Different tiers of accessibility performance could be established for LEED, with a goal of creating a barrier-free environment that prevents separation or "special" treatment of the disabled. Universal design embraces the concept of integrating barrier-free details seamlessly, such that someone in a wheelchair can have the same experience as non-disabled persons. For example, if a person with disabilities is accompanied by his family, the entire group should be able to navigate a path without taking separate pathways or moving single file, and without calling special attention to the disabled individual.

Homeless Work Training Program

On the ground floor, sandwiches and lattes are served in an area with tables and chairs for chatting or lunch. Visitors to the Library are surprised to find that previously coffee was not available. To them, this is the coffee city! The social currency of food and drink are now an integral part of the Library. Integrating food service into any facility can add to its social function. However, the most important thing about the coffee is who is serving it. Operations are handled collaboratively by two nonprofits: FareStart and Youth Care. Funded by a grant from the regional Workforce Development Council, homeless youth between the ages of 16 and 21 receive on-the-job barista training, and are provided with employment education and support services.

Over 1,000 youth are homeless in Seattle, and this program aims to give them the confidence and skills to change their lives. They may come to the program from group homes, transitional housing, shelters, or the streets. This effort allows homeless participants to become self-sufficient and independent, by providing a weekly stipend, job skills, and hope. Many of the young people are also attending high school or community college, and go to work at a variety of other establishments around the city once they graduate. One participant said of the program,

FareStart Cafe. (Photo courtesy of the Seattle Public Library.)

"When I started the Barista Training Program, I was living on the streets and getting by day to day. Now, I'm working full time, have my own apartment, and I even opened a bank account. The Barista Program helped me to see that I can get where I want to go with my life." The program's tagline notes: "Without doubt, the most socially responsible latte you'll ever drink."[15]

Another benefit of this operation is that it fosters local micro-enterprise business within the building, which contributes to the local economy. Some enterprises, such as mobile food or coffee carts, may have very minimal space requirements.

Youth and Non-English Speakers

Following is a list of other spaces in the building that are consciously set aside to serve diverse populations. Age discrimination is often not addressed as clearly as other forms, so it deserves mention here that not only children, but teens are acknowledged as audiences with special needs.

Starbucks Teen Center—3900 square foot space provides special collections of books for teens, a librarian specializing in teen subjects, and reserved computer workstations for teen users. This space is located in one of the highly sought after spaces with a visible "cool" factor, the Living Room.

Faye G. Allen Children's Center—15,000 square feet, the average size of an entire branch library and six times the size of the previous children's area downtown. This area has 26 computers, placed at desks of varying heights to accommodate different ages, family restroom with space to change diapers or nurse, stroller parking and whimsical story hour room.

Evelyn W. Foster Learning Center—houses literacy, multilingual, and English as a Second Language (ESL) resources. Learning workstations provide computer and other language learning assistance; this classroom is used specifically for ESL and literacy programs.

The building location of the Children's Area and the Foster Learning Center are intentionally adjacent to the 4th Avenue street-level entry, making the areas easily accessible for parents and non-English speakers.

English as a Second Language Help Desk. (Photo courtesy of the Seattle Public Library.)

WAYFINDING FOR ACCESSIBILITY

Integrating wayfinding—instruction on building navigation—in the built environment is an important dimension of accessibility for all. Wayfinding tends to be an underdeveloped skill within the design professions. Often, hiring a special wayfinding consultant is not provided for in project budgets; we have all visited buildings with poor user orientation, which can result in confusion if not actually getting lost. Wayfinding can be considered an important element of design for social sustainability, and is also an example of sustainable design often being nothing more than *good* design.

Wayfinding does not equal signage; if too much signage is needed, it indicates that spatial organization and sequencing have failed. The latter two qual-

Children's Area with child-sized workstations. (Photo courtesy of the Seattle Public Library.)

ities should be integral to any good architectural design, and then should complement other forms of communication. Wayfinding has three primary communication elements: visual, audible, and tactile.

The visual coding of graphic communication is a strong suit of the library, and one of its signature elements. Graphic standards created by Bruce Mau's multi-disciplinary New York firm satisfy many of the principles of good visual wayfinding. The huge 36 inch font "supertext" signs are consistently located on the vertical surfaces of information and checkout desks, and along the sides of escalators or walls. Escalator supertext signage on the interior side rails gives passengers information about what space they are headed towards. The memorable graphics are virtually impossible to miss, even for the partially visually impaired, and easily read from long distances. Oversized rubber pads with Dewey Decimal referencing are embedded in the concrete floors adjacent to the book spiral stacks, giving quick and easy reference to a book search. These are easily removed and reconfigured to adjust for changes to the stacks. In addition, signage near each elevator is provided that shows a cross-section of the building with visual coding information.

The layout of the basic functional areas of the building into zones, and the use of a large atrium to visually and audibly orient the visitor, help make the building organization clearer. Color and light serve as an orientation tool as well for those with limited vision. One staffperson who often assists people with disabilities noted, "The blind experience the openness, and the colors are so vibrant to people who still have some vision. There's an echo toward the center of the space; that's an orientation point. We have an architectural model here, and to the blind individual it's just beautiful."[16] In addition, important elements are color-coded throughout the building to augment wayfinding. Bright chartreuse, which attracts the eye, symbolizes pedestrian circulation, and appears on escalators or inside elevators.

Supertext signage by Bruce Mau. (Photo courtesy of the Seattle Public Library.)

Audible and tactile coding is also provided with a palette of flooring materials that create trails and edges that function like shorelines. The floor material changes sequentially as one moves in and out of different functional areas. Each flooring material on the list that follows has its own resiliency and auditory character, providing subtle cues to spatial transitions.

- Aluminum panels: in areas with public computer stations
- Ann Hamilton carved wood floor: in English as a Second Language area (the uneven surface of this floor is unfortunately also a problem for the elderly and wheelchairs)
- Polyurethane: at lower lobby, outside children's area
- Wood or bamboo: in main lobby, reading room, and children's area
- Carpet: in specific areas of main lobby
- Concrete alternating with rubber mats: in book spiral

Other aspects of navigating the library could be improved upon. First-time visitors often experience confusion, such as in finding restrooms (not on every floor), or finding down escalators (there are four up escalators, but only two down, the result of cost-cutting during design.) The unique book spiral has also proved to be less than intuitive, and people still want to know what floor they are on. Plans for additional signage for the building are ongoing. Actual user experience is the best way to fully reveal user preferences in circulation or needed adjustments to design details such as signage, particularly in an atypical building such as this. At least a portion of the typically under-budgeted wayfinding and signage funds should be set aside for the post-occupancy phase, once additional user needs are realized. This design fine-tuning should become standard practice.

One of the best examples of consciously integrating adaptive design into circulation patterns was doc-

umented in *The Oregon Experiment*, a book about the University of Oregon.[17] The campus design used a concept referred to as "piecemeal growth." The master plan was initially designed and buildings placed without pedestrian pathways. Once it was observed where people typically walked between campus buildings, sidewalks were added. This allowed natural use patterns to emerge and inform the design as a practical response to the real world.

CAN GOOD ARCHITECTURE CONTRIBUTE TO ECONOMIC VITALITY?

Green building's economic benefits are often thought of in the context of return on investment for an owner and Life Cycle Cost savings. LEED recognizes how a building can contribute to the local economy as evidenced by Materials and Resources Credit 5.1 and 5.2, as noted previously. Development also contributes to the local economic base if it employs local design professionals and contractors. The City of Seattle conducted an economic development study on the value of the local green building industry to the Seattle economy. The study indicates a significant contribution to local jobs, sales tax, and Business and Occupation tax revenues.

Another study, conducted in 2005, was commissioned by the Seattle Library and the City's Office of Economic Development. This research examined benefits of the new facility as contributing to three key factors for Seattle: image and identity, character and livability, and economic vitality. All of these aspects are seen as central contributors to the economy.[18]

Some of the key findings of the study are explained here. First, the Central Library is an important contributor to Seattle's image as an up-to-date and progressive city. The structure has become an iconic backdrop for numerous magazine ads, promotions, and TV spots. The building reinforces and adds to the "cool factor" that Seattle already sports. The demand for using the library as a set for photo shoots exceeds staff's ability to meet the need, and many requests are turned down. The city's residents, including myself, are clearly proud of their new landmark. The study notes that the Library "contributes to Seattle's sense of pride and identity as a forward-thinking and exciting place to live, work, and conduct business."[19]

The building provides an important anchor in a part of downtown that previously had little sense of place. This enhances downtown liveability and vibrancy. Developers and marketing agencies use the building to promote their own properties. Knowing a prominent LEED project is in the neighborhood can introduce to a developer or building owner the idea of "keeping up with the Joneses." Just across the street from the Library, Urban Visions, a local developer, is constructing a 24-story green condominium tower, a LEED registered project. While this developer was already committed to green building, marketing for adjacency to the Library, already seen as green and trendy, lends a certain attraction. The condo promotional materials proudly tout proximity to this new Seattle landmark.

Landmark buildings are a draw as a tourist destination. Daily visitors to the library have increased dramatically, and circulation has increased by 23%. On opening day, 25,000 people walked through the doors, compared to 5,000 people when the 1960s building it replaced opened. An amazing one-third of visitors to the Library are from out of town, and these visitors come from all over the world. Architectural tourism of new signature buildings, dubbed "The Bilbao Effect," is a reference to the impact the Frank Gehry-designed Guggenheim museum has had on its Spanish hometown. The opening of the building in 1997 literally put the city on the tourist map, and has converted what was previously a bland industrial city to among the #1 tourist destinations in Spain. In 2005, *Travel + Leisure* magazine awarded the Seattle Library "Best Cultural Space." The study estimates that the Library increased tourism to the area by 1% (recognizing Seattle is already a tourist town), which is estimated to yield $1 billion over 25 years to the state's economy. Net new spending associated with the Library was estimated at $16 million during the first 12 months of operation.[20]

ARTS AND CULTURE

Accessing and supporting arts and culture is an important dimension of social sustainability. Seattle enjoys a publicly funded percent-for-arts program, wherein 1% of City-funded Capital Projects budgets is dedicated for spending on the costs to commission, design, and install art. Percent-for-art programs add considerable capacity for public works to expand fi-

nancial support for the arts as well as increase publicly accessible artworks. Seattle's public art ordinance, adopted in 1973, references art's ability to "help people better understand their communities and individual lives."[21]

In many cases, percent-for-art works become integral to the architecture, and the collaborative process between the artist and project team becomes a dynamic part of the design process. Art planners Jessica Cusick and Rick Lowe created an ambitious art plan for the library called "Library Unbound." National searches resulted in the selection of several acclaimed artists to develop site-integrated works for the Central Library. In keeping with the iconoclastic nature of the building and the library focus on technology, many of the installations express media-related art of the avant-garde. These provocative pieces stretch our imagination as well as reveal how art relates to buildings.

Selected Artwork Descriptions

"Braincast," video artist Tony Oursler, New York. Oursler has exhibited his unique works worldwide, including in London, Paris, Stockholm, Istanbul, and Sao Paulo. Many of his site specific works create in effect a sort of psycho-landscape. This installation consists of three egg-like sculptures, which form the surfaces for video projection featuring human faces and the backdrop for audible sounds. The heads babble almost incoherently, as a metaphor for the library as a transmitter of a myriad of information in multiple formats, including spoken, recorded, and digital.

"Braincast" by Tony Oursler. (Photo courtesy of the Seattle Public Library.)

The babbling heads are located within the escalator walls connected to the main lobby, and can be viewed both from the escalator and through a porthole punched through the wall into a hallway beyond. Library visitors become a part of the art as they view one another through the holes—smiling, gawking, and waving.

"Astronomy by Day (and other oxymorons)," media artist Gary Hill, Seattle. Seattle-based Gary Hill is an extremely prolific multi-media video artist. His works tend to be poetic, mysterious, and somewhat rhythmic. This installation occupies a 40-foot wall, three stories high, at the top of the building's nine-story atrium. Video projection depicts a series of seemingly random computer-generated 3D objects. These thousands of mostly everyday objects form a sort of visual encyclopedia, through which the viewer appears to float in a continuous slow-motion tracking shot. The overall effect is of a vast and ethereal landscape formed by an imaginary spherical plane that puts a curved horizon just out of view. The piece creates a dreamlike memory of a world of objects that repeat in a mobius of time.

Chris Bruce, curator of many of Hill's works, has stated, "What you get if you get time as an essential organizing structure is the thrill of expectant consideration and the idea that possibility, unpredictability, shift, random meaning, or surprise can be more than mere subjects in art, but actual occurrences as well."[22]

"Making Visible the Invisible," interactive media artist and professor George Legrady, Santa Barbara. This installation uses visual mapping for the Library's circulation. It is placed behind the reference librarian's desk, and uses a series of six LCD screens to visually display information. "The concept is to try to show what the community is thinking based on the flow of books leaving the library," Legrady notes. "The visualizations try to show what people are reading."[23]

Live data is fed directly from the Library's Information Department to three computers that power the installation. The data is interpreted using four different forms of visualization, with time lags varying from one hour to one day. Data displays include a tally of the number of books and other materials

that have been checked out, titles of checked out materials, and keywords related to checked out items. The words and numbers float across the screens in various formats and colors. The overall effect is vertical or horizontal floating or streaming information.

Untitled, Foreign Language Floor, multi-media artist Ann Hamilton, Ohio. Hamilton's fascination with words manifests in many of her other works, including a 1999 Venice Biennale installation that utilized Braille-embossed walls expressing topics of oppression and slavery.[24] The artistry of this piece is that it is actually the functioning floor in the English as a Second Language (ESL) area. Raised letters are embossed into the maple floorboards, forming a linear arrangement of words. The letters are displayed backwards, like printing typeface, and also references how learning to read represents mastery of initially nonsensical symbols. The words chosen for the piece are the first lines of books in twelve different languages from the ESL collection. The work also expresses the diverse audiences served by libraries, as well as how we must sometimes reorient our biased perspectives of diverse groups.

The works described here are included to provide a flavor for how they might stimulate exploratory thinking that contributes to a cultural backdrop for green building, and to suggest an intersection between the interests of green builders and artists. The emergence of this subject area is illustrated by a 2006 International Symposium held at Budapest's Central European University, and entitled "Sustainability and Contemporary Art." The event is described as striving to "create a trans-disciplinary space for discussion of the fundamental issues bridging the fields of art and environment. . . ." and poses questions such as: "How can contemporary artists contribute to the critique of technocratic approaches to environmental problems? Is fostering human creativity the key to finding lasting solutions to environmental problems?"[25]

INTEGRATING TECHNOLOGY INNOVATIONS

Technology as the practical application of knowledge can serve many purposes. Green building technologies such as active solar systems or rainwater capture can increase resource efficiency of building operations. Other more human-focused technologies can increase worker efficiency and health, or improve equity of community access to information, which contributes to literacy. Technology is discussed here in the context of how emergent innovations might relate to social sustainability.

Perhaps no other city today is more associated with "geek" culture than Seattle. Microsoft's rise and the dot-com boom are deeply entwined in the identity of the Northwest. In this digital mecca, the philosophy of assimilating technology innovations has placed an important stamp on the Library's identity.

INFORMATION TECHNOLOGY ACCESS

As noted earlier in this article, the design team spent a considerable amount of time conducting research on trends in technology development and how this might impact how libraries function. Where once libraries were mostly about books, new media that libraries must address include DVDs, databases, audio cassettes, photos, compact discs, and the list goes on. Koolhaas contends that librarians are becoming a sort of "curator of information" and noted ". . . the Internet is evolving as a kind of weird amalgamation of really useful tools along with a lot of junk . . . libraries can be centers of guidance to help with that sort of navigation."[26]

With the explosion of media technology, one thing the design team explored was whether or not books were becoming relics of the past. "Since even (Bill) Gates has said that he simply cannot imagine reading his children a bedtime story from a computer monitor, the architects reported that the book was here to stay."[27] But the explosion of an Internet culture meant that this way of accessing information needed to be accommodated. Tempering this thinking was also the acknowledgement that relying too much on cutting-edge technology often leaves out the economically or socially disadvantaged.

According to a Pew Research survey of April 2006, 58% of Americans don't have access to broadband Internet access.[28] One of the most basic ways for the Library to democratize technology is to increase public access to computers and to the Internet. Public computer access was increased by bringing the number of accessible computer workstations from 75 at the old facility, to a new count of 400 with Internet access. Compared to many large libraries, this is a

Some of the 400 public access computer terminals. (Photo courtesy of the Seattle Public Library.)

huge number. For comparison, San Antonio's downtown library (designed by Mexican architect Ricardo Legorreta) serves a population of just over 1.1 million and has 81 public access computers. Only 45 of these have access to the Internet and other basic services. Seattle's population is approximately half that of San Antonio (563,000).

Publicly accessible computer workstations tend to get very heavy use within libraries, and often provide Internet access to the homeless who may be job-searching, foreign visitors wanting to check their e-mail, or elderly patrons who want to use a computer, but don't want to deal with owning one at home. Wireless Internet connectivity is also available throughout the library. In 2000, the Seattle Times *Northwest Source* website named the Library the People's Choice for "Favorite Place to get Free Wi-Fi."

Children using computers at Seattle Central Library. (Photo courtesy of the Seattle Public Library.)

Equity is also addressed through the Seattle Library's LEAP (Library Equal Access) Program. This effort is focused on providing for patrons with disabilities or special needs. Equipment and services are provided for the blind, deaf, hard of hearing, and visually impaired. This includes computers with Braille, screen enlargement, and audio screen reading features. Also available are teletypewriter (TTY) equipment, text scanners connected to audio feedback, Braille transcribers, talking book players, and monitor magnification.

Planning for design flexibility to accommodate adaptation to evolving information and digital technology can be a challenge. One strategy for this is to utilize underfloor air distribution (UFAD) systems. The UFAD strategy not only allows for better air quality and energy efficiency, it effectively creates a "plug and play" environment with the ability to access power and technology connections at any point in the floor. A UFAD system was utilized at the library to allow increased flexibility in technology-intensive spaces.

AUTOMATED BOOK SORTING

Old-fashioned hand sorting and checking of books may soon become an artifact of the past. This has been a very labor-intensive process, which can cause repetitive motion stress injuries to library workers, and cause wear and tear on materials. (Books are often dropped from a height of 3 to 4 feet, and then piled haphazardly into large bins.) Not only is this bad for staff and book "health," sorting can also be a very slow process, keeping materials out of circulation longer than necessary. Enter the Tech Logic's Automated Material Handling System (AMHS). This technology has been used on fewer than 30 US public libraries to date, plus some private collections. The system uses a radio frequency tagging system for each item (including CDs, DVDs, etc.), that includes a chip and an antenna. The Radio Frequency Identification tags (RFID) are combined with an automated book drop, conveyor, and sorting bin system. This allows less wear and tear on books, and frees librarians for other tasks. Staff resources have actually been quite a big issue for the library system, and in previous years, cuts in library hours and unpaid furloughs were used to deal with budget shortfalls for staffing.

Check-out/Check-in Desk with book conveyor. (Photo courtesy of the Seattle Public Library.)

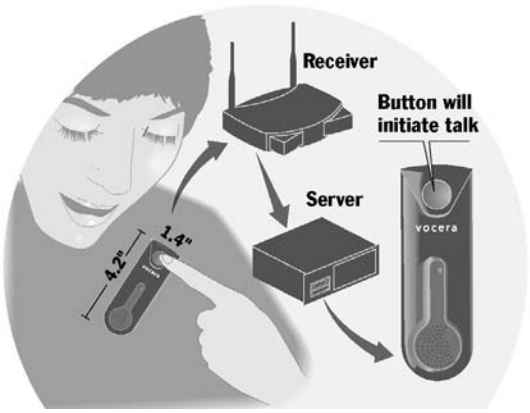
The system distributes materials that are housed at the Central Library to a series of 12 sorters that automatically place books on carts for re-shelving. If a book has been returned from a branch library, the system sends these items to motorized bins for truck distribution to branch libraries, or for immediate shelving. The interagency bins have a motorized floor that prevents bending and back strain. This is just another way in which the system is ergonomically superior. With the ability to process over a thousand items per hour, this automated system helps staff with often overwhelming workloads, and is partially responsible for the increased circulation numbers at the Central Library. Finally, the RFID tagging system allows patrons to quickly and easily do their own check-out.

VOICE COMMUNICATIONS SYSTEM

One of the goals set by the design team was to make it easier for patrons to interact with and find librarians, and to get answers to questions faster. The digital media age has shifted how patrons utilize librarians. Simple, single-subject questions are now usually answered with a quick Internet engine search by the inquirer. The kinds of questions posed to librarians today tend to be much more complex and multidisciplinary in nature. Such inquiries may require several librarians with differing special knowledge areas. In the old model, librarians tend to be buried within the stacks, sitting near the special subject collections they specialize in. Add multi-disciplinary questions to this model, and it could take a patron four different stops at the same number of physical locations to get one answer. OMA was able to rethink this by bringing librarians out of the stacks into a centrally designated space dubbed the "Mixing Chamber," where patrons can easily find librarians. Koolhaas has also been known to call it the "Information Trading Floor."

Communications technology was the tool that brought patrons and knowledgeable librarians together. The Vocera is a wireless voice-activated communications system used to increase staff productivity and reduce wait time for patrons. Voice-controlled communications badges are worn by each librarian, enabling them to interact with any other staffperson in the building instantly. This technology, reminiscent of voice badges on the 1960s "Star Trek" sci-fi fantasy TV program, is tied to a global positioning system that identifies the wearer with his or her physical location. Not only can you find an expert in a particular area of expertise, such as microbiology, by simply speaking the word into the Vocera device, you can also find the expert who is physically the closest to you with the GPS locator interface. The Vocera system enables the centralization of many librarians in one location, versus scattering them physically throughout the stacks. Vocera enables rapid cross-disciplinary problem-solving in a collaborative process, solving a challenge similar to that in the integrated design process.

Vocera communications system. (Kristopher Lee and Mark Knowlin/The Seattle Times. Used with permission. Copyright 2007.)



SUSTAINABLE DESIGN PRACTICE

Green building critique focuses primarily on the product, and to a lesser degree the process, of design. Another dimension that deserves more attention is professional firm business practices. Design firms touting sustainability principles must also pay attention to their own business practices. Are social sustainability values incorporated within office culture and policies? These might include reasonable work hours, family leave, flexible work schedules, or benefits packages that support different family types and holistic health care. Workplace standards might include minimizing paper use (the paper generated by architectural design is massive), "green" office products, and Energy Star office appliances. Commuting and business travel practices should include commute trip reduction policies, teleworking, and hybrid fuel fleet vehicles or loaner bicycles. Some people at Mithun Architect's waterfront office in Seattle are actually able to take passenger ferries or kayak to work.

If taken further, do the company's retirement and 401(k) plans, as well as mutual funds, offer investment options with SRI (Socially Responsible Investment) indexing? Does the firm provide a work environment that demonstrates the principles of sustainable design? Are there good daylight, views, air quality, and thermal comfort for all staff? Many of these factors enhance workplace satisfaction levels, worker recruiting and retention, and productivity, no matter what nature of business. LMN Architects, joint venture firm for the Library, are undertaking greener office practices including offsetting travel flight miles by purchasing carbon credits, reducing paper use with recycled paper and double-sided printing, and using washable kitchen dishware.

CONCLUSION

Design to benefit the commons can by realized in a wide variety of building design strategies. Some of these, such as design that promotes social interaction, are not commonly acknowledged as aspects of green building. Many of the features discussed within this article can, and are, being practiced by professionals involved in design of the built environment. These include urban planners striving to create more spaces in the public realm, developers becoming adept at public process, and architects striving to take accessibility far beyond the legal requirements of ADA. As a powerful market transformation tool, LEED could do more to set standards for design that benefits society, and drive increased adoption of design for social sustainability.

Of course, LEED is a tool in transition, with improvements and new tools being added on an ongoing basis. The single building and site-specific focus of LEED NC has somewhat limited its ability to address broader community sustainability issues. The pilot LEED for Neighborhood Development tool (LEED ND) has taken great strides towards more thoroughly addressing and defining the built environment's impact on neighborhoods and social matters. (On a case-by-case basis, innovation points can be gained for credits from other LEED rating systems.) LEED ND includes a wide range of new proposed credits that promote:

- Compact, complete, and connected neighborhoods
- Neighborhood walkability and public health through physical activity, pedestrian and bicycle safety
- Jobs housing balance, for diverse communities with employment opportunities
- Housing diversity and affordable housing, to include a range of economic levels and age groups
- Community livability with a diversity of uses
- Sense of community with schools and public space
- Community outreach and participation

These steps forward are commendable. However, more can be done. LEED project applicants have at times requested some of the four available innovation credits in areas of social sustainability. Credits have been requested for educational outreach (now a "standard" innovation credit), noise reduction, mixed use, and healing gardens for healthcare. However, a requested innovation credit for an art program was denied based on the need for the art to be incorporated into a public education program relating to all environmental and sustainable features of the project. This entirely misses the value of art in its own right. Another innovation credit was requested for providing a community meeting place including shops and restaurants. This could potentially be considered an aspect of social capital development, but the credit was denied based on the fact that "Innovation is gen-

erally defined as a new or novel idea,"[29] and the reviewer did not see how this concept fit that criteria. Therefore, we can easily see that using the Innovation credits as a catchall for picking up credits based on social sustainability is not a workable solution.

This author suggests the following:

1. Provide a balanced number of points addressing environmental and social benefit for each LEED tool.
2. Create a new LEED category for social sustainability design strategies that do not fit established LEED categories.
3. Integrate all applicable LEED ND social credits into the other LEED tools.
4. Include social benefits where applicable to LEED credit intents stated in Reference Guides, in order to expand the flexibility for interpretation of LEED credits and refine the philosophical framework of LEED.
5. Add new LEED credits for the following:
   - Utilize an Integrated Design Process, including significant client and user engagement, additional research time, and an iterative process of cross-disciplinary collaboration.
   - Create dedicated social and public space within buildings. Set aside special areas for people to interact, or size common areas with sufficient space to encourage lingering.
   - Address the needs of diverse populations, including youth, elders, and non-English speakers.
   - Design beyond ADA requirements, providing for Universal Access.
   - Integrate social services and micro-enterprise into facilities, including homeless services, health services, childcare, and retail and food service.
   - Provide a wayfinding program with graphic, audible, and tactile cues. Develop a portion of the program at least six months after building occupancy.
   - Spend at least 1% of project budget on art. Integrate meaningful artwork into the building that expresses cultural or environmental issues. Include artists on architectural design teams.
   - Integrate innovative technology and other strategies that improve access to information, worker efficiency, ergonomics, or customer service.
   - Adopt sustainable business practices for design and consulting firms, contractors, and clients.

For more information on the Seattle Central Library, see: http://www.spl.org/default.asp?pageID=branch_central_about&branchID=1

For more information on the City of Seattle Green Building Program, see: http://www.seattle.gov/dpd/GreenBuilding

Thanks to Sam Miller, Thor Peterson, and Andra Addison for their assistance.

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