LEEDING THE WAY

USING THE GREEN BUILDING MOVEMENT AND THE LEED RATING SYSTEM AS TOOLS TO FURTHER THE PRESERVATION MOVEMENT

by

LAUREN MICHELLE BROWN

Under the Direction of Mark Reinberger

ABSTRACT

This thesis examines the developments that the green building movement and the preservation movement have made to reach a common goal to pursue a fully sustainable built environment. The green building movement is guided by LEED guidelines, which hold the leading role in sustainable development today. LEED's achievement can be used to further the preservation movement by following successful process it has created. The National Trust has recently formulated a partnership with the U.S. Green Building Council, which has given preservation a platform in the green building movement. Preservationists need to take full advantage of this opportunity by using LEED's branding to market preservation as the main sustainable development tool. This will also be an opportunity to adapt preservation's Standards to become more widely applicable under the direction of the USGBC and broaden preservation in the 21st century.

INDEX WORDS: Historic preservation movement; Green building movement; LEED; Secretary of the Interior's Standards; U.S. Green Building Council; The National Trust for Historic Preservation; Sustainability; Sustainable built environment

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DEDICATION

I would like to dedicate this thesis to my family who never doubted me for one second and called me crazy when I doubted myself. To my mom who has been an amazing role model and best friend. I am especially grateful for unceasing prayers, random surprises of chocolate, encouraging phone calls and constant reminders that you are proud of me. Most of all thank you for teaching me to enjoy life. To my dad who raised me like the son he never had by teaching me to shoot, fish, tear up the woods on a four wheeler and the pride that comes with building and fixings things with your own hands. I believe his work shop is where my passion for design and preservation originated. His support has kept me going from the ice cream money to making sure he was at every award ceremony and graduation to cheer me on. To the rest of my family who make it easy to go out in the world and chase my dreams because I have their love and support to follow me through. Most of all I would like to dedicate this work in loving memory of my grandfather, T.D. Brown, whom we all miss dearly. He loved his family more than anything and never let a day go by without letting us know that we made him proud. I know that he is watching over me today and I will continue to strive to make him proud.

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INTRODUCTION

The preservation movement holds a prominent role in the built environment today. Today, with the current concerns about green house gas emissions and the struggle for global sustainability, the green building movement has emerged as an equally important force. In theory, both movements advocate a common goal for resource and energy efficiency, but they approach this goal in different ways. These different processes have been perceived as conflicting. Recently however, both of the movements have recognized their joint goals and have partnered in attempts to create a more sustainable built environment. The National Trust for Historic Preservation and the United States Green Building Council (USGBC) have formed a coalition to promote preservation through sustainable design. They have taken great strides to combine their efforts and the partnership facilitates a promising future for preservation within the green building movement. This thesis will explore that effort.

The main challenge in joining the two efforts is the difference in regulation structure. The Leadership in Energy and Environmental Design green rating system (LEED), which verifies green building, is performance-based and rewards points to specific design and construction choices. It is a point based system that evaluates buildings according to predicted performance. American preservation's main code, the Secretary of the Interior's Standards, on the other hand, is interpretive and established to provide guidance. It represents a philosophy that has been interpreted many different ways since its establishment, which has given them the characteristic of being flexible.

Both systems have great intentions to help create and sustain a better built environment, but it seems that they could be combined for a higher purpose if both changed their content or structure. Preservation is designed for a social and cultural focus, while LEED was programmed in an environmental direction. They are both now promoting the economical benefits of choosing their methods. Still, they will both miss the mark unless redirected to true sustainability, which is a combination of all three: social and cultural, environmental impact and economical development.[1]

Both regulations have made adjustments to cater to the other's guidelines and to move toward a more cohesive effort in which development would not have to choose between the two. Both movements have started to promote the other's cause, creating national awareness of each movement to their individual supporters. The partnership between the USGBC and the Trust is a positive move for both movements and creates a stronger effort for the goal of a truly sustainable built environment. The partnership provides great potential for preservation as USGBC has currently transformed the market with research and their LEED rating system. Promotion of preservation through USGBC will give preservationists a platform in the green building movement. The partnership will also provide valuable resources for the preservation movement through LEED's market research as well as an increase in market value for preservation projects. The foundation has been established, but preservationists need to take advantage of this opportunity as a chance to further the preservation movement in the 21st century.

[1]Holmes, Joanna D. "Sustainability and The Triple Bottom Line." *Eco Opportunities*. PDF <http://www.enterprisedevelop.com/resources/pdf/EDG%20Sustainable%20Enterprise%20.pdf>.
Michael, Vince. Personal Blog. "Sustainability, LEED, and Preservation." *Time Tells*. 20 March 2009.

CHAPTER 1

THE PRESERVATION MOVEMENT

Where it All Began

The preservation movement has been focused upon in the built environment for over two centuries. The effort began in 1828 by the first restoration effort of the Newport, Rhode Island synagogue, it was then quickly fueled by American pride and those who wanted to establish a history for themselves. The preservation movement was first led by acts such as Ann Pamela Cunningham's creation of the Mount Vernon Ladies' Society. By the 1890's, the importance of Cunningham's effort were realized as the country's people began to understand the importance of the legacy of our great men. By the beginning of the 20th century, preservation societies were established in the West and the Southwest. The beginning of the 20th century also brought new objectives to the preservation movement. People started to recognize the value of objects in their own right and not just for the people who lived in a building or the history that occurred there. This thought process was supported by the founding of the Society for the Preservation of New England Antiquities (SPNEA) by William Sumner Appleton. The organization focused less on pedigrees and more on architectural aesthetics. Americans were becoming educated in the art of preservation.[2]

The Federal government also entered the preservation arena in the first half of the 20th century, playing a prominent role in the movement with the establishment of the Antiquities Act of 1906 and the creation of the National Park Service in 1916. The Antiquities Act created federal protection of artifacts located on government property. More importantly, in the realm of

[2] Murtagh, William J. *Keeping Time: The History and Theory of Preservation in America*. Pittstown, New Jersey. 1988.

preservation, the act gave the president power to designate historic landmarks, structures and other objects of historic or scientific interest. The National Park Service was established to "promote and regulate the use of federal areas known as national parks, monuments and reservations." The creation of the National Park Service became the stepping stone for what would later become the national preservation organization, the National Trust for Historic Preservation.

The preservation movement would soon add a new dimension with the designation of the Battery as the "Old and Historic District" of Charleston, South Carolina in 1931. This action created by the citizens and local government, showed that preservation could be a part of existing communities where we lived and worked. The zoning regulation of the district would also set the stage for the planning tool that preservation uses today. The preservation movement experienced another advance with the passage of the Historic Sites Act on August 21, 1935, creating "a national policy to preserve for the public use of historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States." The act was also a major step in the power that it gave the secretary of the interior, enabling legislation that could develop planning through preservation.[3]

After World War II the Federal government continued its presence in the private sector, in an effort to facilitate transportation and urban redevelopment, created two major programs that would end up proving to be detrimental to the built environment: the Interstate Highway program within the new Department of Transportation and the urban renewal program of the Department of Housing and Urban Development. Both were created with good intentions but led to sprawl, waste, overdevelopment and the obliteration of historic landmarks. The preservation movement had new battles to fight. Paradoxically, the Federal government itself provided the tools for this

[3] Ibid.

fight, as the preservation movement had gone as far as it could go on its own. In 1947 the National Council for Historic Sites and Buildings was established through a meeting led by David E. Finley, Jr. The Council stressed the urgency of surveys and documentation of preservation resources and encouraged the development of a united effort from national, state, and local organizations to establish a foundation of advocacy for preservation during the time of evolving postwar technology. In April of 1947 the Council held a conference where George A. McAneny, president of New York's American Scenic and Historic Preservation Society, proposed the idea of a National Trust. The National Trust would follow the examples of the already successful British National Trust and the San Antonio Conservation Society in Texas. McAneny's proposal was accepted and adopted into the bylaws. The Council created a draft for a National Trust charter bill for submission to Congress. The bill passed unanimously in Congress on October 17, 1949 creating the National Trust for Historic Preservation in the United States. The Trust then created a plan with three main ideas: the National Register of Historic Places, the Advisory Council on Historic Preservation, and tax incentives to encourage preservation.[4]

The National Historic Preservation Act of 1966 became the definitive law of preservation in America. It also began a new time of transformation for the National Trust as they became the only private organization in the country cited by name in the law. The act allowed the Trust to become the recipient of federal funds through a matching grant program. The act also set up a system of checks and balances that created a regulated way for evaluating historic resources. The act expanded the government's view of preservation from only national significance as a qualifying requirement to a broadened scope of state and local significance as well. The act officially created a list of sites and properties of the past that are worth keeping called the National Register of Historic Places. The list includes sites, buildings, objects, districts, and

[4] Murtagh, 1998.

structures significant in history that can be registered under local, state, and national significance. This wording established the word "district" in the language of preservation, allowing establishments such as Charleston's "Old and Historic District" to receive funding through governmental grants. The law also helped direct previously destructive laws, such as urban renewal, to be modified to rehabilitate existing building stock for alternative improved housing.

The Historic Preservation Act also established an Advisory Council and defined its relationship with the office of the Secretary of the Interior (in Section 106 of the law). This section established that any federally funded project that altered the environment could not proceed if it affected a resource located on the National Register without having the Advisory Council comment on the project. Along with the new council, duties were extended to each state with the creation of State Historic Preservation Offices (SHPO) to help further efforts of the law and the National Trust. Federal grants were then established to apply as matching grants to help carry out the law. In 1969 the government took another step with their attempt to regulate the environment with the Environmental Policy Act. This new act stressed federal responsibility for preservation and required environmental impact studies to focus on the effect that their projects have on the environment around them.[5]

Creation of the Secretary of the Interior's Standards

In 1976, preservation received a huge push with another form of creative funding, tax credits. The Tax Reform Act was passed by Congress to provide the first major tax-incentive for preservation. Before this new act, tax incentives focused their benefits on new construction, which gave developers encouragement to replace older buildings with new development, simply to receive a tax break. This new law made the rehabilitation of existing building stock attractive

[5] Ibid.

to developers and leveled the playing field in the competition with new construction. The tax incentives needed to be regulated to make sure that the funding was going toward positive preservation work. In order to control the preservation that was governmentally supported, the Secretary of the Interior produced a document with guidelines. For any property or resource to receive government funding they must meet a required set of standards.[6]

The document was named "The Secretary of the Interior's Standards for Treatment of Historic Properties." The standards were established as the best advice for all who would embark on a historic project. They also created a common language for each type of preservation act that could occur for a property: preservation, rehabilitation, restoration, and reconstruction. These standards were created so that they could be applied to every type of resource that is listed on the National Register of Historic Places. Since they are to be applied so broadly, they stand as broad guidelines, or as most call them, advice. They were not created to be answers to specific situations but are open for interpretation to fit most situations. Because of their need for interpretation, the Standards advise the use of a professional historic preservationist in the early development of the project.[7]

The Standards are divided by type of treatment with a set of guidelines for each treatment (see Table 1.1). The first treatment is Preservation, the process of maintaining a property in the way that it was found and evolved over time. This process requires the retention of as much historic fabric as possible including material, form and architectural details. The next process is Rehabilitation, which involves using the structure for a new and modern use but retaining as much historic fabric and character as possible. Many rehabilitations are judged on whether or not

[6] Murtagh, 1998.

[7] "The Books." *National Park Service*. Web. 16 Jun. 2012 <http://www.nps.gov/tps/standards/rehabilitation/rehab/credits.htm>.

the new use is compatible with the historic use. The next treatment is Restoration, a process of preserving a structure in the way it was at a specific time or period of significance. This treatment can include the removal of fabric if it was installed after the selected time period of significance. Finally, the last treatment and the most extreme of all is Reconstruction. This treatment is definitely more of a process since it is the reconstruction of a missing or non-surviving resource. This process is used for interpretive purposes only. Each of these treatments are considered separately, but can be combined for the preservation of an entire site with an overall treatment in mind.[8]

[8] "Introduction: Using the Standards and Guidelines for Preservation, Rehabilitation, Restoration, or Reconstruction Project." *National Park Service*. Web. 6 Jun. 2012 <http://www.nps.gov/hps/tps/standguide/overview/using_standguide.htm>.

Table 1.1: The Secretary of the Interior's Standards for Rehabilitation[9]

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction will be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

[9] "Introduction: Using."

The Standards also contain a section to mandate that each preservation act follow safety and code regulations. The Standards state: "Work that must be done to meet accessibility requirements, health and safety requirements or retrofitting to improve energy efficiency is usually not part of the overall process of protecting historic buildings; rather, this work is assessed for its potential impact on the historic building."[10] The Standards describe each code requirement and encourage individuals to proceed with caution. Code updates have the ability to jeopardize a building's materials and historic character, but must be met to ensure the safety of workers and patrons to each site. The Standards, again, do not specifically detail how a historic structure should be updated to code, but it encourages individuals to look at alternatives and ensure that as much historic character is maintained as possible.

The code of the Americans with Disabilities Act of 1990 is one of the major codes that historic sites must adhere to. Each site must grant accessibility to all patrons, but the Standards ask that the adjustments be minimal and designed to create the least amount of visual change to the structure. The same general reasoning goes with new additions. Expansion is inevitable and when deemed necessary the Standards ask that the addition be minimal to the existing historic resource and they also require that the addition be clearly differentiated. This requirement makes sure that the existing building can meet new uses while maintaining its character. The new code requirements that historic sites face are energy efficiency regulations. The Standards suggest looking at the existing inherent energy saving features of the buildings before automatically adding new features and mechanical systems. The Standards recognize that retrofitting may be needed but again require that the historic character be maintained and the least invasive approach

[10] Ibid.

as possible used. The goal is to obtain the highest level of compliance with the least amount of impact.[11]

Growth and Development of the Standards

The first version of the Standards was written by W. Brown Morton III and Gary L. Hume in 1976. This version contained seven defined treatments: acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction.[12] Revisions and expansions to the document occurred in 1978 and 1983. In 1990 a complete revision of the Standards began, culminating a new version in 1995.[13] The document was reduced in length and the language was edited to facilitate a clearer communication. This revision is now adapted to apply to all historic resources listed on the National Register including buildings, sites, structures, objects, and districts. The 1995 edition also takes a more philosophical approach, unlike the earlier versions that followed a general and specific format. The earlier versions had a set of general standards followed by a set of specific standards that focused on different work approaches. This combination created seventy-seven standards, while the 1995 edition reduced the number of standards to thirty-four by focusing only on the general approach. This also allowed for a reduction in the number of treatments. Acquisition was removed completely, and Protection and Stabilization were combined with Preservation. This left only four treatments –

[11] "Introduction: Choosing an Appropriate Treatment for the Historic Building." *National Park Service*. Web. 6 Jun. 2012 <http://www.nps.gov/hps/tps/standguide/overview/choose_treat.htm>.

[12] "The Books."

[13] "Introduction: Using."

Preservation, Rehabilitation, Restoration, and Reconstruction. The four were easier to differentiate, helping to create a more common language in the world of preservation.[14]

Although the Standards were regularly updated after their first publication, the 1995 version still applies today. When Kay D. Weeks, co-author and principal architect of the latest edition, posted her remarks on the revisions she stated, "Certainly, as the field of historic preservation continues to grow and change, the Standards will be revised again. No philosophical system is ever permanent. This announcement is, in part, to underscore the notion that achieving a common language for historic preservation treatment is at least in an active state of evolution."[15] Preservation is in a state of evolution as the age of sustainability is now guiding the regulation of the built environment.

[14] Weeks, Kay D. "Historic Preservation Treatment Towards a Common Language, CRM Bulletin." *Department of the Interior, National Park Service.* Washington, D.C. 1991.

[15] Ibid.

CHAPTER 2

THE GREEN BUILDING MOVEMENT

Where it All Began

The need for the green building movement can be followed back into the 1930's, when the built environment began to experience rapid change through human awareness. The world had developed new technologies such as gasoline powered cars, air conditioning, fluorescent lighting and structural steel. These developments were seen as advancements for they allowed buildings to cater to human comfort and convenience. Hind sight reveals that these so called "advancements" were taking a major toll on the environment and human health. The new technology encouraged builders not to worry about design and location since innovation now provided alternative ways of providing comfort, and inexpensive fossil fuels gave power to these innovations.[16] These innovations fueled an explosive development and spread a feeling of carefree empowerment.[17]

By the post-World War II period, planners and developers began to face the issues of sprawl, as studies produced awareness of the detrimental effects that unplanned development was having on our environment and declared that a change in attitude and development was desperately needed. In the 1960's leaders in the built environment began to take notice of the serious issues at hand and began to form an environmental movement to change the established thought process. The movement became a collaboration between architects, environmentalists,

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[16] "White Paper on Sustainability." *Building & Design Construction*. Nov 2003. PDF <http://www.usgbc.org/Docs/Resources/BDCWhitePaperR2.pdf>.

[17] Lehmann, Dr. Steffen. "TRANSFORMING THE CITY FOR SUSTAINABILITY: The Principles of Green Urbanism." Journal of Green Building. 6.1 (Winter 2011). 104-113.

and ecologists and became known as the "Green Building Movement". Their efforts converged in a celebration of the first Earth Day in April of 1970. However, it was not until the OPEC Oil Embargo of 1973 that people began to take a personal interest in the movement. Gasoline prices rose and caused the issue to become personal. It was suddenly clear that dependence on fossil fuels for transportation or buildings was not healthy and needed to change.[18]

Efforts began to find ways to fight the energy crisis at hand. One of the first was the energy task force formed by the American Institute of Architects, which later became the Committee on Energy. The task force focused on two separate areas. The first was passive design systems such as development location and use of materials. The second area focused on technological advances to save energy. Luckily a general awareness was enough to make the immediate energy crisis decline. The fear of returning to that state obviously still remained because efforts began to increase around the world to help rectify the situation.

In 1978, California took the lead at the state level by commissioning eight energy-sensitive state office buildings. The year before, 1977, the national government took a step by creating the Department of Energy to help monitor energy usage and conservation. Also in 1977, Golden, Colorado established an institute to investigate energy technologies, such as photovoltaics, called the Solar Energy Research Institute, which later became the National Renewable Energy Laboratory. International efforts produced energy-efficient wall systems, water-reclamation systems, systems to reduce construction waste, and passive design practices such as daylighting and operable windows.

By 1987, the green building movement had become a well-known effort and terminology had been developed. Norwegian Prime Minister, Gro Harlem Bruntland, head of the United Nations World Commission on Environment and Development, established the first definition of

[18] "White Paper," 2003.

"Sustainable Development": "that it meets the needs of the present without compromising the ability of future generations to meet their own needs."[19] In 1989 the American Institute of Architects (AIA) redeveloped their Committee on Energy to become the Committee on the Environment (COTE). COTE went on to form a project that was funded by the Environmental Protection Agency to create a guide to building products that were based on life cycle analysis. The project evaluations were then compiled into the AIA Environmental Resource Guide, which is now one of the main publications on sustainability. Since its first publication in 1992, the Environmental Resource Guide has encouraged many building product manufacturers to be more ecologically minded when developing their products.

In 1992 the United Nations' Conference on Environment and Development, also known as the Earth Summit, was held in Rio de Janeiro. The conference established Agenda 21 (a blueprint for achieving global sustainability), the Rio Declaration on Environment and Development, and statements on forest principles, climate change, and biodiversity. Sustainability had come to consider all ecological systems, all aspects of the built environment, and all effects of human life. People were starting to understand that sustainable design is an integrated process and that it includes more than just the structure being built at that moment.

Susan Maxman, the new AIA president in 1992, was an inspired attendee of the Earth Summit conference. The next year she strengthened the AIA's leadership role in Green Building by naming sustainability as the theme for the June 1993 UIA (Union Internationale des Architectes) / AIA World Congress of Architects. The event was held in Chicago where it brought together six thousand architects from around the world. They focused on sustainability using the definition of the U.N.'s 1985 Bruntland Commission. The event became known as "Architecture at the Crossroads" and is recognized as the turning point in the green building

[19] Ibid.

movement, as it resulted in the development of the Declaration of Interdependence for a Sustainable Future and was signed by AIA president Maxman and UIA president Olufemi Majekodunmi.[20]

The green building movement now had cause to be regulated and with that came the Energy Policy Act of 1992. The act became a public law with the goal to reduce Americans' dependence on imported petroleum and improve air quality. The act focuses mainly on alternative fuels by addressing all aspects of energy and energy efficiency.[21] The U.S. Environmental Protection Agency and the U.S. Department of Energy took a step further by creating a joint program called ENERGY STAR. The program promotes energy efficient products to help consumers save money and help protect the environment. It was started as a voluntary labeling program in 1992 only regulating computers and monitors. The program has now grown to be the trustworthy representation of over sixty product categories including: major appliances, office equipment, lighting, and home electronics. In 2010 the program reportedly saved consumers in the United States around $18 billion. The program's success can also be seen in the result that it has become a driving force in energy efficiency through technological innovations, efficiency lighting, power management systems for office equipment, and low standby energy use.[22]

The national effort took a more personal turn in November of 1993 with the election of President Bill Clinton. Earth Day of April 21, 1993 provided the appropriate platform for President Clinton to declare the White House as "a model for efficiency and waste reduction."

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[20] Ibid.

[21] "Federal & State Incentives & Laws." U.S. Department of Energy 4 Jun. 2012 <http://www.afdc.energy.gov/afdc/laws/key_legislation#epact92>.

[22] "History of Energy Star." Energy Star. Web. 4 Jun. 2012 <http://www.energystar.gov/index.cfm?c=about.ab_history>.

The greening of the almost 200 year old historic home created an annual energy, water, landscaping, and solid waste savings of $300,000. This became an influence in the federal built environment that encouraged many government properties to follow suit. The greening of other federal properties included the Pentagon, the Presidio in San Francisco, and the U.S. Department of Energy Headquarters. The Federal government also went as far as to green three national parks: The Grand Canyon, Yellowstone, and Alaska's Denali. A consolidated record of these efforts was created by the Department of Energy's Federal Energy Management Program. The publication was titled Greening Federal Facilities and is used as a general guide for contributors of the built environment such as: Federal facility managers, designers, planners and contractors.[23]

The green building movement continued to flourish during the 1990's inside the United States with the government as a leading example. Outside the United States, international efforts grew as well, indicating that this movement had the ability to make a difference in the built environment. In 1990 the United Kingdom launched an environmental assessment rating system for buildings called BREEAM, the Building Research Establishment Environmental Assessment Method. BREEAM uses established measures of performance in design categories such as: energy and water use, the internal environment (human health), pollution, transportation, materials, waste, ecology and management processes. The assessment tool quickly spread to other countries and became widely recognized as the measure for building's environmental performance as it set a standard for best practice on sustainable design, construction and operation. This was a clear example that the green building movement was no longer a trend but now an actual practice.[24]

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[23] "White Paper," 2003.

[24] "About BREEAM." *BREEAM*. 2011-2012. Web. 4 Jun. 2012 <http://www.breeam.org/page.jsp?id=66>.

The proof of the power of this movement was displayed in 1998 when representatives of fourteen nations gathered in Vancouver, British Columbia for the Green Building Challenge. Representatives were present for Austria, Canada, Denmark, Finland, France, Germany, Japan, the Netherlands, Norway, Poland, Sweden, Switzerland, the United Kingdom, and the United States. Additional conferences were held in Maastricht, the Netherlands in 2000 and in Olso, Norway in 2002 drawing an even larger group of national representatives. The goal of the collaborative conferences was to create an international assessment tool that measures environmental, economic and social aspects, known as today as the Triple Bottom Line.[25]

Creation of USGBC and the LEED Rating System

The United States had become a key player in the green building movement at the international level through the Green Building Challenge conference, but the nation was also taking great strides in its own built environment. The success of the U.S. in the sustainability realm was proven when the United States Green Building Council was established in 1993. USGBC is a 501 c(3) non-profit organization based in Washington, D.C. whose main function is to promote a prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings.[26] The nonprofit organization began with the partnership of David Gottfried, a construction manager and real estate developer, and Michael Italiano, an environmental lawyer. This might have been seen as a combination of two professions that would not usually collaborate, but the unique partnership proved to be the missing link in the

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[25] "White Paper," 2003.

[26] "U.S. Green Building Council." *USGBC*. 2011. Web 28 May 2012 <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>.

development realm and is now the basis for the green building movement – collaboration through integrated design.[27]

Gottfried and Italiano met while working on an Environmental Defense Fund project, a type of project that is designed to bring together science, economics and laws to solve environmental threats. The pair realized, though their personal experience in the built environment, a need for a higher degree of collaboration to achieve full sustainability. Their idea grew as they met with other professionals and leaders in the green building movement, such as Robert Berkebile, chair of the AIA Committee on the Environment. They also met with individuals in the industry and Federal agencies such as the Department of Energy. The organization grew and by 1993 they were fully established with a couple dozen members and the creation of a sustainability rating system became their first goal.

Since 1993 the organization has grown and now contains nearly 16,000 member companies and organizations, and more than 170,000 LEED Professional Credential holders. USGBC has become a driving force in the United States by bringing together a diverse combination of builders and environmentalists, corporations and nonprofit organizations, elected officials and concerned citizens, and teachers and students through integrative design. Not only has this organization established a new level of sustainable development to reduce our damaging effect on the environment, but from 2009 to 2013 the USGBC is projected to generate $554 billion to the U.S. gross domestic product, a welcoming profit margin to a country that is facing a returning recession. [28]

[27] "White Paper," 2003.

[28] "USGBC," 2011.

USGBC realized a need for regulation to support sustainable development. They partnered with the American Society of Testing and Materials to develop the rating system. USGBC maintained a constant role by having members serve on the ASTM subcommittee for the development process. After two years, USGBC decided that the ASTM process was too drawn out. USGBC stepped away from their partnership with ASTM to create a rating system on their own, LEED- the Leadership in Energy and Environmental Design green rating system. The chairman of the formulating committee was Rob K. Watson, a senior scientist with the Natural Resources Defense Council (NRDC). Under Watson, the formulating committee spent the next three years examining and rejecting existing rating systems, even the European established system BREEAM, on the basis that they held too much emphasis on code officials and a primary focus on reducing carbon dioxide emissions. LEED needed to create a broader base to cover more environmental issues. It became clear that the system that was needed had to be created from the ground up, and the committee produced LEED version 1.0 in 1998.[29]

LEED's influence spread quickly especially with continued support from the Federal Energy Management Program that launched a pilot program within months. Reference guides were also created and, in the first year, buildings totaling more than a million square feet were registered with the LEED rating system. With all of the attention on the new addition of standards in the built environment, the flaws of LEED 1.0 were quickly found. Credits were found to be either too specific or were already required practice through building codes. Energy specific credits did not efficiently create a performance outcome that could be measured. Also the reference guide needed revising.

By March 2000 the committee had listened to the concerns and issues being presented and a revision was produced as LEED 2.0. The credits allotment of forty from LEED 1.0 was

[29] "White Paper," 2003.

now expanded to sixty-nine and categories were created to award different levels of green building. The levels of certification were established as Bronze (now Certified), Silver, Gold, and Platinum. The reference guide also followed suit and adjusted material accordingly. LEED did not stop there, but produced an updated version with greater refinements three years later named LEED 2.1. At that point it was proven that LEED admitted that it was not perfect, but it was willing to reassess and make changes. This appears to be a key to the success of the rating system. Its simplistic structure, based on the achievement of points, has also assured its success. This combination has given LEED a vast appeal, making it the most widely accepted program of its kind in the U.S. and it is now gaining international status.[30]

Breakdown of the LEED Rating System and the Keys to its Success

The influential value that LEED has over market transformation is credited to its continuous improvement cycle. The constant re-assessing of the rating system allows the program to increase in scope and austerity as market readiness increases and new technologies are developed.[31] The USGBC website lays out the intentions and goals of the system, "LEED certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality."[32] The goals of the systems are easily promoted and achieved thanks to the breakdown of the system. The main LEED rating

[30] Ibid.

[31] "LEED 2012 Development FAQ." *USGBC*. 2012. Web. 28 May 2012 <http://www.usgbc.org/ShowFile.aspx?DocumentID=9826>.

[32] "USGBC," 2011.

system, LEED 2009 for New Construction and Major Renovation, is divided into five main sections: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. The system also has a section for innovation points that credit individuals for developing new ideas or technologies to achieve efficiency goals. The Innovation and Design Process section also rewards those who demonstrate exceptional performance by doubling the requirements for certain credits. This section also includes Regional Priority to reward design that caters to the needs of a specific region in which a project is developed. All of the main categories also have prerequisites that must be met to gain any level of certification. After the prerequisites and Minimum Program Requirements (mostly existing environmental efficiency codes) have been met, project teams can decide which level of certification they hope to achieve through integrative design that includes the opinions and ideas of multiple professionals upfront. Next, the project team will evaluate their project and context to decide which credits will be the most beneficial in reaching their certification goal.[33]

Another key factor to the success of the LEED rating system is the competition that it proposes from its game design and set up. The game proposes levels through its range of certification as well as optional paths to achieve the certification. It creates a challenge to see who can obtain the most points. The system is also creative in how it rewards those who find new ways to achieve points while still establishing rules and leading the built environment to a common goal of sustainability. Points for the different levels of LEED certification are rewarded based on the practices that will gain the most environmental sustainability. The levels of certification according to the LEED 2009 checklists are as follows: Certification 40 – 49 points, Silver 50 – 59 points, Gold 60 – 79 points, and Platinum 80 – 110 points.[34]

[33] "White Paper," 2003.
[34] Ibid.

Table 2.1: LEED 2009 for New Construction and Major Renovation Project Checklist[35]

LEED 2009 for New Construction and Major Renovations

Project Checklist

Project Name

Date

Y	?	N			
Sustainable Sites				Possible Points:	26
Y			Prereq 1	Construction Activity Pollution Prevention	
			Credit 1	Site Selection	1
			Credit 2	Development Density and Community Connectivity	5
			Credit 3	Brownfield Redevelopment	1
			Credit 4.1	Alternative Transportation—Public Transportation Access	6
			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
			Credit 4.4	Alternative Transportation—Parking Capacity	2
			Credit 5.1	Site Development—Protect or Restore Habitat	1
			Credit 5.2	Site Development—Maximize Open Space	1
			Credit 6.1	Stormwater Design—Quantity Control	1
			Credit 6.2	Stormwater Design—Quality Control	1
			Credit 7.1	Heat Island Effect—Non-roof	1
			Credit 7.2	Heat Island Effect—Roof	1
			Credit 8	Light Pollution Reduction	1
Water Efficiency				Possible Points:	10
Y			Prereq 1	Water Use Reduction—20% Reduction	
			Credit 1	Water Efficient Landscaping	2 to 4
			Credit 2	Innovative Wastewater Technologies	2
			Credit 3	Water Use Reduction	2 to 4
Energy and Atmosphere				Possible Points:	35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
			Credit 1	Optimize Energy Performance	1 to 19
			Credit 2	On-Site Renewable Energy	1 to 7
			Credit 3	Enhanced Commissioning	2
			Credit 4	Enhanced Refrigerant Management	2
			Credit 5	Measurement and Verification	3
			Credit 6	Green Power	2
Materials and Resources				Possible Points:	14
Y			Prereq 1	Storage and Collection of Recyclables	
			Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
			Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
			Credit 2	Construction Waste Management	1 to 2
			Credit 3	Materials Reuse	1 to 2

Y	?	N			
Materials and Resources, Continued					
			Credit 4	Recycled Content	1 to 2
			Credit 5	Regional Materials	1 to 2
			Credit 6	Rapidly Renewable Materials	1
			Credit 7	Certified Wood	1
Indoor Environmental Quality				Possible Points:	15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
			Credit 1	Outdoor Air Delivery Monitoring	1
			Credit 2	Increased Ventilation	1
			Credit 3.1	Construction IAQ Management Plan—During Construction	1
			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
			Credit 5	Indoor Chemical and Pollutant Source Control	1
			Credit 6.1	Controllability of Systems—Lighting	1
			Credit 6.2	Controllability of Systems—Thermal Comfort	1
			Credit 7.1	Thermal Comfort—Design	1
			Credit 7.2	Thermal Comfort—Verification	1
			Credit 8.1	Daylight and Views—Daylight	1
			Credit 8.2	Daylight and Views—Views	1
Innovation and Design Process				Possible Points:	6
			Credit 1.1	Innovation in Design: Specific Title	1
			Credit 1.2	Innovation in Design: Specific Title	1
			Credit 1.3	Innovation in Design: Specific Title	1
			Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
			Credit 2	LEED Accredited Professional	1
Regional Priority Credits				Possible Points:	4
			Credit 1.1	Regional Priority: Specific Credit	1
			Credit 1.2	Regional Priority: Specific Credit	1
			Credit 1.3	Regional Priority: Specific Credit	1
			Credit 1.4	Regional Priority: Specific Credit	1
Total				Possible Points:	110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED certification has become a marketing tool for business and development to help create interest in the real estate market as well as increase the market value of a project. LEED has become equivalent to the *Good Housekeeping* Seal of Approval or a favorable review in *Consumer Reports*. LEED developments can advertise that they are environmentally superior to at least 75% of the contemporary buildings in the market. Bragging rights increase with each higher level of certification that a building receives. The combination of simplicity, competition

[35] "USGBC," 2011.

and a marketable brand allows LEED to become the number one influence in the American built environment towards a more sustainable future.[36]

Growth and Development of LEED

LEED has come a long way since version 1.0 which is now recognized as merely a starting point. It was obvious that the first version had its flaws and shortcomings, proven by the first generation of followers who gained certification by going for the "easy" points and not always the most beneficial. A good example was the Sustainable Sites credit 4.2: Provide bicycle storage and changing facilities for x amount of occupants. This credit was intended to encourage sustainable transportation to the site but turned out to be more of an easy target for point accumulation, demonstrated by projects that were inaccessible to bikes but still installed bike racks and showers to obtain points.

LEED has gone though many updates and revisions and continues to re-evaluate their progress and influence each year. Their process and foundation remains the same and their ability to fix what they are doing wrong shows true growth and commitment. LEED encourages innovative design; so as new ideas, processes and technology are developed; LEED adapts to stay ahead of the status quo. Their foundational idea of integrated design has remained the key ingredient throughout this entire process showing that their base is a strong fundamental element. The idea of integrated design requires the design team for each project to come together at the beginning of the project instead of working individually throughout design development. This creates a collaborative effort by bringing together a range of backgrounds and thought processes

[36] "White Paper," 2003.

to meet the common goal. This process allows every design to reach its full sustainable potential and to significantly reduce construction costs.[37]

LEED 2.0 was released in March of 2000, two years after the pilot run of LEED 1.0. The rating system was still new, but the U.S. Green Building Council had listened to individuals who had followed the program and made adjustments to make the system more relevant. The rating system quickly grew each year with the numbers of projects applying and gaining certification. LEED also grew as a new update 2.1 was released in 2003. In 2005 LEED realigned the rating system of New Construction and Major Renovation to further comply with the engineering code standard of ASHRAE 90.1. USGBC followed the success and struggles of projects undergoing certification and in 2009 they were able to put their records to good use. LEED 2009 included a complete content alignment. LEED 2009 included a revision for five of the rating systems: New Construction & Major Renovation, Core & Shell, Commercial Interiors, Schools, and Existing Buildings. The new changes also included changes to the professional credentials and certification process by adding LEED Green Associate, a new level of professional certification. This time USGBC set up two comment periods for the public to review the changes and make suggestions. The comments were reviewed and the updated version was published in November of 2009.[38]

LEED 2009 presented a re-arranged point system. Feedback was received that the points were unjustly distributed and the common practice was to credit some points higher than others. The redistributed points were rated based on the environmental impact or effect on human health that each credit contained. The new points raised the possible limit from sixty-nine to an even

[37] Ibid.

[38] Campagna, Barbara A. "How Changes to LEED Will Benifit Exisiting and Historic Buildings." *Forum News*. National Trust for Historic Preservation. XV. 2 (Nov/ Dec 2008). 2-6.

100 or 110 if bonus points are included. The points for each category differ for each individual rating system but they do share the fact that the category with the most points goes to Energy and Atmosphere, because this category has the most effect on the environment.[39] LEED Online v3 was also developed in 2009 as an online reference to promote sustainable building practices worldwide. This reference tool contains an interactive program to help explain the LEED Green Building Rating System. The tool also takes a creative approach by comparing the rating system with a nutrition label for better understanding. The new online system also allows individuals an electronic tool to manage their certification process.[40]

LEED then expanded by adding the new rating systems Health Care and Neighborhood Development to the existing rating systems of New Construction & Major Renovation, Existing Buildings, Commercial Interiors, Core & Shell, Schools, Retail and Homes (see Table 2.2).[41] This created a total of nine rating systems to reach a greater range of development. In the summer of 2009 LEED – Neighborhood Development was published after a two-year pilot run and two public comment sessions via the internet. This rating system followed the structure of the existing categories but focused on infrastructure in the public realm with buildings as only one component. This system is made up of only four different sections instead of the general seven that are repeated with the other systems. The sections in LEED – ND are Smart Location and Linkage, Neighborhood Pattern and Design, and Green Infrastructure and Buildings. The last section is the bonus points of Innovation Design Process combined with Regional Priority.[42]

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[39] Campagna, Barbara A. "The Impact of Involving LEED Standards on Historic Preservation Projects." *Journal of Green Building*. 3.4 (Fall 2008) 21-29.

[40] "LEED," 2012.

[41] Ibid.

[42] "USGBC," 2011.

Even though LEED – ND follows different requirements it is designed to align with the LEED format as much as possible. Terminology is streamlined and the 100-point system is maintained. LEED – ND also follows the integrative design process in the way that its creation was a collaboration between USGBC, the Natural Resources Defense Council, and the Congress for New Urbanism. USGBC also joined forces with the Center for Disease Control (CDC) to maintain the focus on public health especially for this rating system.[43]

[43] Campagna, "The Impact," 2008.

Table 2.2: LEED Rating Systems and Uses[44]

1. New Construction & Major Renovations	Designed to guide and distinguish high-performance commercial and institutional projects, including office buildings, high-rise residential buildings, government buildings, recreational facilities, manufacturing plants and laboratories.
2. Existing Buildings: Operations & Maintenance	Helps building owners and operators measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts.
3. Commercial Interiors	Used for certifying high-performance green interiors that are healthy, productive places to work; are less costly to operate and maintain; and have a reduced environmental footprint.
4. Core & Shell	Covers base building elements such as structure, envelope and the HVAC system. LEED for Core & Shell is designed to be complementary to the LEED for Commercial Interiors rating system, as both rating systems establish green building criteria for developers, owners and tenants.
5. School	Recognizes the unique nature of the design and construction of K-12 schools.
6. Retail	Designed to guide and distinguish high-performance retail projects, including banks, restaurants, apparel, electronics, big box and everything in between.
7. Healthcare	Guides the design and construction of both new buildings and major renovations of existing buildings, and can be applied to inpatient, outpatient and licensed long-term care facilities, medical offices, assisted living facilities and medical education and research centers.
8. Homes	Promotes the design and construction of high-performance green homes
9. Neighborhood Development	Integrates the principles of smart growth, urbanism and green building into the first national system for neighborhood design.

USGBC is currently working on a new version of the rating system. The update named LEED 2012 was intended to be published this year, but due to expanded public comment sessions its release is postponed until June 1, 2013.[45] The new version is to be considered a streamlining of the 2009 version and because of the delay will now be named LEED v4. LEED

[44] "USGBC," 2011.

[45] Ibid.

v4 will improve clarity, usability, and functionality with the focus on simplicity. The new version will also focus on expanding the market sectors able to use LEED. This technical update will include new credit categories and increases to the technical rigor of the rating system to accompany technological advancements and market acceptability of green building practices.[46]

Updates to the new LEED rating system will include new prerequisites as well as the possibility of new Minimum Program Requirements. These updates will raise required basic level performance to create a more sustainable built environment. Credit categories will also be expanding to include more credit options. The new credits are also an effort to streamline the residential rating system of LEED for Homes to the commercial systems by creating matching categories. The first category is Integrative Process (IP) to encourage multidisciplinary design. The next category will be Location and Transportation (LT) to highlight the planning aspect along with the importance of location and transportation in sustainable design. The final category is Performance (PF) to promote the importance of continual operational performance. The Performance category will include existing credits that already measure performance, the credits will simply be reorganized to have their own category now. The category's credits will measure metering, commissioning, and utility consumption data reporting. These new categories will call for a reallocation of the point system but the system is still being determined.

The major updates in preference of preservation are proof of the labors of the partnership with the National Trust. In LEED v4 credits will be weighted using a new method of Life Cycle Assessment (LCA) criteria. The LCA looks at products' effect on the environment for their entire life cycle by using scientific calculations. LCA is also used to rate a newly developed Alternative Compliance Path for existing buildings. The new path was titled "Life Cycle Assessment of Building Assemblies" and provides an optional path to use the Materials &

[46] "LEED," 2012.

Resources Credits by judging the durability and embodied energy of existing materials based on their LCA rating.[47] The addition of life cycle assessment into the structure of LEED determined that long-term performance of a building components and the structure itself would be given greater consideration.[48]

Existing projects that are already registered under LEED 2009 are allowed to continue their certification process. The LEED Online v3 is not being updated at this time to allow current projects to continue to adjust to the new resource. The online tool will continue to be refined, but LEED v4 will be aligned with the current online v3 version to allow existing users a comprehensive tool.[49]

LEED updates follow a rigorous process that includes public participation. A public comment process is created where stakeholders are encouraged to review the changes and add their opinions. LEED usually holds two comment sessions per update, sometimes more if necessary, for they hold public opinion in high regard for direction of growth and changes. LEED also uses pilot runs to test out new credits and changes. The LEED Pilot Credit Library is encouraged to be utilized by current certification projects to gain actual application feedback. There is also a volunteer committee for Expression of Interest Periods composed of stakeholders who want to have a personal say in the process. Finally, there is a vote cast by USGBC members to approve proposed changes or updates.

The LEED rating system will continue to develop as its current structure is designed for continuous growth. The main ingredient to LEED's growth is the continuous analysis of the market sector. The program is constantly reevaluating credit achievement data collected from

[47] Campagna, "How," 2008.

[48] "White Paper," 2003.

[49] Ibid.

certified projects. The data is used to determine which credits are not contributing to the overall goal of a sustainable environment and which credits have succeeded in market transformation. LEED also follows the market closely to know when to release updates. The program is continuously recording market analysis to make sure their rating system is current with technologies and most importantly the public's thought process.[50]

[50] Ibid.

CHAPTER 3

THE POWER OF THE GREEN BUILDING MOVEMENT FOR THE FUTURE OF PRESERVATION

The Common Objectives between the Two Movements

In today's built environment a quick examination of a building reveals its green energy-efficient strategies: the use of locally extracted and manufactured resources; the use of durable materials according to Life Cycle Analysis; the location of the building to cater to sunlight and wind pattern for solar heating and harnessing of natural ventilation; the convenient placement next to pedestrian access and local necessities. However, suppose that the building was constructed in the 1920's, long before the technology and research had been compiled to create building guidelines for energy efficient construction. A step back further and the historic character provides an entire new respect for the structure. It is a wonder how construction used to be based on energy efficiency along with the combination of skilled magnificent craftwork. How these existing structures are a creation of such a beautiful combination and have stood the test of time is worth learning from to define the future of new development.

The green building movement started to affect the built environment around the same time the built environment was starting to motivate the preservation movement. Preservation had experienced one phase of popularity before World War II with the support of the New Deal. After the war Americans found their built environment expanding at an alarming rate and wreaking havoc on the environment. The rapid expansion of development was causing a severe loss in non-renewable resources such as historic structures and fossil fuels. The preservation

movement and the green building movement took up the fight to rectify the situation, but both headed in separate directions. Both movements proposed to change the built environment, but at opposite ends of the spectrum. Preservation led the fight from the existing building stock and Green design took control over new development. They were bound to meet in the middle at some point, but it has taken over three decades for the two movements to converge and realize that they are fighting for the same cause.

The sustainable design movement is now well established in many parts of the world. It is time that historic preservationists joined this effort, since in all reality sustainability is their world. The current main focus of sustainable issues is the topic of green house gas emissions. Historic preservation has been working to counteract the environmental impact of these emissions through campaigns against unnecessary construction since The Secretary of the Interior's Standards were produced in 1977. Now the whole world is interested in the benefits of the practice of preservation, just indirectly.

The two movements share multiple values. Sustainable design focuses on criteria for materials such as durability, locally extracted and designed, or salvaged, which sounds directly comparable to the materials that preservation projects capitalize on – longevity, regional appropriateness, and in-kind replacement to retain historic character. Both movements promote resource conservation. This is the main component of preservation, but sustainable design advocates for the practice as recycling to save depleting resources and to manage waste distributed to landfills. They both advocate energy efficiency, the main focus of sustainable design. Preservation promotes this value as a benefit from using historic structural design such as cross-ventilation, operable windows, extensive use of glazing, and architectural features to mitigate heat gain as many historic buildings were built before structures were designed to rely

on mechanical systems. The practice of preservation brings a structure back to its energy efficient design with a lessened reliance on mechanical systems and fossil fuels, a design tactic that green building promotes today.[51] Sustainability is not just about energy conservation; it goes much deeper than that. It is about developing a thought process that makes environmentally responsible choices. It is not just about how to design a new building that will last for future generations. Sustainable design is the ability to use resources wisely to create places of enduring value to society. Together the practice of green design and preservation aim to develop cultures that sustain social aspects, environment, and economy (as seen in table 3.1).[52]

Preservation and green design both market their techniques from economic standings. The rehabilitation of a structure saves developers money from new materials and construction cost, not to mention the money saved from demolishing an existing building and clearing the site. Most historic structures are compiled from durable materials that are built to last creating a sound investment. Green building takes economical design to the next level by applying technology advances to mechanical and electrical systems to make sure buildings run more efficiently. Efficient systems decrease the use of electrical power and fossil fuels which can offset operational cost. Preservation and green building both emphasize the importance of maintenance and proper operations. With education from both programs we can have a more sustainable built environment from maintenance practices alone. Proper maintenance also creates less stress on systems, requiring less money in the future to replace and update them. Federal

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[51] Farneth, Stephen. "Sustaining the Past, Guidelines for Historic Preservation Shouldn't Have to Clash with LEED Requirements, Since Preservation and Sustainability Share Many Similar Goals." *Green Source, The Magazine of Sustainable Design*. (2007). Web. 18 Oct. 2011 <http://greensource.construction.com/features/0710mag_current.asp>.

[52] "The Sustainable Preservation Coalition, Devising A Joint 'Green Strategy'." The National Trust for Historic Preservation. PDF. 16 Jun. 2012 <http://ohp.parks.ca.gov/pages/1054/files/sustainable%20pres%20ncshpo.pdf>.

funding through tax credits is also a key player in both movements. Tax credits are allotted for both efforts and can help fund each project.

Tax credits for historic preservation are offered at the federal and state level with an incentive of 20% for "certified historic structures" according to the Secretary of the Interior's Standards and 10% for non-historic structures that were placed in service before 1936.[53] LEED specifically has not been awarded tax incentives, but the practice of sustainable design that is achieved through the LEED certification process is granted federal and state incentives. The Energy Policy Act of 2005 and the Tax Relief and Health Care Act of 2006 offer tax incentives for the use of alternative energy sources. Specific examples include:

1. Tax credits of up to $1.80 per square foot on buildings that save 50 percent on projected heating, cooling, ventilation, water heating, and interior lighting energy consumption. (Lesser tax credits are available for individual system upgrades.)
2. Tax credits of up to 30 percent of the cost of solar energy systems.
3. Tax credits for 30 percent of the cost of fuel cells and 10 percent of the cost of micro-turbines[54]

[53] "Tax Incentives for Preserving Historic Properties." *National Park* Service. Web. 25, Jun. 2012 <http://www.nps.gov/tps/tax-incentives.htm>.

[54] Lee, Deborah A. "Tax Rebates and Incentives for Sustainable Design." *The American Institute of Architects.* Web. 6 Jun. 2012 <http://www.aia.org/akr/Resources/Documents/AIAP037764?dvid=&recspec=AIAP037764>.

Table 3.1: The Combination of LEED and Historic Preservation for a Fully Sustainable Built Environment

Full Sustainability	LEED	Historic Preservation
Social/ Cultural	• Locally extracted and designed materials	• Creating a sense of place through historic character
Environmental	• Recycled materials • Durability of materials • Energy efficient design with advances to mechanical and electrical systems • Proper Maintenance	• Resource conservation • Longevity of materials • Energy efficient design with less dependence on mechanical systems • Proper Maintenance
Economical	• Money saved by using environmental design to lower operating costs • Tax credits for sustainable design	• Money saved by using existing materials • Tax credits for historic preservation

Both movements have the same mindset and goal to achieve the same end result, a sustainable built environment. It appears that they are just pursuing their goals through different processes. Up until the past decade, the two movements have conflicted with each other, but now they are starting to see the benefits of combining their efforts. Green building may be from the school of new development while preservation protects the existing building stock, but together both of their efforts will help to pursue a completely sustainable built environment. The joint

effort will also become a powerful tool in creating future sustainable development that protects the environment and the world's historic resources.

The Benefits of Such a Powerful Coalition

The United States holds only 5% of the world's population yet it is responsible for 22% of the world's greenhouse gas emissions.[55] The biggest contributor to this number at 43% of carbon emissions is the operation of buildings.[56] That percentage is simply for operation, not the construction or manufacturing of materials and products. It takes a sizable amount of energy to construct a building. The construction of a 50,000 square foot commercial building requires the same amount of energy needed to drive a car for 20,000 miles a year for 730 years.[57] That is a depressing reality for a world that is choking on its own smog from all the green house gas emissions it creates. The good news is that the public has realized these facts and that the damage to the environment affects them personally. It affects their lungs, their children's future, and their wallets as the price of dependence on fossil fuels increase. The public is now willing to make the changes that are necessary and they are looking for ways to make a difference. The green building movement has the right idea to save the planet at the source, the built environment. People are buying into the green building movement because it is affecting them personally and changing their environment for the better.

The preservation movement has a golden opportunity to re-establish itself through the benefits of the already well accepted green building movement. Preservationists just need to

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[55] "Sustainability Program, Reuse, Reinvest, Retrofit, Respect." National Trust for Historic Preservation. Mar. 2009. PDF. 12 Jun. 2012 <http://www.preservationnation.org/who-we-are/press-center/fact-sheets-and-reports/ONE-PAGER-March-2009.pdf>.

[56] Ibid.
[57] Ibid.

secure a position in the movement by becoming advocates for green building and sustainable design. They need to position themselves at the head of the discussion instead of at the conflicting end. A partnership with LEED is the key to making the preservation movement a player in the green building movement. The preservation movement comes into the partnership with age and wisdom. The movement has lasted for over two centuries in America and still continues to hold a place today in the nation's built environment. The green building movement brings energy and modern technology to the table with the research and knowledge of how to control market transformation. Together the two could change the built environment to a complete sustainable community.

The key that will cause preservation to have a prominent place in the green building movement is embodied energy. Embodied energy is the culmination of all the energy that is required to extract, manufacture, deliver, and install materials for construction.[58] Existing structures already contain the energy that was expended in their construction. The practice of demolishing an existing building to replace with a new structure is a waste of embodied energy and uses unnecessary energy. New and modern uses and needs for buildings are continuously developing. It is natural to expect new development in an expanding environment, but if the practice of rehabilitation is utilized appropriately it can be used to restore existing buildings to meet modern needs. The act of rehabilitation preserves embodied energy while meeting real estate needs and preserving open space.[59]

Preservationists teaming up with the green building movement can help bring the movement to true sustainability. LEED promotes environmental practices and human health,

[58] Ibid.
[59] "Green Building Guidelines for the Rehabilitation of Historic and Non-Historic Buildings." *The Presidio Trust*. 2002. PDF.

while preservation focuses on the social and cultural aspects of design, and both campaign for the economical benefits they each offer. Still, both methods are missing the mark until they redirect to true sustainability, known today as the Triple Bottom Line, which is a combination of all three focuses of design: environmental, economical, and social-cultural.[60]

The USGBC has set the perfect stage for the partnership between the green building movement and the historic preservation movement with their foundation of integrated design. LEED promotes and requires each project to be considered as a whole by having every individual, who would normally be involved only during their specific task, to be included from the design phase at the start of each project. Integrative design creates a synergy by allowing views from different backgrounds and training to culminate at once. The combined effort opens the door for creative design and innovative opportunities. It also cuts down on costs of design and construction by allowing all team members to be coordinated. The process also helps to indentify environmental opportunities and to set design goals while receiving everyone's input to design the best plan on how to reach the goals.[61] The practice of integrative design has opened projects pursuing LEED certification to receive advice and direction from other view points and disciplines. The public comment sessions that LEED offers has also opened doors for review from any of the public who have an opinion about the system and the changes that the USGBC makes. This has set the stage for preservationists to come in on the ground level and provide their expertise on how to develop a truly sustainable built environment.

The USGBC's values and market transformation is leading development in the built environment in the United States. Many local, state, and federal agencies are starting to require

[60] Holmes

[61] "Green Building Guidelines," *The Presidio*. 2002.

new construction and major renovation projects to obtain specific levels of certification in the LEED rating system.[62] LEED's influence and marketability is the promotion that preservation needs to further its stance on sustainability in the 21st century. If preservationists collaborate with LEED to promote rehabilitation as the number one sustainable development tool, the promotion will give preservation a continuous platform in the green building movement, but it will require the preservation community to be as dynamic as the green building world is today by being open to change and collaboration.

[62] Farneth, 2007.

CHAPTER 4

THE SECRETARY OF THE INTERIOR'S STANDARDS VS. LEED

The Issues in Preservation that Hinder Green Building

1. Need for redirection of focus to include sustainable design in preservation

The practice of preservation focuses on aesthetics, architectural character and providing individuals with a sense of place. Preservation has been practicing sustainability for over two centuries, but it is not the movement's main focus. The Secretary of the Interior's Standards has included a paragraph in the mandatory code section that encourages sustainable design, as well as advertised the practice of sustainability as a benefit of preservation.[63] The encouragement to rehabilitate structures, recycle materials, and save the embodied energy of an existing structure is far more effective at reducing green house emissions than a brand new energy efficient building that will take 35 – 50 years to regain the energy it used from replacing the old one.[64]

The preservation movement has been promoting for the last decade that they have always been Green, a campaign based on truth, but one that has was not gained the attention that the green building movement has received. The promotion appeared to gather mostly the support of current preservationists. Sustainability was never preservation's leading campaign slogan, and there will need to be a redirection in preservation to gain the support of current "green" enthusiasts. It will be difficult for preservationists to market the sustainability side effect of preservation as the number one choice in green building on their own. Up until recently, a theme in preservation oriented articles was to reprimand LEED for their promotion of new construction

[63] "Introduction: Choosing."

[64] "Sustainability Program," 2009.

over preservation. Preservationists often promoted their practice as sustainable, but at the expense of LEED. The right move would be to join with the green building movement and give it the credit of market research and of presenting its cause to the public in a way that caught attention.[65]

2. Need to Contribute to the Reduction of Greenhouse Gas Emissions

The highest concern in the green building movement currently is the effect of greenhouse gas emissions and what the world is doing to reverse the situation. Preservation usually defines itself by the platform of character defining features. This platform is essential in saving America's heritage and creating communities that provide a sense of place, but the thought process can be overlooked or considered unnecessary in the current environment where the focus is sustainable design. This promotion does not mix well with LEED's sustainability stance on saving the environment. The separate promotions established by each movement appear to put developers in the position that they must choose one or the other.

3. Conflicting Issue of Aesthetics Versus Environmental Design

The main focus of the sustainability movement currently is the practice of protecting the environment and health of the individuals within the built environment, while the strictly aesthetic approach that the Secretary of the Interior's Standards promotes has been a contentious point in the sustainable development world. Conflicts have arisen when historic sites try to adapt to energy efficient standards to gain LEED accreditation but must follow the Standards for the process. The difficulty increases with the fact that the Secretary of the Interior's Standards are required regulation in preservation practices, whereas LEED is a voluntary rating that can be pursued for energy efficiency compliance and marketing value. The 1995 Standards recognize

[65] Barcik, Mike. "Green . . . Before it was Cool." *Georgia Trust for Historic Preservation Rambler*. 37.3 (Summer 2010). 8-11.

energy efficiency as a code but do not include ways to integrate energy efficiency with the standards that must be followed. This leaves a gap between the two regulations and causes developers and designers to figure out a bridge.[66]

A key issue that historic preservationists defend against in green design is aesthetics. For example, a new material for roof design in green building is the installation of a green roof and solar panels. The 1995 Standards do not encourage these types of materials because they do not represent historic time periods. Moreover, the most appropriate location of solar panels for sun collection can be turned down by historic preservation commissions for the new and modern aesthetic they create for historic sites. Green roofs are encouraged in sustainable development for their environmental and economic benefits. The main benefit of a green roof is the reduced heat island effect and storm water management through evaporation. The Life Cycle Analysis of a vegetated roof is also a main benefit because the material outlasts conventional building materials. The roofing material also acts as a prime insulator to reduce cooling and heating costs, reducing green house omissions and providing another cost benefit.[67] The current Standards do not dismiss the use of green roofs, but the material can be denied for installation on the premise that it is not a historically appropriate roofing material.[68]

Green roofs and solar panels have been approved on historic projects. A good example is the green roof installed on the over 100 year old building of Chicago's City Hall. The roof has been deemed one of the most impressive green roofs in the country with its circular plant design and layout, but the building had an ideal setup for the installation. It was over thrity-three stories

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[66] Weeks, Kay D., & Anne E. Grimmer. "The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings." *Department of the Interior, National Park Service.* Washington, D.C. 1995.

[67] "Heat Island Effect." *United States Environmental Protection Agency*. Web. 12 Jun. 2012 <http://www.epa.gov/hiri/mitigation/greenroofs.htm>.

[68] "The Sustainable," *The National Trust*.

tall and had a flat roof. The installation of the green roof did not interfere with any visual aesthetics or roof design. That type of structure is not always the case and can cause the installation of modern roofing materials to be rejected by interpretation of the Secretary of the Interior's Standards. The Standards do not refuse the use of green roofs or solar panels, but the regulations do require that individuals account for aesthetics. The prime location for solar panel installation may compromise the integrity of a historic structure and require developers and designers to come with different locations or having to scratch the installation all together. This decision has been interpreted as choosing aesthetics over energy efficiency.[69]

4. Funding Through Tax Incentives

Another issue that has caused developers conflict between preservation and sustainability is funding. Incentives to preserve through tax credits have sometimes encouraged developers to choose preservation over gaining LEED certification. Tax credits established through the Federal government encourage preservation and are regulated by the Secretary of the Interior's Standards. This incentive gives preservation an economic benefit, sometimes trumping sustainable design, an undesirable outcome. Many developers focus on rehabilitation because they rely on the tax incentives to fund the development. If a disagreement between LEED and the Standard's arises, these developers are willing to scrap environmental solutions for the tax incentives. The preservation movement needs to encourage the application of LEED guidelines in an effort to avoid conflicts, a compromise even more important because tax incentives have now been developed for structures that reach a certain level of efficiency and more governmentally funded projects are being held to sustainabilty standards. This is pushing LEED

[69] "Chicago's Green Rooftops." *City of Chicago, Department of Environment*. Web. 23 Jun. 2012 <http://www.cityofchicago.org/dam/city/depts/doe/general/GreenBldsRoofsHomes/GuidetoRooftopGardening_v2.pdf>.

towards to become regulation code and not just a recommendation. If preservation does not take advantage of adapting to LEED standards now, in the future green building may trump preservation.[70]

5. Difference Between Regulations

The main hindrance between the Secretary of the Interior's Standards and LEED is the different structure of regulation. The two regulations are formatted differently, with the Standards being guidelines to be used with interpretation while the LEED rating system is performance based with a reward system through credits. Also given their age, the Standards appear to be outdated, while LEED regulations are constantly analyzed as market research is coordinated to determine when new updates are needed.[71] The preservation movement is still regulated by Standards last updated in 1995, almost two decades ago. The Standards were designed to be flexible, but they were also designed to be updated to maintain a current application in the built environment. Established processes must grow and adapt to new information and concepts as they are readily available. It is only responsible for the preservation movement to be willing to adapt their process and update their standards to the current built environment that they want to influence. [72]

The Steps that the National Trust has Taken to Adapt to the Green Building Movement

The National Trust has realized their need to redirect and promote sustainable design and they have made efforts to adjust to the new campaign.

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[70] Farneth, 2007.

[71] "LEED," 2012.

[72] Weeks, 1991.

1. Advocacy: The Trust has started to direct preservation from an educational position to an advocacy position for sustainability. Preservation needed to take a greater role in the green building movement by helping make the decisions, instead of commenting on or refuting the ones that were made.
    a. At the beginning of the 21st century, preservation efforts started to reorganize and begin a campaign for preservation as sustainable design. Several organizations were holding meetings and conferences to try to define preservation's role in the green building movement.
    b. In 2005 the National Trust sought to combine the efforts and formed a coalition with three other organizations to promote historic preservation as an inherently sustainable building practice. The group named themselves the Sustainable Preservation Coalition and consisted of the American Institute for Architects (AIA), the Association for Preservation Technology International (APT), and the National Park Service (NPS).[73]
    c. In March of 2006, the coalition met the U.S. Green Building Council to begin discussing ways to reflect the sustainable principles of preservation in the LEED rating system. The partnership inevitably turned out to be preservation's way into the green building market. USGBC agreed the current rating system lacked important aspects such as historic preservation, smart growth, and cultural value. USGBC welcomed the coalition's help and suggestions.
    d. Together the team is devising preservation metrics for use in revisions of LEED. The National Trust is leading the coalition through the process as the other members collaborate to define the parameters for further research. The metrics are

[73] Campagna, "The Impact," 2008.

still developing today but some of the adjustments can be seen in LEED 2009 and even more will be published in LEED v4.

e. The coalition has grown to include the National Council of State Historic Preservation Offices (NCSHPO) and General Services Administration (GSA), and they also plan to create an advisory board consisting of members from leading academic institutions who are active in this particular field of study.

The main purpose of the coalition remains to promote preservation as a sustainable design practice through research, education, and outreach. The key to further their purpose is the partnership with USGBC by which they will strengthen the inclusion and application of historic preservation into the LEED rating systems. The preservation movement has grown to represent all elements of sustainability: environment, equity and economics. Historic Preservation is the one of the most sustainable building practices and with the National Trust now at the head of the discussion the practice can now be rightfully recognized.[74]

2. Promotion: In 2007 the National Trust took the purpose of the coalition a step further with a personal promotion of green design.

    a. The Trust established their own sustainability program, an effort to focus the nation's attention on the importance of reusing existing buildings and investing in older communities, as a key component in battling climate change.

The program represents existing structures as the winning green development option over new construction. This time the campaign follows LEED's influence by integrating green design technologies and ideas into their program instead of simply promoting their process alone as

[74] "NTHP Sustainable Preservation Coalition Meeting with USGBC." *The American Institute of Architects*. Continuing Education System. 2006. Web. 12 Jun. 2012 <http://www.aia.org/education/ces/AIAS076540>.

green design. The campaign also expands the usual preservation promotion of social and economical value to include the environmental benefits.

The program is made up of four guiding principles. (1) Reuse: the continued use of existing building stock reduces the amount of waste deposited in landfills. The embodied energy saved in the reuse of a structure lessens the waste of natural resources and unnecessary demand for energy. (2) Reinvest: in older communities promotes smart growth and saves the embodied energy of infrastructure, such as roads, water and sewer lines. Using historic communities also taps into pedestrian accessibility with factors such as density, walkability, central location, and connection to mass transit. (3) Retrofit: renovation of historic buildings comes with historic character that is built around energy efficient features because of the age in which they were developed. (4) Respect for historic structures, the foundation that is the basis for the existence of the National Trust.[75]

3. The National Trust's Sustainability Program launched the Preservation Green Lab in 2009, located in Seattle, Washington.

The lab's purpose is to advance research that explores the value that older buildings bring to their communities and creates policy solutions that make it easier to reuse and green older and historic buildings. The Green Lab promotes reuse of existing buildings as a sustainable development tool to minimize carbon impacts from the built environment and conserve character-rich and human-scale communities that attract people to more sustainable, urban living patterns.

Most green building retrofitting is currently focused on large scale projects, whereas 95% of the United States existing commercial buildings are less than 50,000 square feet. The Preservation Green Lab has developed the Older Building Performance Program to encourage

[75] Campagna, "The Impact," 2008.

the reuse of older buildings of all sizes. The main focus of the program is smaller commercial, mixed-use, and multifamily buildings that are currently overlooked by the existing market. The program is made up of four areas of innovation: District Energy – to create easy transitions for older neighborhoods to cleaner sources of energy; Valuing Building Reuse – to promote the value over reusing an existing structure versus new construction; Deep Energy Retrofits – web-based tool to help commercial structures achieve energy savings of 50% or higher; and Outcome Based Energy Code – alternate, more flexible new code framework to for greening older buildings.[76]

The Trust's Sustainability Program has established itself at all levels to build partnerships to advance research. The program is developing model policies to encourage preservation as sustainable development through planning tools such as energy and zoning codes. It is also creating model language for comprehensive plans and climate action plans. The program is marketing preservation through federal policy as a way to meet carbon dioxide reduction targets and provide new green jobs. Federal tax credits for rehabilitation will also be strengthened through this program and expanded to fund green retrofits of older buildings. The Trust also confirms a commitment to its members with the tools they need to incorporate green practices into their historic homes and buildings.[77]

[76] "About the Preservation Green Lab." *National Trust for Historic Preservation*. Web. 12 Jun. 2012 <http://www.preservationnation.org/information-center/sustainable-communities/sustainability/green-lab/about.html>.

[77] "Sustainability Program," 2009.

Continued Efforts through the Preservation Movement to Include Green Building Standards

1. The Presidio Trust's Green Building Guidelines

The development of a code that regulates preservation through green building may be just now coming into practice, but it is not a completely new development. In 1999 San Francisco's Presidio Trust developed Green Building Guidelines to rehabilitate its park that was designated a National Historic Landmark in 1962. The Presidio Trust Management Plan of 2002 states, "The Presidio Trust will apply sustainable design practices and promote energy and water conservation, waste reduction and recycling, and clean technologies." The park is made up of almost 800 buildings that the Presidio Trust intends to rehabilitate and reuse, more than half of which are historic. At this time green building was typically applied to new construction, but with the state of California encouraging environmental efficiency and the Trust founded on historic preservation principles, they combined the two practices to prove that they are natural partners.

The Presidio Trust did not let the lack of regulations intimidate them; it simply created its own guidelines. The Presidio Trust Green Building Guidelines for Rehabilitation of Historic and Non-Historic Buildings is based on the LEED rating system. The Guidelines are divided into sections created from LEED categories: Planning Sustainable Sites, Improving Energy Efficiency, Conserving Materials and Resources, Enhancing Indoor Environmental Quality, and Safeguarding & Conserving Water. Each category has its own requirements, submittals, and opportunities, just as LEED is separated into prerequisites and credits with submittals for required performance evaluation. The main difference from LEED is that these guidelines include consideration for the rehabilitation of historic structures. The key difference from the Secretary of the Interior's Standards and Presidio's own guidelines is the specific detail for each

requirement, submittal, and opportunity of the performance that is expected and how to achieve the required level of performance. The guidelines were applied to all building within the park, historic or not, to create a regulated and successful rehabilitation.[78]

In 2010 the Presidio Trust adopted LEED as a standard for all of its major projects. Since then there has been a total of seven LEED projects certified within the park, some of them historic. Several more structures are pending certification as the Presidio Trust continues to use their successful guidelines and promote preservation as a sustainable development tool.[79]

2. Pocantico Proclamation

Another major move in the right direction for 21st century preservation is the Pocantico Proclamation on Sustainability and Preservation, a collaboration of about thirty preservationists, architects, environmentalists, and green-building professionals who met at the historic Rockefeller estate at Pocantico Hills, New York in 2009. The meeting outlined several topics and principles that are intended to create ongoing discussion for the revising of the LEED guidelines and the Secretary's Standards. The intent was to bring preservation policy into the 21st century and to re-evaluate the tools and policies they are using to meet modern needs. An idea was even discussed to create a whole new rating system that would be governed by the Standards and resemble the LEED system: such as Preservation Silver, Preservation Gold, and Preservation Platinum.[80]

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[78] "Green Building Guidelines," *The Presidio*. 2002.

[79] "Green Building' at the Presidio." *The Presidio Trust*. Web. 12 Jun. <http://www.presidio.gov/about/Pages/green-building-LEED.aspx>.

[80] O'Connell, Kim A. "New Principles for Old Buildings, Advocates for Green Restoration Consider How to Change Historic Preservation Guidelines." Eco-Structure Magazine. 31 Jul. 2009. Web. 18 Oct. 2011 <http://www.eco-structure.com/historic-preservation/new-principles-for-old-buildings.aspx>.

The Proclamation focused on those who will experience the buildings and how to improve their lives. The conversation was based on three main imperatives: climate change and how to reverse harmful greenhouse emissions; the economic well being of those inhabiting the structures, and how the nation is based on unsustainable utilization and over dependence on limited resources; and equity based on the uneven levels of distribution and resource consumption. The product from Pocantico was a plan to create a more stable environment through sustainable practices and preservation advocacy.[81]

[81] Friends of the National Center for Preservation Technology and Training. "Pocantico Proclamation on Sustainability and Historic Preservation." National Trust for Historic Preservation. Web. 20 October 2011 <http://www.preservationnation.org/issues/sustainability/additional-resources/Pocantico-Proclamation.pdf>.

Table 4.2: The Pocantico Principles on Sustainability and Historic Preservation[82]

1. **FOSTER** a Culture of Reuse: Maximizing the life cycle of all resources through conservation is a fundamental condition of sustainability. The most sustainable building, community or landscape is often the one that already exists.
2. **REINVEST** at a Community Scale: We must consider the larger context of the built environment: our communities. Reinvestment in existing, more sustainable neighborhoods – especially our older and historic ones – saves resources and promotes socially, culturally, and economically rich communities.
3. **VALUE** Heritage: The design of older buildings, landscapes, and communities should inform future building practices.
4. **CAPITALIZE** on the Potential of the Green Economy: Preservation economics provide a powerful model for shifting away from a consumption-based and energy-inefficient economy.
5. **REALIGN** Historic Preservation Policies with Sustainability: Historic preservation must contribute to the transformation of communities and the establishment of a sustainable, equitable, and verdant world by re-evaluating historic preservation practices and policies, and making changes where appropriate.

The Pocantico Proclamation has been a turning point for preservation policy and will continue to help efforts grow in the right direction as long as advocates are willing to take advantage of the sustainable movement and the platform it offers. An advocacy plan will help continue the direction of the proclamation. The plan hopes to demonstrate that historic

[82] Ibid.

preservation offers a model for sustainability and challenge the preservation movement to engage more fully with sustainable building practices.[83]

3. The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings, (See Reference 84 below for complete document)

The most recent advancement from preservation authorities towards green design is the revised version of the Secretary of the Interior's Standards that includes illustrated guidelines on sustainability. The document was published by Technical Preservation Services on Earth Day, April 22, 2011. These guidelines replace the chapter on "Energy Conservation" from the last update of the guidelines in 1995. The format remains the same, with the standards listed first and suggested guidelines following. These are still presented in the "recommended" and "not recommended" format but they do display more illustrations than any previous edition. The main difference in this revision is the guidance on how to make historic buildings more sustainable while preserving their historic character.

The language of the new Standards encourages green design and suggests that all rehabilitations should take the method into consideration by saying, "good preservation practice is often synonymous with sustainability."[84] The first step is to assess the existing energy saving features of the building before adding new ones. The design, materials, type of construction, size,

[83] Friends of the National Center for Preservation Technology and Training. "Actions to further Pocantico Principles." National Trust for Historic Preservation. Web. 20 October 2011 <http://www.preservationnation.org/issues/sustainability/additional-resources/Actions-to the-Pocantico-Proclamation.pdf>.

[84] Grimmer, Anne E., Jo Ellen Hensley, Liz Petrella, & Audrey T. Tepper. "The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings." *U.S. Department of the Interior, National Park Service, Technical Preservation Services*. Washington, D.C. PDF <http://www.nps.gov/tps/standards/rehabilitation/sustainability-guidelines.pdf>.

shape, site orientation, surrounding landscape and climate all play a role in how buildings perform. Another good preservation practice is not just restoring how a building, in terms of how it looked, but how it ran as well. Buildings should be updated as new technology and processes exist to help each structure run more efficiently. The new guidelines cover everything from planning, energy efficiency for windows, HVAC systems, weatherization and insulation, as well as new approaches such as the addition of solar panels to roofs, wind power systems, cool roofs, and green roofs. As always, the guidelines continually encourage the practice of overall maintenance.[85]

The sustainability guidelines are still a new document so their effect is still unclear, but they step in the right direction in terms of language and support to the green building movement. The document still has some questions to face. Are the Standards still the appropriate document format to continue to govern preservation, or should the movement follow the local and state efforts such as Presidio and Pocantico in creating a new format? Also, why is the National Trust developing a committee to transform LEED's guidelines to meet their guiding regulation, the Secretary of the Interior's Standards, but not branching out to create a multi-disciplinary team to revise their own? The preservation movement is making great strides to create a stance for itself in the 21st century, but it needs to adapt and follow successful examples if it wants to grow and have a greater influence on the built environment. The movement has always had a prominent place in the built environment but it will only grow as fast as it adapts to change around it.

[85] "NPS Releases New Guidelines on Sustainability and Rehabilitation for Historic Buildings." *Riverside Avondale Preservation*. 9 May 2011. Web 12 Jun. 2012 <http://riverside-avondale.blogspot.com/2011/05/nps-releases-new-guidelines-on.html>.

CHAPTER 5

LEED VS. THE SECRETARY OF THE INTERIOR'S STANDARDS

The Issues in Green Building That Hinder Preservation

> "The danger is that the elegance of the LEED scorecard, which I believe accounts for its incredible brand identity, can be misconstrued as a simple checklist, encouraging simplistic analysis of the appropriate LEED credits to address. Face it: we have all been to the meetings where the discussion devolves into a point-buying exercise. What is the highest rating we can get for the least extra construction cost?"
>
> – Tom Paladino[86]

LEED being seen as a game has been one of its hot success points. It was created as a reward system for those who made environmentally responsible choices for their built environment. Just like all good intentions, the LEED system was not immune to abuse, especially in its novice pilot days. The "game" quickly turned into how many points a project can receive for the least amount of money, a kind of thinking that misses the point. LEED is designed with optional credits so each project can choose which points will benefit them the most. LEED requires a new consumer mindset. The system is not built on what is the best benefit for the least amount of money up front. The system is built on return on investment. Many of the credits in the LEED rating system require a higher upfront cost with either quicker return periods, or lower maintenance bills, to see a more profitable choice in the long run. The USGBC has made revisions to the point scale by weighting credits higher that will have a more positive

[86] Paladino, Tom. "Transforming Green Building Trends for Success." *Environmental Design + Construction*. (Nov/ Dec 2003). 28-30.

effect on the environment (as opposed, for example to receive the one point credit for having a LEED accredited professional on your team). Education has also been a big focus of USGBC to let consumers know what products are out there and what decisions will help them profit the most. The rating system can still be abused, but it will be at the expense of those who do not know how to get the most out of the system.

1. LEED has been seen as an issue in preservation because its influence it encourages new construction over restoration.

LEED was created mainly for new construction and major renovation, but it advocates smart environmental decisions in all construction. The program also calls for builders to protect open space. The first credit in Sustainable Sites, Site Selection, encourages the use of a site that has been previously developed. It also lays out strict restrictions on the types of undeveloped land that are not considered sustainable for construction. Another credit in this section allots points for the development of a brown field site. The credit is achieved by using a site that is deemed contaminated and renovating the space to bring it back up to code. This credit appears to encourage rehabilitation as it can be achieved by renovating the existing structures on the site, but it is still given to developers who level the site for new development. The credit supports the environmental scope of reducing blight and maintaining green fields, but there should be more points added for this credit for projects that retain structures and preserve embodied energy.[87]

This type of thinking encourages sustainable new construction, but it does not advocate an overall sustainable built environment. Energy and resources are wasted with each replacement of existing structures. If LEED wants to advocate for the most sustainable development, it needs to embrace a preservation philosophy. Historic features and character are not usually at the top of the list when green design is being initiated. LEED does reward building reuse, but unfortunately

[87] "USGBC," 2011.

LEED does not allocate more points for rehabilitating, or using a portion of, a historic building than any other structure. They fail to distinguish whether a building is five years old or over a century old. A point adjustment could easily be made in the system since older buildings are more durable in quality and gain more credits towards the life-cycle analysis criteria. Instead LEED is weighted towards systems that have life expectancy of ten – fifteen years, such as lighting, electricity, and mechanical.[88]

2. A major controversy that has arisen between green building and preservation is the request to replace existing windows with newer "more energy efficient" ones.

This request results in the loss of historic character and fabric of a building and in most cases is not approved by the Secretary of the Interior's Standards, resulting in a loss of National Register recognition and tax credit funding. Manufacturers advertise their new window technologies as the answer to excessive heating and cooling bills due to loss of energy through leaks in a building. The truth is buildings lose energy through many conduits: attics, basements, and cracks in walls. Windows are only responsible for 10% of the energy lost in a typical home. That 10% is usually found to be a culprit of improper maintenance and not an inefficient window. [89]

When the embodied energy of an existing window, that is being replaced, is taken into account the numbers regarding energy efficiency do not add up. Most historic windows are made from wood and have been proven to last over a hundred years. Modern manufactured windows are made from vinyl, which is a petroleum-based non-renewable substance, and are marketed with manufacture warranties ranging from two to twenty years. According to Keith Haberern, an

[88] Farneth, 2007.

[89] Wolff , Sarah Donahue. "Historic Windows & Energy Efficiency." *Preservation North Carolina*. 2007. Web 13 May 2012 <http://www.presnc.org/Features/Historic-Windows-Energy-Efficiency>.

engineer in New Jersey, the payback period to recover the financial investment in a new window is 41.5 years. Assuming it reaches its full life of twenty years, building owners will have to replace their new windows before they have paid for themselves. With technical developments, there are plenty of ways to update existing wooden windows without replacing them. Simple maintenance is the answer. Each window needs to be sealed and caulked properly. If the simple maintenance is not enough to overcome past neglect, adding storm windows is an energy efficient way to maintain the character of any building. For both appearance and for the energy/ cost savings, the most sustainable decision is to repair and maintain the existing fabric of windows and not replace with vinyl substitutes.[90]

3. It has been determined that the missing link in preservation is the environmental aspects while LEED is missing a social cultural aspect; these aspects are necessary for both regulations to reach full sustainability.

Social sustainability is harder to measure than the energy performance of a building, but it is still a key factor in developing a built environment that is sustainable for all areas of life. The partnership that USGBC has created with the National Trust will hopefully add the social and cultural element to LEED by adding preservation philosophy into the green building mix. Preservation provides individuals with a sense of place and well being that helps to shape individual and collective identities. Preservation also has a focus on quality of life. Crediting for restoration of historic communities means that LEED will be encouraging traditional community style living with walkability, access to amenities and mass transit, and green space. The

[90] Ibid.

restoration of historic communities will also increase social engagement and civic interaction, important considerations for traditional community style living.[91]

To create a fully sustainable mindset, the green building movement will need to include the lessons that traditional building practices utilized to shape the built environment and to respect structures that have lasted through time. The new mix will also have to include the impact of their projects on cultural value. Both movements are appealing to the public. In order to reach as many individuals as possible, the preservation movement will have to redirect itself to include the health and future of the environment, while the green building movement will have to redirect itself to include the importance of the past and heritage as they contribute to health of communities.[92]

The Steps that the Green Building Movement Has Taken to Adapt to the Preservation Movement

To give LEED some credit, the system has come a long way since the first version that awarded the same credit for re-using an existing building and putting in a bike rack.

1. The newest edition of LEED v4 touches on the issue of historic resources by assigning different weights to various credits according to life-cycle assessment criteria.
2. It also offers an alternative compliance path to encourage rehabilitation of an existing building based on life-cycle and durability.

The USGBC recognizes the need for an improved performance-based system that will focus more on the time of occupancy and performance of the building. The main problem for

[91] Frey, Patrice. "A DRAFT White Paper presented in advance of the Sustainable Preservation Research Retreat." The National Trust for Historic Preservation. 15 Oct. 2007. PDF. <http://www.preservationnation.org/information-center/sustainable-communities/sustainability/additional-resources/DiscussionDraft_10_15.pdf>.

[92] Campagna, "How Changes," 2008.

bringing preservation into LEED practices has been the lack of input from preservation professionals. However, the USGBC has realized preservation's importance and is partnering with the National Trust to adjust the system to focus on less quantifiable aspects of buildings and more on humans. This expansion will help to better address social sustainability, health and comfort, and social capital. This shows that LEED is heading in the right direction.[93]

3. LEED was designed to guide new construction but they have developed new rating systems through a consensus-based process.

LEED-EB (Existing Buildings) exists, but is focused on the maintenance and operations, not the preservation, of structures. However, the Existing Buildings rating system opens the conversation to other types of construction besides new development. Most of the preservation projects are guided by LEED-NC (New Construction and Major Renovation). When a building is required to update its mechanical systems it is considered a major renovation and can be judged in the same category as new construction. This puts a lot of pressure on a historic building, but thanks to the changes that LEED is making the pressure will be reduced.

4. USGBC also presented a new rating system that displayed the way LEED had grown – LEED –ND (Neighborhood Development).

Neighborhood Development expands beyond the rating of a single building to an entire development by incorporating principles of smart growth and new urbanism. USGBC had created another partnership and called on professionals outside their realm of expertise to create the new ideals for this system. This was the result of a collaboration between the National Resources Defense Council (NRDC) and the Congress for New Urbanism (CNU). USGBC might have the limelight in the development world, but they openly admit to not being the answer to all the problems that challenge our environment. More importantly, they are open to

[93] Campagna, "The Impact," 2008.

partnerships and willing to use their platform in marketing to create a voice for those who do have answers that will lead to a more sustainable environment.

The leadership that USGBC is displaying in the market, and with creating partnerships, will be a promising tool in the future of preservation. The specific partnership of USGBC and the Sustainable Preservation Coalition will open multiple doors for the green building movement and for preservation. The key will be the metrics that the coalition is developing to rate preservation on an individual building-by-building basis. The metrics will also evaluate sites within a larger context such as its contribution to livable sustainable communities, including the cultural value that each historic resource brings.[94]

5. The partnership of the Sustainable Preservation Coalition helped LEED make fundamental changes for their LEED v4 revision.

The most prominent of those revisions for preservation is the Alternative Compliance Path. The path is developed to specifically benefit existing buildings during certification, and is regulated by a new criterion of Life Cycle Analysis. There are many different approaches to calculating LCA, but LEED is working on developing a calculator to regulate the credit. This will give greater weight to historic buildings as it recognizes embodied energy and durability through the Materials and Resources credits. As with all other LEED developments, the new process will continue to be refined as it is tested in the field.[95]

LEED's testing process has been judged for the flaws in their system each time they publish a new idea, credit, or rating system, but they remain open to suggestions and are constantly listening to feedback and analyzing their products. One of their main tools to test their ideas is the LEED Pilot Credit Library. This is a resource that contains potential regulations that

[94] "NTHP," 2006.

[95] Campagna, "The Impact," 2008.

being considered for adoption as actual credits. Each credit in the library contains all the information as it would in an actual rating system: Intent, Requirements, and Options. This allows developers to try the credits and see what would benefit them or what would be unreasonable to apply. This process creates a proactive approach where LEED can get application feedback before they publish an actual credit.

6. An exciting new credit for preservation that is included in the LEED Pilot Library right now is Pilot Credit 19: Whole Building Reuse.

The credit is pilot testing for LEED project types: New Construction, Schools, New Construction for Retail, and Core and Shell. The intent of the credit is "To respect local landmarks and conserve material and cultural resources by encouraging the preservation and adaptive use of underused buildings." The requirements of this credit are to maintain the existing building structure, envelope, and existing interior nonstructural elements, to a sum of at least 75% of the total building surface. These qualifications specifically include everything from the structural floor to ceiling systems. However, window assemblies and non-structural roofing members are excluded from this requirement. The credit also excludes any structurally unsound portions of the building or any hazardous materials, but only 20% of the building's total square footage can be excluded due to deterioration or damage.

The credit creates two options to receive the points:

Option 1: Historic Building Reuse, requires that the structure be listed on the National Register of Historic Places. The option requires that no historic building, or any portion of the structure, is allowed to be demolished. It goes on to support local historic commissions by requiring that buildings listed locally must receive approval for construction from the local historic preservation review board and the State Historic Preservation Office. It also requires that

any rehabilitation of a historic building must be done in accordance with local or federal standards by either obtaining a Certificate of Appropriateness and/ or following the Secretary of the Interior's Standards if the project is regulated by federal requirements. Lastly, it states if the project does not have to adhere to federal or local review, then the project must include a preservation professional on the team to confirm that it follows the Standards appropriately.

Option 2: Renovation of Abandoned or Blighted Buildings. This option has less strict qualifications by only requiring the renovation of a building that has been abandoned and bring it to a state of productive occupancy. The points that will be allotted for each of these options have not yet been published, but it would be wise for LEED to encourage preservation by weighting the first option more than Option 2. Many of their credits allot double the points for those who choose the option that is the more environmentally friendly path. In this case, a social and cultural aspect could be added to allot more points for the sustainable choice or preserving a sense of place.[96]

In any event, it is obvious that the USGBC is trying to give preservation a voice, and now all preservationists need to do is to make sure they are open to the change, support green building in all of its forms, as it is supporting their efforts, and most of all be present in the decision making process. LEED is providing a platform for preservation in the green building movement and preservationists need to take full advantage.

[96] "LEED Pilot Credt Library, Pilot Credit 19: Whole Building Re-use." *USGBC*. 2011. PDF. 28 May 2012 <http://www.usgbc.org/ShowFile.aspx?DocumentID=8194>.

CHAPTER 6

CASE STUDIES OF GREEN PRESERVATION SUCCESSES

Case Study 1: The Robert H. Smith Visitor Education Center (VEC)

at President Lincoln's Cottage, Washington, D.C.

Figure 6.1: Visitor Education Center at President Lincoln's Cottage[97]

Name: The Robert H. Smith Visitor Education Center (VEC) at President Lincoln's Cottage

Built: 1905

Placed on National Register: 1974

LEED Certification: New Construction & Major Renovation, LEED Gold

[97] "U.S. Soldiers' and Airmen's Home (USSAH), Washington, D.C." U.S. *Department of Defense*. Armed Forces Retirement Home (AFRH). Public Affairs Office, Washington, D.C. Web. 16 Jun. 2012 <http://www.defense.gov/specials/heroes/history1.html>.

The Robert H. Smith Visitor Education Center is a rehabilitated building located on a 251 acre site in Washington, D.C. made famous by President Lincoln's Cottage and known today as the United States Soldiers' and Airmen's Home for retired veterans. The home was once built as an asylum for the old and disabled veterans and has now been renovated to a modern retirement home with a self sufficient community complete with a fitness center, golf, hospital, specialty stores, bowling alley, and transportation to local attractions. The Soldier's Home was designated as a National Historic Landmark on November 7, 1973 and listed on the National Register of Historic places on February 11, 1974. By 2000 the site had been placed on the National Trust for Historic Preservation's 11 Most Endangered list, when President Bill Clinton proclaimed it, and 2.3 surrounding acres, a National Monument. With the new designation and in efforts to reclaim the building from being endangered The National Trust for Historic Preservation rehabilitated the main structures on the site with funding from United Technologies Corporation, a Save America's Treasures grant, and other donations.[98]

The main building on the site is President Lincoln's Cottage which was originally named Anderson Cottage when it was built in 1842 as the home for George W. Riggs. The cottage was used by Abraham Lincoln and his family during his presidency and as a summer retreat for three other presidents, Chester Arthur, Rutherford B. Hayes, and James Buchanan. The site is located on a hillside three miles from the White House in Washington and was a fine escape from the political limelight. The thirty-four room Gothic Revival house underwent a seven year restoration by the National Trust. The Trust's Preservation Sustainability Coalition decided to

[98] Ibid.,
O'Connell, Kim A. "New Directions for the Old Retreat, With its President Lincoln's Cottage project, the National Trust puts environmental principles to work." *Preservation, The Magazine of the National Trust*. (Jan/ Feb 2008). Web. 16 Jun. 2012 <http://www.preservationnation.org/magazine/2008/january-february/lincoln-cottage.html>.

use the site as a case study for green preservation. They used green techniques for the restoration of the cottage, but the Visitor Education Center would become the first National Register site to receive LEED certification in April of 2009.[99]

The Robert H. Smith Visitor Education Center (VEC) was built in 1905 as an Italianate Renaissance Revival structure and used as the administrative building for the Old Soldier's Home. It is now used as a visitor's center and the starting point for interpretation and tours of the site. Inside the building visitors, get a close up view of a copy of the Emancipation Proclamation as well as exhibits on such subjects as wartime Washington, Lincoln's presidency, and the history of the Soldiers' Home. It is also a fine example of how preservation has progressed in the area of interpretation with a simulation room that gives visitors a chance to be in Lincoln's Cabinet and debate emancipation through an interactive computer game. The building is still used as an administrative building for the Trust as it is run by the national organization along with the Armed Forces Retirement Home. [100]

The over $8 million restoration was performed by Christman Constructors Incorporated of Michigan and designed by Hiller Architecture of New Jersey. The project began as an attempt to pursue LEED Silver certification and ended with LEED Gold under LEED version 2.2. The project also was the recipient of the USGBC National Chapter Region LEED New Construction: Major Renovation Project of the Year Award in 2009, the 2009 Victorian Society of America Preservation Award, and the 2008 Mayor's Award for Excellence in Historic Preservation. Under the direction of the National Trust's Sustainability Preservation Coalition, the building

[99] Reeder, Linda. "Reuse of Historic Buildings to Address Climate Change." America Institute of Architects. 2008. Web. 16 Jun. 2012 <http://www.aia.org/akr/Resources/Documents/AIAP072833>.

[100] O'Connell, "New Directions," 2008.

was used as a pilot to test the Alternative Compliance Path. That path is now being used today to make LEED certification friendlier to preservation. [101]

Using LEED 2.2, the Visitor Education Center received forty-four points out of a total of the current sixty-nine points in the New Construction and Major Renovation Rating System. At this time there is no specific rating system for historic structures, therefore many existing buildings that are intensely renovated pursue LEED certification through the NC category. "We've shown that LEED is flexible enough to allow you to get a high level of sustainability," says Gavin Gardi, a LEED-accredited professional with the Christman Company who led the cottage's certification process, "no matter what kind of building you have." Gardi was speaking of how the historic character was not inconvenienced by the pursuit of LEED certification since most of the green features will not even be obvious to visitors, but they will result in less harmful emissions to the environment and smaller electrical and water bills for the site. Most of the changes were made in the choice of materials that were either made of all recycled content and/or emitted only low levels of volatile organic compounds**,** or organic chemicals that have a high vapor pressure at ordinary room-temperature conditions. Utility bill savings of up to 40 percent on power through the life of the building were produced through installation of updated energy-efficient heating and air condition systems – manufactured by United Technologies. Also, water used was reduced by low flow water closets. The most important energy saver reportedly was the meticulously restored windows with brass weatherstripping. These updates

[101] Christman. "President Lincoln's Cottage and the Robert H. Smith Visitor Education Center Historic Renovation." *Christman Company*. 2009. Web. 16 Jun. 2012 <http://www.christmanco.com/portfolio.asp?id=256#top>.

combined to earn LEED Gold for the VEC while proving that the historic integrity does not have to be harmed.[102]

The project proved LEED to be very compatible with historic preservation. Under LEED 2.2, many of the points can be applied to any type of building. An example from the VEC is the Sustainable Sites credit earned for the development in a dense urban area that provides access to community services and alternative transportation such as the metropolitan Washington, D.C. bus lines. Another neutral point that the VEC acquired is the previously touchy subject of the bike rack and showers to encourage employees to walk, run or bike to work. Other neutral points include maintaining the existing landscaping of indigenous plants that require little water and the application of non potable water for irrigation. The project also obtained points through the Innovation and Design category by the easy action of using a LEED accredited professional and developing an educational plan, both of which favor neither new nor existing construction. The most important point the project earned was for commissioning. This is a prime benefit that LEED has brought to the built community by requiring that projects be monitored from the design phase to completion to make sure that systems are installed and running correctly. This cuts down on maintenance and costs, two key aspects for preservation.

Ten of the sixty-nine points granted to the project relate directly to preservation. These were mostly gained through the Materials and Resources section. The project gained points for reusing 98% of the existing walls, roof and floors, and 15% of other building components were acquired through refurbishment and reuse. When new materials were acquired, they were produced with high levels of recycled content or sourced within 500 miles of the site. This project proves the valuable combination of green design and preservation. It also encourages a

[102] O'Connell, "New Directions," 2008.

greater partnership between the two movements. This project has encouraged many more historic LEED certifications and has opened a door to a compromising ground between the two regulations of LEED and the Standards.[103]

[103] Campagna, "True," 2008.

Case Study 2: Hurt Building Atlanta, Georgia

Figure 6.2: Hurt Building[104]

Name: Hurt Building

Built: 1913

Placed on National Register: 1977

LEED Certification: Existing Buildings: Operations & Maintenance, LEED Gold, pursuing Platinum

The Hurt Building was begun in 1913 and was reported in the *Atlanta Constitution* to open on October 1, 1913. Due to the outbreak of World War I, the Hurt building did not acquire its V-shaped wings until 1924 and was not fully completed until 1926. The building is a privately

[104] Brown, Lauren. "Photographs of Hurt Building." 30 May 2012.

owned commercial establishment located at 45 Edgewood Avenue northeast of downtown Atlanta, Georgia. When built, it was the 17th largest office building in the world and stood 17 stories high. Its vast size and triangular shape, determined by the existing lot arrangement, makes the Hurt Building one of the most prominent and noticeable structure of downtown Atlanta. The main core of the building takes up the first four floors of the structure and most of its site. The remaining 13 stories form a V-shaped arrangement extending into two wings and leaving an open light court between the wings which open toward Ivy Street. The most prominent feature of the structure is the three-story domed rotunda that is placed as an entrance to the lobby and embellished with classical elements.[105]

Figure 6.3: View into light court created by V-shaped wings[106]

[105] "Inventory - Nomination Form for Hurt Building." *National Register of Historic Places.* National Park Service. 1976.

[106] Brown, 2012.

The building was named after its developer and designer, Joel Hurt, an Atlanta engineer and businessman. Hurt designed the building with preliminary sketches, then hired J.E.R Carpenter, a prominent New York architect, to draw the final plans. Hurt is credited with reshaping Atlanta with the development of a "garden style" neighborhood and Atlanta's first suburb, Inman Park. Hurt also created a new street, Edgewood Avenue, which connected downtown to Inman Park. He also designed a street car system to run along this street to connect commuters to their homes outside the city. It was at the end of this street that he decided to build his skyscraper. Today Inman Park is considered one of the most desirable places to live, and the government has implemented a plan to bring back Hurt's streetcar system to return the area to the way it functioned historically.[107]

The Hurt Building gained a National Register nomination in 1977 for its significance in the area of architecture. In the nomination the building is described as, "A relatively simple and sober approach to commercial style high-rise which gives the impression of competence and thoroughness in design rather than imagination and unusual creativity." The engineering background of Joel Hurt was prominent in the simple ornamentation of the design. The Building is built in a neoclassical style but the "frills" were kept to a minimum for Hurt's respect for architecture as a structural art. Its efficient simplicity, yet grand height, has made it a landmark in Atlanta then and its grandeur continues as a landmark today.[108]

The Hurt Building was completely renovated in 1985 by the current owner, Richard Courts, through Atlantic Realty Company. Courts performed a complete overhaul of the HVAC and plumbing systems to modernize the structure. There is a recorded disagreement between the

[107] "The Hurt Building: Atlanta's Grand Old Skyscraper Goes 'Green'."City-Data. Web 13 May 2012 <http://www.city-data.com/articles/The-Hurt-Building-Atlantas-Grand-Old.html>.

[108] "Inventory," 1976.

National Park Service and Courts over interior finishes. Courts paid great attention to detail on the exterior of the structure and in the classical embellished rotunda, but he preferred what he considered a higher quality of finish in the interior lobby and hallways. Courts obviously won because the site is still listed on the National Register and the interior finishes create the dramatic effect he reportedly wanted with his choice of black marble floors, etched granite walls and soft light.[109]

The building was purchased in 2006 by Norfolk, Virginia based company Harbor Group International. HGI purchased the building with plans to spend over $500,000 on interior and exterior renovations. Brian Boehmcke, vice president of asset management for Harbor Group International, reported that his company was excited about the purchase considering the wealth of resources the Hurt Building had to offer. Boehmcke stated, "Downtown Atlanta is poised for great momentum and offers exceptional visibility in the world marketplace. The Hurt Building, with Trusco Capital as an anchor tenant, the landmark City Grill restaurant and a unique mix of foundations and associations, is a special property and we intend to maintain its character through our management and leasing."[110]

[109] Walters, Jonathan. "Disagreement in Atlanta." *Preservation: The Magazine*. 38 (Nov / Dec 1986) 67-68.

[110] "Historic Hurt Building Sold." *Atlanta Business Chronicle*. 10 Apr 2006. Web. 13 May 2012 <http://www.bizjournals.com/atlanta/stories/2006/04/10/daily5.html>.

Figure 6.4: LEED Gold certification seal on the rotunda entrance[111]

The Hurt Building began the LEED process in 2007 under the management of Harbor Group International after the building won a TOBY, The Outstanding Building of the Year presented by BOMA, Building Owners and Managers Association International in the Historical Building Category.[112] The building and its management staff enjoy the status and marketable benefits that come with the prestigious award. The team wants to keep the positive press going by attempting to win the Earth category of the TOBY awards in the next round. In order to accomplish their goal, the management team applied for LEED certification through Existing

[111] Brown, 2012.

[112] "2006 - 2007 Regional Award Winners" *BOMA*. Web. 13 May 2012 < http://www.boma.org/LocalBOMA/SouthernRegion/getinvolved/Pages/0607awards.aspx**>.**

Building: Operations & Maintenance.[113] It was an easy decision to make according to Shannon Westberg, general manager of the building, since the building had already experienced many renovations in order to reach energy efficiency.[114]

The building had a prime location with a connection to public transportation and adjacency to local amenities. The building had already experienced modern updates such as the electrical renovation in 1992 and in 2002 when an energy efficient cooling tower system was installed with monitors to regulate the temperature. Both of these updates and other adjustments led to the building's impressive Energy Star of 92 at the time it was applying for LEED certification. The building's shape and design was a key factor in gaining LEED points. The structure was built before air conditioning was invented, therefore the building was designed to accommodate cross ventilation. Every office on the 5th floor and above has full access to windows for daylight, views, and air control, which all played major roles in gaining LEED Gold certification for the structure. The main issue the building needed to control was its water usage with its current 4.5 gallons per flush toilets. To solve this problem, over 40 percent of the toilets and urinals were replaced with water efficient models. The remaining fixtures received lower use flush valves. Most of this work was completed by the developers and this project was completed for around $8,000. According to Shannon Westberg, the water saving fixtures were well worth the money since they paid for themselves within 90 days.[115]

The tenants also played a major role in the building's certification. The building already had in place an efficient recycling system that the civic minded tenants eagerly followed. All of

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[113] "USGBC," 2011.

[114] "LEED Project Directory, Hurt Building." *USGBC, GA.* Web 5 May 2012 <http://www.usgbcga.org/resources/leed-in-georgia-building-directory/130?task=view>.
Westberg, Shannon. Personal Interview. 15 May 2012.

[115] "LEED," USGBC, GA.

the tenants also reportedly used the electrical systems with energy efficiency in mind. The collaborative team work also led to an "Innovative" point during LEED certification with the building's "Miscellaneous Furniture Room." A space on the top story where tenants can leave unwanted furniture or go shopping for second hand items that they can use in their own space, for free.

The bonus existing feature of the building was a water retention system installed in the 1950's to keep the basement from flooding. When the building was first built, the only water control system was a trench that ran through the basement floor of the building. The trench was used to control ground water runoff, but the pipes that drained the roof emptied into the trench as well. When it rained, the trench could not handle all of the runoff and the excess water would overflow and flood the basement. To solve this problem, the previous owners, Atlantic Realty Company, installed two 500 gallon tanks to drain the storm water from the roof. When it rains, the water is automatically collected in the tanks until they are 80% full; then the excess water is pumped into the city storm system.[116]

[116] Westberg, 2012.

Figure 6.5: Water retention system in the basement[117]

The creative collective water system was altered in 2007 to allow the building to use the recycled water. The water in the tanks is used to water the 25,000 square foot lobby's extensive interior landscaping. Westberg explained the system, "The tanks are elevated approximately 3 feet off the ground and there is a hose connection on the piping, which allows the in-house horticulturist to attach a garden hose and use the weight of gravity to run water out of the tank

[117] Brown, 2012.

system and into the storage vessel with a pump that he uses to water the landscaping."[118] The system requires minimal maintenance. Also the location of the pump at the bottom of the tank allows the tank to be emptied while keeping sediment from building up inside. The engineering of the tanks led to multiple LEED points with storm water quantity management and reduction of potable water use.[119]

The Hurt Building changed hands again with an announcement on February 17, 2012 by its new owner, a Houston based real estate firm – Boxer Properties. They reportedly purchased the building for its Class A amenities and convenient access to interstates 75, 85, and 20. This was the first purchase in Georgia for the real estate company and they are using its historic character, landmark standing, and premier status of LEED Gold to market the structure to its full potential. David Kayle, Boxer's Acquisitions Director, stated, "We are excited that our first building in Atlanta is such a historic icon in downtown, adjacent to Georgia State University."[120]

Boxer Properties is initiating a program to recertify the building as LEED Platinum by 2015. They will resubmit their documentation to LEED in 2014 and begin the planned process. The management staff has already made some significant changes that will help gain LEED Platinum points. The building now has integrated pest control and a green cleaning system which uses only environmentally safe chemicals. In 2012 they renovated their lighting system again to remove all incandescent bulbs and replace them with more energy efficient compact fluorescents. They also made a deal with Georgia Pacific to become a test facility for their paper products which will result in the building becoming the first to use all 100% post consumer

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[118] Wroblaski, Kylie. "Flush Rainwater, Not Money, Down Your Toilets." *Buildings*. 105.2 (Feb 2011) 36-40.

[119] "USGBC," 2011.

[120] "Boxer Acquires LEED Gold Certified Hurt Building in Atlanta." *Boxer Property*. 2012. Web 16 May 2012 <http://www.boxerproperty.com/news-details/boxer-acquires-leed-gold-certified-hurt-building-in-atlanta>.

content paper towels and toilet paper. The building will still have to undergo more changes as they will need to raise their current Energy Star rating from an 83 to a 95 to gain Platinum certification. A plan is in place to assist with the rating score is energy efficient film for the windows. Westberg is being cautious of the historic status of the building by planning to use only high energy efficient film that is transparent from the outside. The management staff already has a plan to pick up points in the materials and resource category by switching to mostly sustainable materials, such as carpet and furniture, and to use paint that contains low or no volatile organic compounds paint. Plans are also in place to install a secondary water retention system to be able to water the exterior landscaping to lower their potable water usage further.

According to Shannon Westberg, the process of applying LEED guidelines to this historic structure was not a conflicting or complicated task. Westberg remarked, "Old can be beautiful and the guts modern and efficient. Preservation is about appearance of the façade, and LEED is about the interior mechanics." Westberg also reported on the monetary benefits of the sustainable updates saying, "The building's exclusive status of historic and LEED Gold has made it easier to market and fill with higher end commercial clients." In the modern market place, the title of LEED carries weight and allows owners to market for higher values. The unique combination of the Hurt Building National Register listing and LEED Gold certification made the structure even more marketable, especially since it was the first historic building in Georgia to achieve this status.[121]

[121] Westberg, 2012.

Case Study 3: The Presidio, San Francisco, California

Figure 6.6: The Presidio and The Golden Gate Bridge[122]

Name: The Presidio of San Francisco

Established: 1776

Placed on National Register: 1962

LEED Certification: Neighborhood Development, LEED Gold

The Presidio historic military post is one of the oldest settlements in the Bay Area of San Francisco, California. 42 acres of the post are deemed a historic district and located at 15th Avenue and Lake Street on the southern edge of the Presidio post. The site has created a great

[122] "Green Building, LEED." *Presidio*. Web. 16 Jun. 2012 <http://www.presidio.gov/about/Pages/green-building-LEED.aspx>.

path connecting the preservation movement to the green building movement by becoming the first historic district to receive LEED certification. The entire site was an abandoned military base that was turned into a national park. Congress established the Presidio Trust to tend to the site in 1996. In 2004 the site underwent rehabilitation to become a residential neighborhood district under the Presidio Trust and the National Park Service. The site has a range of buildings that date from the early 1800s to new townhouses built as infill and in keeping with the historic character.[123]

Figure 6.7: California Historic Landmark 79[124]

The Presidio military post has been used as a headquarters by Spain, Mexico, and the United States. It was a major command post during the Mexican War, Civil War, Spanish-

[123] Schlesinger, Victoria. "Unveiling the Presidio's new green neighborhood." *San Francisco Press*. 23 Sep. 2010. Web. 16 Jun. 2012 <http://sfpublicpress.org/news/2010-09/unveiling-the-presidios-new-green-neighborhood>.

[124] "California Historical Landmark 79, Presidio of San Francisco." *Noehill*. 26 Mar. 2004. Web. 16 Jun. 2012 <http://www.noehill.com/sf/landmarks/cal0079.asp>.

American War, World Wars I and II, and the Korean War. A portion of the post was proclaimed a National Historic Landmark District in 1962 because of its association with the Spanish settlement of California, and it is preserved today as a symbol of United States authority in the Pacific. The largest historic structure in the Presidio is the Marine Hospital, during the 1950s it was the largest federal hospital on the West Coast with 730 beds and its own helipad. The hospital was established as a Public Health Service Hospital that was used to conduct leading medical research and serve military members and their families suffering from epidemic diseases. The Marine Hospital was first a wooden structure built in 1875 in the Georgian Revival style but enlarged in 1932 to a six-story, 222,000 square foot building to accommodate local research for epidemiology. Today it has been rehabilitated to luxury apartments, but thanks to the efforts of the Presidio Trust, the Marine Hospital and many other buildings on site look the way they did when they were recovered by the National Park Service.[125]

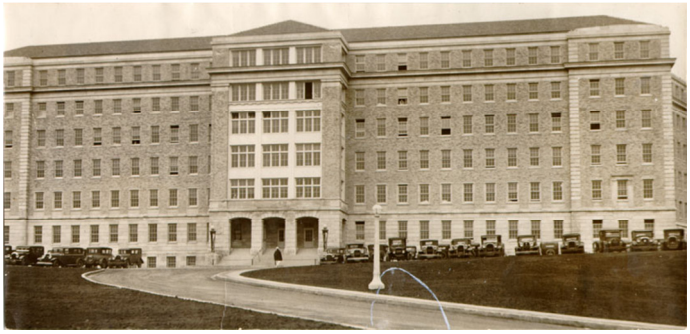

Figure 6.8: The Marine Hospital, 1932[126]

Figure 6.9: The Marine Hospital, 2011[127]

[125] Schlesinger, 2010.

[126] Ibid.

[127] "The Presidio Landmark in San Francisco." *National Association of Home Builders*. 17 Oct. 2011. Web. 19 Jun. 2012 <http://www.nahb.com/default.aspx>.

"This is more or less like running a town or a small city," says Stephen Potts, the Presidio Trust's director of operations. "We have to be able to respond to almost any kind of problem ourselves." Potts is speaking of the large challenge that the Presidio Trust has taken on with the rehabilitation of this historic district. The Presidio Trust's management plan is to apply sustainable design practices and promote energy and water conservation, waste reduction and recycling, and clean technologies. The post was taken over by the National Park Service in 1942. The site sat neglected for over 50 years until the Presidio Trust and the park service came up with the innovative idea of LEED certifying the first national historic district. Since this feat had never been performed the Trust had to create their own rules. The Trust created a partnership with the United States Department of Energy's Rebuild America program in 1999 and developed their own Green Building Guidelines to promote energy conservation as a main goal in the park. The guidelines follow the format of the LEED rating system but cater to historic preservation.[128]

The Presidio Trust Green Building Guidelines were designed to introduce topics of "green building" and to provide guidance through the process of successful permit submission to the Presidio Trust permitting office. The document combines the regulations of LEED certification and the Secretary of the Interior's Standards. The LEED guidelines were not sufficient as they did not specifically apply to historic structures and the measures that must be taken when working with historic fabric. The Standards were not appropriate on their own either as they did not include sustainability practices to reduce the harm that the built environment causes to the atmosphere. The Trust's Green Building Guidelines combines the two documents and provides a specific layout that was flexible enough to include multiple types of structures, but also specific enough to regulate rehabilitation throughout the park.

[128] "Noehill in Sanfrancisco." *Noehill*. Landmarks. Web. 16 Jun. 2012 <http://www.noehill.com/sf/landmarks/cal0079.asp>.

The guidelines are laid out like the LEED guidelines by being divided into five sections: Planning Sustainable Sites, Improving Energy Efficiency, Conserving Materials and Resources, Enhancing Indoor Environmental Quality, and Safeguarding and Conserving Water. Each category is complete with background information on the intent and specific requirements. The document also includes blank submittal forms located at the end of each category for the requirements that have specific submittals; those requirements also contain specific details on how those are to be obtained. The requirements act as pre-requisites from the LEED guidelines, and the document also contains options which match LEED credits that can be pursued as an option. The document continues as a complete resource with an appendix that contains tables to apply a Solid Waste Management Plan and tables that list out volatile organic compounds (VOCs) limits for each material, a Green Building Material list, and a Formaldehyde-Free Insulation list.[129]

Today the Presidio Trust operates under the Green Building Guidelines, indicating that the combination of the two guidelines was a success. The Guidelines regulated the rehabilitation of the park into a residential district in 2004 when The Presidio Trust entered into a contract with Forest City Enterprises, a national real estate company. The sustainable management decision eased the process in 2010 when the Trust adopted LEED as a standard for all major projects. Preservation is the core mission of the Trust, therefore it follows the Secretary of the Interior's Standards to protect the Presidio's National Historic Landmark District designation, but it has gone beyond these to make sure environmentally conscious design is a key component of each project.[130]

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[129] "Green Building Guidelines," *The Presidio*. 2002.
[130] Noehill. "Noehill in Sanfrancisco." Landmarks. from http://www.noehill.com/sf/landmarks/cal0079.asp.

There are officially eight LEED certified projects in the park today with many other pending certifications on the way. The certified buildings include the adaptive reuse of the Marine Hospital into 154 luxury apartments as LEED Gold, the new construction of Belles Townhomes as LEED Platinum, rehabilitation of the former nurses' dormitory into contemporary office space as LEED Gold, rehabilitation of the Wyman Avenue homes which contribute to the LEED Neighborhood Development Certification. Other rehabilitations include the former Calvary barracks receiving LEED Gold, the University of San Francisco as LEED Silver, House of Air (historic airplane hangar turned indoor trampoline park) as LEED certified, and Roaring Mouse (highest rated bicycling shop in San Francisco) as LEED Silver. At least seven other buildings within the park are pending certification under LEED with plans for many more to follow.

The Presidio National Park includes 790 buildings, and almost 500 of the buildings are registered historic landmarks. The structures represent many decades of construction and architectural types, from elegant officers' quarters to massive warehouses and from medical facilities to stables. Since The Presidio Trust began work on rehabilitating the site, 300 historic buildings have been rehabilitated with 160 others receiving upgrades. All have been renovated using the Green Building Guidelines to create a positive combination between history and the environment. The Marine Hospital rehabilitation was reportedly equivalent to taking 154 cars off the road annually in terms of greenhouse reductions.

The Presidio is also an important site for its landscape, including archaeological deposits dating from the pre-European period to the 1930s. The site also contains many significant designed landscapes that include the golf course, the San Francisco National Cemetery, Crissy Airfield, and the parade grounds of Fort Scott and the Main Post, not to mention 300 acres of

historic forest planted by the army in the 1880s. All of the landscapes were revived by the Trust, include the forest, and are maintained today following green guidelines for water conservation and the Standards for historic landscapes.[131]

The Presidio follows their sustainable management plan by taking green building measures for each project even if the structure will not be pursuing LEED certification. The Trust requires that each project use environmentally responsible materials, conserve water through reduced consumption and efficient fixtures, and provide a healthy indoor environment by reducing or elimination release of toxins and pollutants. The Trust has created a unique environment with the continued historic character and environmental advancements.[132]

[131] "Green Building," Presidio.

[132] Hounsell, Dan. "Transforming the Presidio." *Facilities Net*. Maintenance & Operations. Apr. 2004. Web. 12 Jun. 2012 <http://www.facilitiesnet.com/maintenanceoperations/article/Transforming-the-Presidio--1795#>.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

The case studies discussed above represent many examples of successful application of LEED guidelines to historic structures. A prominent famous example includes the Empire State Building in New York certified as LEED Gold. An example closer to home is the new location of the College of Environment and Design of the University of Georgia campus into the fifty year old visual arts building that will be certified LEED Gold as well. The green building movement and the historic preservation movement both have a prominent influence in the built environment and reach out to different sectors of the public. Both movements have common goals with the same direction of creating a better built environment for those who live in it. The partnership that the National Trust for Historic Preservation and the United States Green Building Council have created is a powerful step towards the goal of creating a completely sustainable built environment. With preservation's experience and wisdom and LEED's market transformation the two can become a powerhouse in design. They will also bring together supporters from different sectors to create a greater awareness for sustainability and environmental efficiency. The USGBC and the National Trust are currently making great strides to combine the two movements and further each other's cause.

Goals to Further the Preservation Movement

1. Revised Version of the Secretary of the Interior's Standards

The next version of the Secretary of the Interior's Standards needs to be fueled by an integrated committee to create a more widely applicable document. Environmentalists and

LEED practitioners should be included to develop ways for the preservation movement to mesh with the green building movement. Nor should the committee stop there; it should also include doctors and psychologists to broaden the scope of preservation to focus on the well being of humans and the lives that preservation affects. This combination is currently used in the local levels of development and planning, which creates an even greater reason why it should be used on the national level to update the regulations that all levels of preservation must follow.

2. Sustainable Rating System for Preservation Regulated by the Standards

The National Trust is already involved in the process for including preservation practices in LEED regulation. The partnership could also be used to create a rating system for preservation. A sustainable preservation rating system could follow the LEED format and focus on the key points that made it a success. Competition and Branding could be promoted by using LEED's process and market research. It would reward and market preservation projects based on their innovative design and energy efficiency, creating a competition for preservation projects while encouraging sustainability. Simplicity would be a key factor by using the same credit categories that LEED uses but applying the Standards to each credit to advise individuals on how to achieve the points while maintaining historic integrity. Each credit could also be weighted to apply a different amount of points according to how much historic fabric was maintained.

3. LEED Historic Structures

The system would be promoted by LEED as the National Trust would have them involved in the development process. This will help to create a document that could be used as a pilot rating system that can be later transferred into LEED's rating systems as LEED Historic Structures. A rating system specifically for historic preservation in LEED will help preservation

projects gain LEED certification, as they will be credited by Life Cycle Analysis instead of being regulated on the same scale as new development and major renovations of modern structures.

Recommendations for Current Efforts to Achieve Future Goals

LEED Historic Structures would be a preservation victory in the green building movement, but this idea will require a long development process. There are current efforts and changes that the preservation movement can make to create a better platform for itself in the green building movement and create a path for the LEED Historic Structures rating system to be created.

1. Innovative Design

"Design has the potential to remind us of what it means to be human. This experience encompasses a certain mindfulness of our relationship to – and indeed, our place within – the natural world and the cosmos. The troubling and nearly daily reports on the dramatic changes we've generated in the biosphere should signal to us the lasting importance of architecture and design – the profession can no longer maintain itself by merely building and problem solving."

– Kevin Burke[133]

The quote from Kevin Burke, Principal architect at Parabola Architecture and Industrial Design in Charlottesville, Virginia, is a wonderful example of the thought process that should be acquired through combining the two movements. The combination is not necessarily an easy one but they are compatible. The combination does not focus on one element; it aims to achieve both historic integrity and sustainability. The combination will require innovative design and not simple answers that can be repeated with each project. LEED currently has an Innovation and

[133] Paladino, 2003.

Design section to reward those who use innovative thinking to solve design problems in ways that have not existed before. Nor is this a new concept to preservation. As codes and mechanical systems have been updated, preservationists have developed new ways to integrate fire protection systems and wheel chair ramps to safely provide access to patrons. LEED represents another set of guidelines that preservationists will need to creatively combine into their current rehabilitation and maintenance plans. The innovative design factor will be a key ingredient to sustainable preservation and no longer just for those who decide to go above and beyond. It needs to have a permanent position in preservation.

2. Integrative Design

A way to create innovative design for sustainable preservation is by using the main process promoted through LEED, integrated design. Integrated design combines professions that would not usually consult with each other. Bringing together multiple disciplines for the betterment of preservation can only lead to greater success. Preservationists have embraced this idea by getting involved on LEED committees and planning and development projects to make sure preservation is a key component on the front end of projects. Now preservation needs to reverse the role and let other disciplines in on its development. If committees are only made up of preservationists, ideas will only progress as far as that mindset will allow.

3. Marketing

Promoting preservation through LEED is going to be the best marketing tool. LEED already has the nation's attention and is open to using preservation as a sustainable design tool. LEED's success is largely due to their extensive research in market transformation and reassessing of their regulations and how to make them more applicable. Preservation has a chance to partner with this research and should take advantage of the marketability that LEED

possesses. Preservation can learn from the marketing combination that has made LEED a national success: simplicity, competition, and branding. Preservationists need to push hard and use the partnership with the USGBC to their advantage. A campaign needs to be led to get the USGBC to promote rehabilitation as the number one sustainable development choice. In return preservation will promote sustainable design practices for each preservation project that is approved by the Secretary of the Interior's Standards.

4. Recognition

Simple tasks can be headed by the National Trust to form a website that will list and promote structures that are listed on the National Register and have gained LEED certification. Through this website the Trust can also promote a contest that will reward the projects who led innovative attempts by combing the processes of preservation and green building. This will give structures strong marketing with recognition from LEED and the National Trust. It will also establish a reward system in the way that the Innovative and Design category works for the LEED rating system.

5. Education

Another promotional point is the use of education, but not just towards preservationists. Preservation and embodied energy could be added to the curriculum required for gaining LEED accreditation as a Green Associate or a LEED Accredited Professional. A LEED Green Associate is the base level and is accredited as having a general knowledge of the green building rating system. The next level is LEED AP where a professional can specialize in his/her field of expertise. Currently LEED has certifications for LEED Building Design and Construction, Interior Design and Construction, Homes, Operations and Management, and Neighborhood

Development.[134] The USGBC could be led by the National Trust to create a LEED AP Historic Preservation. This education process will create a great awareness of preservation by LEED accredited professionals, but the effort must be duplicated in preservation as well. Preservation education should include green building knowledge to make preservationists aware of how to make historic buildings reduce greenhouse emissions.

6. Funding

Another move would combine federal efforts through tax incentives. Currently preservation is encouraged through a 20% tax credit.[135] The Energy Policy Act of 2005 allotted federal tax credits for structures that received energy efficiencies above code regulations, which can be applied to LEED projects. There are also energy efficiency tax credits that are applied through state legislations.[136] In some states, Maryland for example, a combination has already been made with a state rehabilitation tax credit for 20% for regular LEED certified historic projects and an increase to 25% for the achievement of LEED Gold. This combination through tax credits can be duplicated in other states and on the national level to encourage sustainability through preservation.[137]

These steps can help lead to an overall goal of developing a rating system that promotes a fully sustainable built environment through LEED and preservation. They can also be used as a platform for preservation to gain a place in the green building movement. This will help gain recognition for preservation nationwide and gain more marketing potential. With promotion and

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[134] "USGBC," 2011.

[135] "Tax Incentives for Preserving Historic Properties."

[136] "Public Policy and Advocacy." *USGBC*. Web. 25 Jun. 2012 <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1780>.

[137] Goulding, Charles, Jacob Goldman, and Nicole DiMarino. "LEED Building Tax Opportunities." *Energy Tax Savers*. Jan 2008. Web. 24 Jun. 2012 <http://www.energytaxsavers.com/articles/LEED-Building-EPAct-179D-Tax-Opportunities.pdf>.

direction from the USGBC, the National Trust can help make preservation the number one sustainable development tool in the built environment today.

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APPENDIX A

LEED Scorecard for Lincoln Cottage, Visitor Education Center,

Case Study 1

LINCOLN COTTAGE - VISITOR EDUC

LEED-NC

How to Interpret this Report

Purpose The Leadership in Energy and Environmental Design (LEED) Rating System was designed by the US Green Building Council to encourage and facilitate the development of more sustainable buildings.

Environmental Categories The report is organized into five environmental categories as defined by LEED including:

Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Enviro

LEED Prerequisites Prerequisites must be achieved. Non-compliant prerequisites must be resolved before a certification can be awarded.

LEED Credits The environmental categories are subdivided into the established LEED credits, which are based on desired performance goals within each category. An assessment of whether the credit is earned or denied is made and a narrative describes the basis for the assessment.

Achieved 44

The applicant has provided the mandatory documentation which supports the achievements of the credit requirements, achieving the associated points. Currently the project has scored the adjacent points in this category.

Denied 0

The applicant has applied for a point in a particular credit, but has misinterpreted the credit intent or cannot substantiate meeting the requirements. Currently the project has the adjacent points in this category.

Rating This Project has achieved enough points for Gold Rating.

Official Scores Official LEED v2 Scores: Certified: 26-32 Silver Rating: 33-38 Gold Rating: 39-51 Platinum Rating: 52+

LINCOLN COTTAGE - VISITOR EDUC

9	0	Sustainable Sites	Possible Points: 14
0	0	**Construction Activity Pollution Prevention**	Prerequisite 1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template states that the sediment and erosion control plan for the project conforms to EPA 832/R-92-005. Measures include silt fence, sediment filters, stabilized construction entrance.

1	0	**Site Selection**	Credit 1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares that the site does not meet any of the prohibited criteria.

1	0	**Development Density & Community Connectivity**	Credit 2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template indicates that the project is located within a half mile of a residential zone or neighborhood with an average density of at least 10 units per acre net, and within a half mile of at least 10 basic services. A site vicinity drawing indicating the residential development and community services has been provided.

		Brownfield Redevelopment	Credit 3-Version 2.2

1	0	**Alternative Transportation: Public Transportation Access**	Credit 4.1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template states that there are 3 bus lines with one or more stops within 1/4 mile of the project site. A scaled site vicinity drawing has been provided.

1	0	**Alternative Transportation: Bicycle Storage & Changing Rooms**	Credit 4.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that 8 bicycle stalls and 1 shower are provided within 200 yards of the project for 10 full-time occupants and 136 peak period transient occupants. A plan highlighting the location of

LINCOLN COTTAGE - VISITOR EDUC

		Alternative Transportation: Low-Emitting & Fuel Efficient Vehicles	Credit 4.3-Version 2.2
1	0	**Alternative Transportation: Parking Capacity**	Credit 4.4-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares that no new parking is provided for this project.

		Site Development: Protect or Restore Habitat	Credit 5.1-Version 2.2
1	0	**Site Development: Maximize Open Space**	Credit 5.2-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares that no local zoning requirement exists and that open space greater than or equal to the building footprint has been provided. A project site/landscape drawing has been provided.

1	0	**Stormwater Management: Quantity Control**	Credit 6.1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that the post-development 1.5 year, 24 hour peak discharge rate and quantity do not exceed pre-development conditions. Additionally, a site plan and narrative have been provided.

1	0	**Stormwater Management: Quality Control**	Credit 6.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares the stormwater runoff from 90% of the average annual rainfall is captured or treated such that 80% of the average annual post-development Total Suspended Solids (TSS) is removed. However, it is unclear whether the entire project site was considered in calculations.

TECHNICAL ADVICE: The total site area utilized in calculations for SSc6.1 is 1.3 acres. Treatment calculations are provided for drainage areas 1, 2, 4 and 5 on plan C.03, and these areas add up to a total of 0.33 acres. Please provide clarification in the form of a narrative and calculations describing how the additional 0.97 acres (including drainage area 3) is treated. Per LEED-NC v2.2 Reference guide page 85, where infiltration is used, determine the infiltration rates and confirm that the soils have the capacity to infiltrate water at a rate and quantity sufficient to absorb at least 80% of the annual rainfall volume.

Construction Application 2/3/2009

The LEED Submittal Template has been amended declaring that stormwater run-off generated by the average annual rainfall is captured or treated such that 80% of the average annual post-development Total Suspended Solids (TSS) is removed. A list of non-structural controls has been provided.

1	0	**Heat Island Effect: Non-Roof**	Credit 7.1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template and calculations indicate that a minimum of 50% of the total hardscape areas are open-grid paving systems, will be shaded within five years, and/or are constructed with materials having an SRI of at least 29. A site plan has also been submitted to demonstrate compliance.

		Heat Island Effect: Roof	Credit 7.2-Version 2.2
		Light Pollution Reduction	Credit 8-Version 2.2

Earned	Denied		
4	0	Water Efficiency	Possible Points 5
2	0	**Water Efficient Landscaping**	Credit 1.1-1.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that the landscaping installed does not require permanent irrigation systems and that any temporary irrigation system will be removed within one year of installation. The applicant provided a narrative, landscape plan and plant listing demonstrating overall compliance.

		Innovative Wastewater Technologies	Credit 2-Version 2.2

Earned	Denied	
2	0	**Water Use Reduction** — Credit 3.1-3.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template and calculations have been provided declaring that water use has been reduced by 39.20% through the use of low-flush water closets, low-flush urinals, low-flow lavatories, low-flow kitchen sink and a low-flow shower.

However, a narrative mentions that there are existing fixtures that have been excluded from the calculations. Per WEc3.1 CIR ruling dated 4/19/2004, the design case is defined as the building with the actual fixtures [illegible]

[illegible] Template vary from the standard numbers given in the LEED-NC v2.2 Reference Guide, page 141. It is not clear why the usage numbers would be different for this building.

TECHNICAL ADVICE: Please revise and resubmit calculations to include the existing fixtures. See the CIR cited [illegible]

Design Application 6/11/2007

This credit has been resubmitted based on the compliance path of LEED-NC v2.2. The LEED Submittal Template and calculations have been provided demonstrating that water use has been reduced by 44.2% through the use of dual-flush water closets, low-flush urinals, low-flow lavatories, low-flow kitchen sink and a low-flow shower. Existing fixtures have been included in the calculations.

Earned	Denied	
5	0	**Energy & Atmosphere** — Possible Points 17
0	0	**Fundamental Commissioning of the Building Energy Systems** — Prerequisite 1-Version 2.2

Construction Application [illegible]

[illegible]

Earned	Denied	
0	0	**Minimum Energy Performance** — Prerequisite 2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that the project meets all the mandatory provisions of ASHRAE/IESNA 90.1-2004.

0	0	**Fundamental Refrigerant Management**	Prerequisite 3-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that the project's HVAC&R systems do not use CFC-based refrigerants.

3	0	**Optimize Energy Performance**	Credit 1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template, summary tables, and energy modeling output declare a 34.4% savings between the budget and design cases in comparison with ASHRAE 90.1-2004 as per the Performance Rating Method. However, there are a few items that require further clarification before the amount of credit claimed can be determined.

1. The heating energy cost is not included in the Submittal Template. It is listed as purchased from Landlord.

2. It is not clear what energy efficiency measures (EEMs) have been included to generate the savings.

3. The number of hours load not met exceeds the allowable value as per Appendix G.

4. There appears to be some error in the rate computation used in the analysis. The proposed case rate is $0.0098/ kBtu while the baseline rate is $0.014 / kBtu. Using the proposed case and calculating energy costs, the project performs 6% better than ASHRAE 90.1-2004 based on costs.

TECHNICAL ADVICE: Please address the items above.

1. Please include the energy cost for the heating source (hot water) in the calculations.

2. Please provide a list of EEMs included in the project.

3. Please refer section G 3.1.2.2 of ASHRAE 90.1-2004 for guidance in dealing with the issue of hours load not met.

4. Please clarify the difference in the calculations between the proposed and the baseline design case numbers and correct the energy cost accordingly.

Design Application 8/11/2007

The project team submitted clarifications and revisions to documentation. The LEED submittal template demonstrates that the project performs 13% better than ASHRAE 90.1-2004, earning 3 points for an existing building.

		On-Site Renewable Energy	Credit 2-Version 2.2

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1	0	**Enhanced Commissioning**	Credit 3-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares that the required commissioning activities have been completed or are under contract by an independent commissioning authority who meets the qualifications outlined in the credit requirements. A narrative was also provided to demonstrate compliance.

1	0	**Enhanced Refrigerant Management**	Credit 4-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template indicates that the refrigerants selected for base building HVAC&R equipment have a combined refrigerant impact per ton of 98.8, below the allowable threshold of 100.

		Measurement & Verification	Credit 5-Version 2.2

		Green Power	Credit 6-Version 2.2

Earned	Denied		
9	0	Materials & Resources	Possible Points 13
0	0	**Storage & Collection of Recyclables**	Prerequisite 1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template indicates that recycling collection areas have been provided to meet the needs of the project. The building's recycling collection and storage area will accommodate plastics, metal, paper, cardboard and glass.

2 | 0 **Building Reuse** Credit 1.1-1.2-Version 2.2

Design Application 6/11/2007

The LEED Submittal Template declares that the project is a renovation or rehabilitation of an existing building that does not include a building addition. Calculations have been provided declaring that 97.731% of the project's structure and shell have been retained. However, the square footage of the existing interior second floor structural walls was listed as zero. It is unclear why no square footage was listed and as this information could affect achievement of MRc1.2, only MRc1.1 can be awarded at this time.

TECHNICAL ADVICE: Please provide a narrative describing why the square footage for the existing interior second floor structural walls was listed as zero

Construction Application 2/3/2009

The applicant provided clarification regarding the interior second floor structural walls.

1 | 0 **Building Reuse, Non-Structural** Credit 1.3-Version 2.2

Design Application 6/11/2007

The LEED Submittal Template declares that the project is a renovation or rehabilitation of an existing building that does not include a building addition. Calculations have been provided declaring that 97.731% of the project's non-structural elements have been retained. However, the square footage of the existing interior molding/wood wainscoting was not provided. It is unclear why this information was excluded and because this could affect achievement of MR Credit 1.3, clarification is needed.

TECHNICAL ADVICE: Please provide a narrative describing why the square footage for the existing interior molding/wood wainscoting was not provided.

Construction Application 2/3/2009

The applicant provided clarification regarding the interior molding / wood wainscoting.

1 | 0 **Construction Waste Management** Credit 2-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares that 70.887% of project construction waste was diverted from the landfill. A narrative and list specifying materials and diversion locations has been included. Please note that land-clearing debris is to be excluded from MR Credit 2 calculations. Because the 2 tons associated with the land-clearing debris would not affect achievement, this credit is awarded.

2 | 0 **Resource Reuse** Credit 3-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template indicates that 17.296% of the cost of materials is salvaged materials.

Earned	Denied	
1	0	**Recycled Content** — Credit 4-Version 2.2

Construction Application — 2/3/2009

The LEED Submittal Template has been provided demonstrating that the project has achieved a combined recycled content value of 10.111% of the total materials.

Earned	Denied	
2	0	**Regional Materials** — Credit 5-Version 2.2

Design Application — 6/11/2007

The LEED Submittal Template and supporting calculations have been provided declaring that 24.149% of the total project's materials, based on cost, were harvested and manufactured within 500 miles of the project site. Please note that some materials in the Template are listed as having the manufacturer and extraction location in [illegible] specific extraction location. Materials like paints, sealants, carpets and other products with various components would not likely contribute [illegible]. As the exclusion of these materials could potentially affect achievement of MR Credit 5.2, additional documentation is needed to demonstrate credit compliance.

TECHNICAL ADVICE: To support the calculations in the LEED Submittal Template, please provide a product cut sheet, product literature or letter from the manufacturer indicating the location of extraction and manufacture for each material.

Construction Application — [illegible]

The applicant provided a narrative, supporting documents and revised LEED Submittal Template for clarification.

Earned	Denied	
		Rapidly Renewable Materials — Credit 6-Version 2.2
0	0	**Certified Wood** — Credit 7-Version 2.2

Earned	Denied	
12	0	Indoor Environmental Quality — Possible Points 15
1	0	**Minimum IAQ Performance** — Prerequisite 1-Version 2.2

Design Application — 1/10/2007

The LEED Submittal Template has been provided stating that the project has been designed to meet the minimum requirements of ASHRAE Standard 62.1-2004, using the Ventilation Rate Procedure.

0	0	**Environmental Tobacco Smoke (ETS) Control**	Prerequisite 2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template has been provided stating that no smoking is allowed in the building and outdoor smoking areas are located away from entries, outdoor air intakes and operable windows.

1	0	**Outdoor Air Delivery Monitoring**	Credit 1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template declares that a permanent CO2 monitoring system has been installed that provides feedback on ventilation system performance to ensure that ventilation systems maintain design minimum ventilation requirements. The system is configured to generate an alarm when the conditions vary by 10% or more from setpoint via either a building automation system alarm to the building operator or via a visual or audible alert to the building occupants. The applicant has provided a narrative and drawings as supporting documentation. The narrative states that the project has 8 CO2 sensors; however the sensor locations were not clear on the drawings.

TECHNICAL ADVICE: Please highlight the locations of the CO2 sensors on drawings. Please also provide a list of spaces that are monitored, occupant density of each space and mounting heights of the CO2 sensors. A cut-sheet of the CO2 sensor would also be helpful in determining compliance.

Design Application 6/11/2007

The applicant provided a list of spaces that are monitored, occupant density of each space, mounting heights of the CO2 sensors and drawings demonstrating credit compliance.

1	0	**Increased Ventilation**	Credit 2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template has been provided declaring that breathing zone outdoor air ventilation rates, in all occupied spaces, have been designed to exceed the minimum rates required by ASHRAE Standard 62.1-2004 by a minimum of 30%.

1	0	**Construction IAQ Management Plan: During Construction**	Credit 3.1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template has been provided stating that a construction IAQ plan was implemented and followed. A list of all filtration media installed during construction has been provided, confirming that filters with a MERV 8 rating or better were used and replaced prior to final occupancy. Photographs and a copy of the IAQ Management Plan were included.

1 | 0 **Construction IAQ Management Plan: Before Occupancy** Credit 3.2-Version 2.2

Design Application 6/11/2007

The LEED Submittal Template declares that, prior to occupancy, a building flush out was performed by supplying a total air volume of 3,500 cubic feet of outdoor air per square foot of floor area a minimum of three-hours prior to occupancy and during occupancy, until a total of 14,000 cubic feet per square foot of outside air has been delivered to the space while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%. However, it is not clear how the temperature and humidity levels were maintained. Due to the weather in Washington DC in the summer the humidity level can be an issue.

TECHNICAL ADVICE: Please provide a narrative describing how the outside air was tempered. This can be simply a statement that the air handlers were dehumidifying the air to a maximum 60% relative humidity.

Construction Application 2/3/2009

The applicant provided a narrative describing how the outside air was tempered during the flush-out to demonstrate credit compliance.

1 | 0 **Low-Emitting Materials: Adhesives & Sealants** Credit 4.1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template declares the use of compliant adhesives and sealant products. A list with associated VOC levels has been provided.

1 | 0 **Low-Emitting Materials: Paints & Coatings** Credit 4.2-Version 2.2

Design Application 6/11/2007

The LEED Submittal Template declares that all paints and coatings used on the interior of the building meet the VOC requirements of Green Seal or SCAQMD Rule 1113. A list, with VOC content indicated has been provided. However, clarification is needed for why additional paints and primers listed in MR Credit 5 Calculations were not accounted for in the EQ Credit 4.2 Template.

TECHNICAL ADVICE: Please provide a narrative explaining this exclusion and/or a revised LEED Submittal Template accounting for the additional paints and primers and their compliance with the VOC requirements.

Construction Application 2/3/2009

The applicant provided a narrative and revised LEED Submittal Template for clarification.

1 | 0 **Low-Emitting Materials: Carpet Systems** Credit 4.3-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template has been provided declaring that all carpet products comply with the CRI Green Label Plus testing program and that all carpet cushion products comply with the CRI Green Label testing program. A list of all carpet and cushion products has been provided.

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1	0	**Low-Emitting Materials: Composite Wood & Agrifiber**	Credit 4.4-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template has been provided declaring that all composite wood and agrifiber products used in the project do not contain added urea-formaldehyde, and a list of products has been included.

		Indoor Chemical & Pollutant Source Control	Credit 5-Version 2.2

1	0	**Controllability of Systems: Lighting**	Credit 6.1-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template indicates that at least 90% of individual workstations and all shared multi-occupant spaces have lighting controls as required by this credit.

1	0	**Controllability of Systems: Thermal Comfort**	Credit 6.2-Version 2.2

Construction Application 2/3/2009

The LEED Submittal Template indicates that at least 50% of individual workstations and all shared multi-occupant spaces have thermal comfort controls as required by this credit.

0	0	**Thermal Comfort: Design**	Credit 7.1-Version 2.2

0	0	**Thermal Comfort: Verification**	Credit 7.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template has been provided declaring that there is a survey planned for the validation of the thermal comfort conditions for the project. The provisions for creating a plan for corrective action have been included. However, the applicant did not submit any documentation for EQc7.1. Please note that credit 7.2 is

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1 | 0 **Daylighting & Views: Daylight 75% of Spaces** Credit 8.1-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template, drawings, and calculations demonstrate that 75.53% of critical visual task areas have a daylight factor of at least 2%. However, the applicant has included in the calculations rooms 101 & 101A, which appear to be lobby spaces. In addition, room 107 has been included but appears to not have any of its own exterior glazing. The LEED glazing factor calculations do not take into account shared daylight from adjacent rooms.

TECHNICAL ADVICE: Please provide a narrative stating the purpose of room 101 and 101A. If these spaces are lobby or corridor spaces and not regularly occupied, they should be excluded from calculations for both EQc8.1 and EQc8.2. Revise and resubmit calculations if necessary.

In order to consider room 107 for daylight calculations, please provide computer simulation results or actual daylight measurements to verify the amount of daylight the room is receiving from the shared windows. If only the glazing factor calculations are used, room 107 must be included with no glazing.

Design Application 6/11/2007

Web portal clarification was requested and received for this credit. The applicant submitted a signed LEED Letter Template, revised drawings and calculations with the corridor spaces and room 107 excluded from the Daylight calculations. The applicant has demonstrated that 75.06% of critical visual task areas have a daylight factor of at least 2%.

For future submittals, please provide simulation results or actual daylight measurements for atrium or double height spaces with skylights. The LEED daylight calculator does not take into consideration the lower footcandle levels for spaces with skylights at heights greater than standard single-story level.

1 | 0 | **Daylighting & Views: Views for 90% of Spaces** | Credit 8.2-Version 2.2

Design Application 1/10/2007

The LEED Submittal Template and calculations indicate that 97.64% of critical visual task areas have direct access to views. However, there are several issues that require clarification.

1. The applicant has included in the calculations rooms 101 & 101A, which appear to be lobby spaces.

2. The sight line geometries on the provided plans do not appear to have been done correctly and do not take into account wall thicknesses. For example, rooms 102 and 112 should both have a small area in their exterior building corners that do not have direct line of sight to perimeter vision glazing. For a good illustration showing access to views, see the LEED-NC v2.1 Reference Guide, page [illegible]. Note that this illustration is for reference only and the project must follow all requirements of LEED-NC v2.2 for this submittal.

3. The floor areas used for calculations do not appear to be correct. For example, rooms 102 and 112 have areas in the exterior building corners that do not have direct line of sight to perimeter vision glazing, yet the entire floor area of the room has been used in calculations. Per the LEED v2.2 Reference Guide page [illegible], "For private offices, if the percentage of floor area with direct line of sight is equal to or greater than [illegible], you may enter the entire square footage of that room in the spreadsheet. If less than [illegible] of the room has direct line of sight, you must estimate the compliant floor area and enter that value in the spreadsheet. For multi-occupant spaces, estimate the actual square footage with direct line of sight to perimeter vision glazing."

TECHNICAL ADVICE: Please address the issues listed above.

1. [illegible] room 101 and 101A. If these spaces are lobby or corridor spaces [illegible] they should be excluded from calculations [illegible]. Revise and resubmit calculations if necessary.

2. Please revise and resubmit the sight line geometry floor plans.

3. Revise and resubmit the calculation spreadsheet with the correct square footages entered in the "space area with access to views" column.

Design Application 6/11/2007

The applicant submitted a signed LEED Letter Template, revised drawings of the sight lines, and updated calculations [illegible] spaces were excluded from the calculations. [illegible]

Earned | Denied

[illegible] | [illegible] | Innovation and Design Process | Possible Points [illegible]

1 | 0 **Innovation in Design** Credit 1.1-Version 2.2

Design Application 1/10/2007

Green Building Education Program

The applicant has submitted an innovation credit based on the merits of having an educational outreach program in place for the project. This innovation credit is based on established CIRs.

Based on CIR rulings dated September 24, 2001 and January 13, 2003, any educational program should be

1. An interpretive signage program built into the building's spaces to educate the occupants and visitors of the benefits of green buildings. This program may include windows to view energy-saving mechanical equipment or signs to call attention to water-conserving landscape features.

2. The development of a manual, guideline or case study to inform the design of other buildings based on the successes of this project. This manual will be made available to the USGBC for sharing with other projects.

3. An educational outreach program or guided tour could be developed to focus on sustainable living, using the project as an example.

Though the provided LEED Submittal Template mentions signage, brochures and tours in the credit requirements section, the narrative describing the project's approach does not indicate that any of these measures have been implemented.

TECHNICAL ADVICE: Please provide a narrative explaining the measures taken by the project to meet the specific credit requirements above. Provide a copy or photographs of any signage, brochures or case studies and a description of the outreach program or tours if implemented.

Construction Application 2/3/2009

The applicant submitted an innovation credit based on the merits of having a green educational outreach program in place for the project. This innovation credit is based on established CIRs. The project has instituted a comprehensive program that educates building occupants as well as visitors, using case study, pamphlet and tours. These collective measures demonstrate compliance to the established criteria for an innovation credit based on a green educational outreach program.

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1	0	**Innovation in Design**	Credit 1.2-Version 2.2

Design Application 1/10/2007

Green Housekeeping

The applicant has submitted an innovation credit based on the merits of having a green housekeeping program in place for the project. This innovation credit is based on a CIR ruling dated April 8, 2004.

The applicant provided a narrative with a statement of purpose and declaration that Green Seal standard GS-37 will be used as a performance benchmark. The only additional documentation included is a copy of manufacturer's product information with recommended cleaning procedures. The project has met both the four requirements for the credit but has not shown that following two requirements have been met:

1. A contractual or procedural requirement for operations staff to comply with the guidelines, including a written program for training and implementation.

2. Documentation of the program's housekeeping policies and environmental cleaning solution specifications, including a list of approved and prohibited chemicals and practices.

TECHNICAL ADVICE: Please provide copies of project-specific written policies addressing the two criteria above.

Construction Application 2/3/2009

The applicant submitted an innovation credit based on the merits of having a green housekeeping program in place for the project. This innovation credit is based on the LEED-NC v2.1 IDc1.1 CIR ruling dated 4/8/2004. The project has instituted a comprehensive green cleaning program and utilizes products that comply with the Green Seal standard GS-37.

1	0	**Innovation in Design**	Credit 1.3-Version 2.2

Design Application 6/11/2007

The applicant submitted an innovation credit for Exemplary Performance of WEc3, Water Use Reduction. WEc3 has been submitted based on the compliance path of LEED-NC v2.2. The LEED Submittal Template and calculations have been provided demonstrating that water use has been reduced by 41.2% through the use of dual flush water closets, low flow urinals, low flow lavatory faucets and a low flow shower. Existing fixtures have been included in the calculations. The percentage of water use reduction exceeds the threshold for an innovation credit.

1	0	**Innovation in Design**	Credit 1.4-Version 2.2

Construction Application 2/3/2009

The applicant submitted an innovation credit based on exemplary performance for SSc7.1, Heat Island Effect, Non-Roof. The LEED Submittal Template and calculations indicate that 100% of the total hardscape areas are constructed with materials having an SRI of at least 29. The project has demonstrated achievement of the next incremental threshold for the credit.

1	0	**LEED Accredited Professional**	Credit 2-Version 2.2

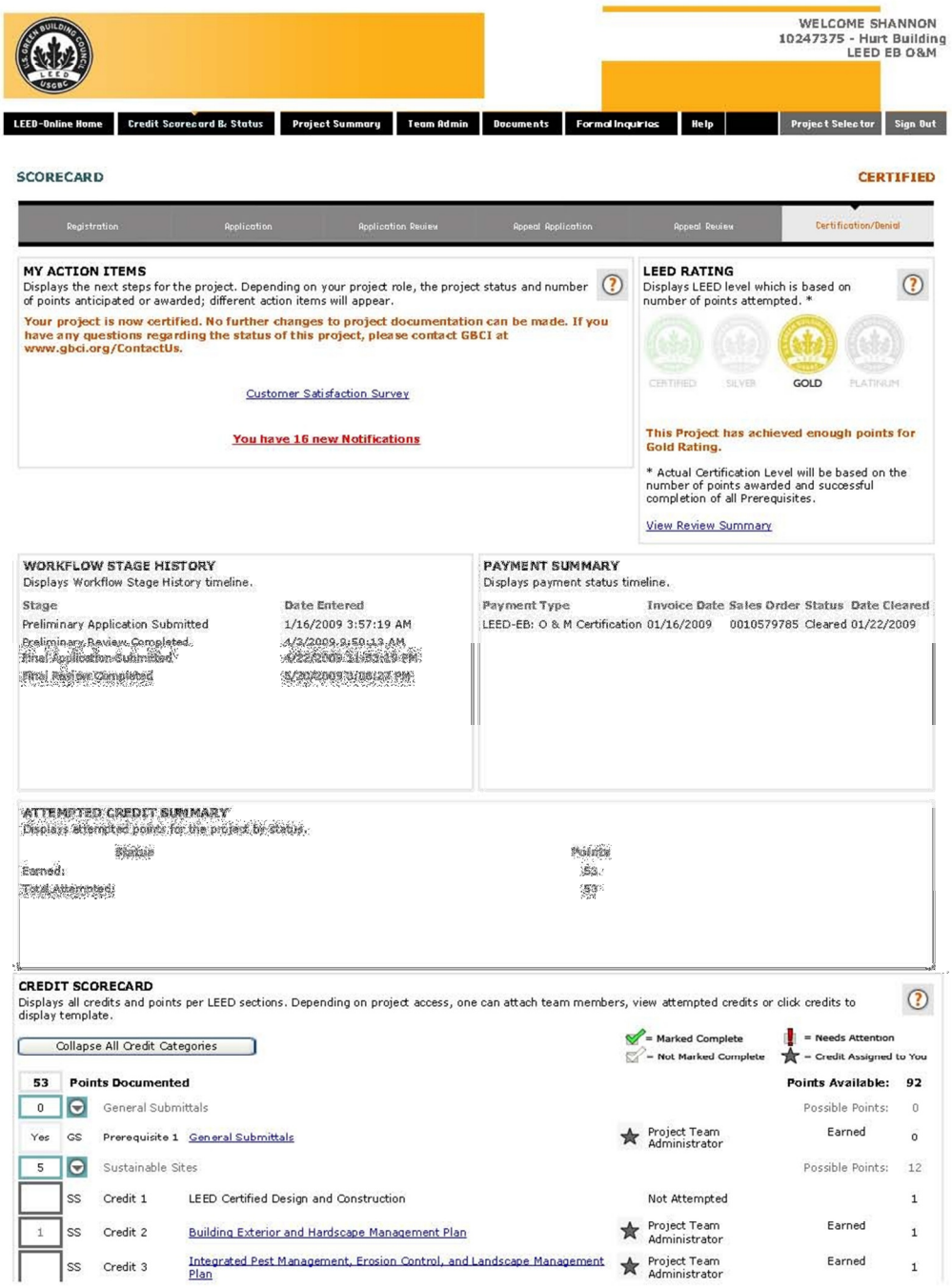
Construction Application 2/3/2009

The signed LEED Letter Template and the LEED Accredited Professional Certificate have been provided for Gavin Gardi.

APPENDIX B

LEED Scorecard for Hurt Building,

Case Study 2



WELCOME SHANNON
10247375 - Hurt Building
LEED EB O&M

LEED-Online Home | Credit Scorecard & Status | Project Summary | Team Admin | Documents | Formal Inquiries | Help | Project Selector | Sign Out

SCORECARD — CERTIFIED

Registration | Application | Application Review | Appeal Application | Appeal Review | Certification/Denial

MY ACTION ITEMS
Displays the next steps for the project. Depending on your project role, the project status and number of points anticipated or awarded; different action items will appear.

Your project is now certified. No further changes to project documentation can be made. If you have any questions regarding the status of this project, please contact GBCI at www.gbci.org/ContactUs.

Customer Satisfaction Survey

You have 16 new Notifications

LEED RATING
Displays LEED level which is based on number of points attempted. *

CERTIFIED | SILVER | GOLD | PLATINUM

This Project has achieved enough points for Gold Rating.

* Actual Certification Level will be based on the number of points awarded and successful completion of all Prerequisites.

View Review Summary

WORKFLOW STAGE HISTORY
Displays Workflow Stage History timeline.

Stage	Date Entered
Preliminary Application Submitted	1/16/2009 3:57:19 AM
Preliminary Review Completed	4/3/2009 9:50:13 AM
Final Application Submitted	4/22/2009 5:53:19 PM
Final Review Completed	5/20/2009 3:08:27 PM

PAYMENT SUMMARY
Displays payment status timeline.

Payment Type	Invoice Date	Sales Order	Status	Date Cleared
LEED-EB: O & M Certification	01/16/2009	0010579785	Cleared	01/22/2009

ATTEMPTED CREDIT SUMMARY
Displays attempted points for the project by status.

Status	Points
Earned:	53
Total Attempted:	53

CREDIT SCORECARD
Displays all credits and points per LEED sections. Depending on project access, one can attach team members, view attempted credits or click credits to display template.

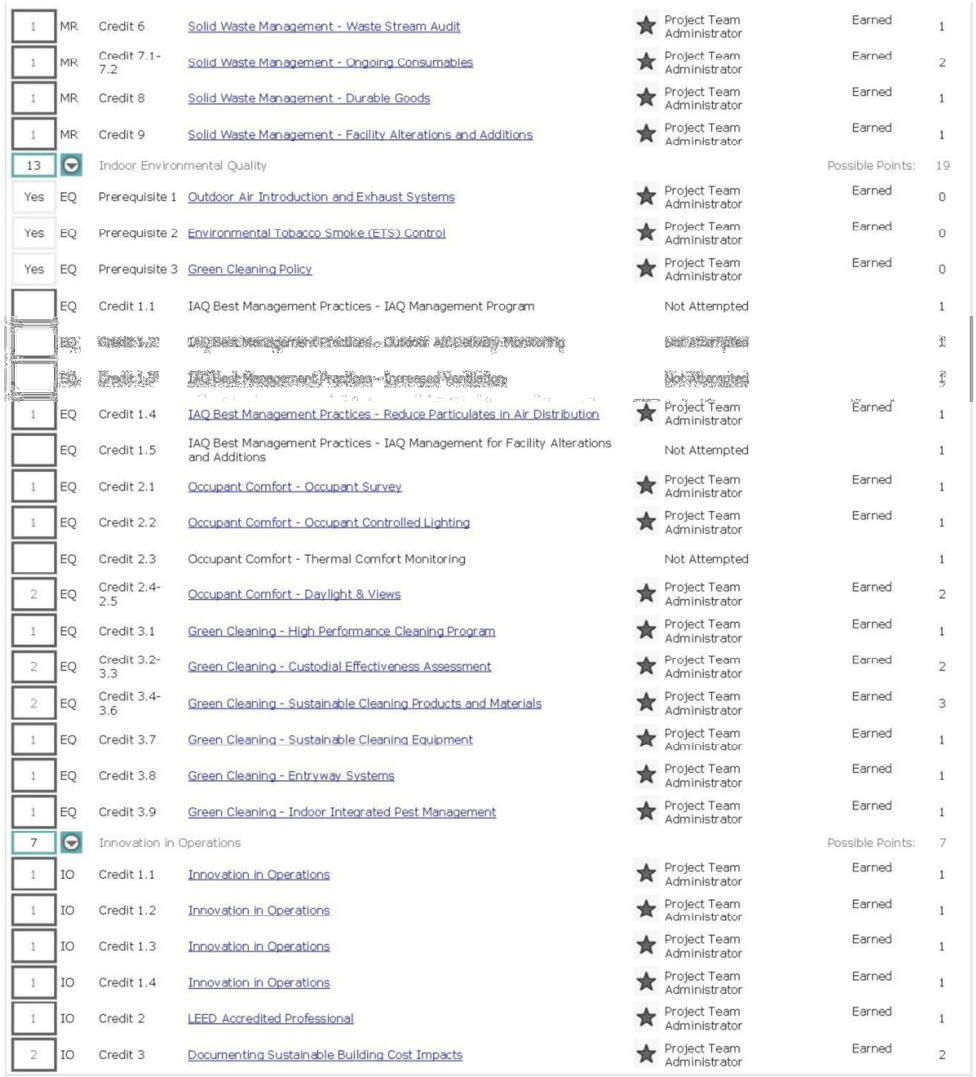
Collapse All Credit Categories

= Marked Complete | = Needs Attention
= Not Marked Complete | = Credit Assigned to You

53 Points Documented — **Points Available: 92**

0		General Submittals		Possible Points:	0
Yes	GS	Prerequisite 1	General Submittals	Project Team Administrator	Earned 0
5		Sustainable Sites		Possible Points:	12
	SS	Credit 1	LEED Certified Design and Construction	Not Attempted	1
1	SS	Credit 2	Building Exterior and Hardscape Management Plan	Project Team Administrator	Earned 1
	SS	Credit 3	Integrated Pest Management, Erosion Control, and Landscape Management Plan	Project Team Administrator	Earned 1

1	SS	Credit 3	Integrated Pest Management, Erosion Control, and Landscape Management Plan	Project Team Administrator	Earned	1
2	SS	Credit 4.1-4.4	Alternative Commuting Transportation	Project Team Administrator	Earned	4
	SS	Credit 5	Reduced Site Disturbance - Protect or Restore Open Space	Not Attempted		1
	SS	Credit 6	Stormwater Management	Not Attempted		1
1	SS	Credit 7.1	Heat Island Reduction - Non-Roof	Project Team Administrator	Earned	1
	SS	Credit 7.2	Heat Island Reduction - Roof	Not Attempted		1
	SS	Credit 8	Light Pollution Reduction	Not Attempted		1
2		Water Efficiency			Possible Points:	10
Yes	WE	Prerequisite 1	Minimum Indoor Plumbing Fixture and Fitting Efficiency	Project Team Administrator	Earned	0
	WE	Credit 1.1	Water Performance Measurement - Whole Building Metering	Not Attempted		1
	WE	Credit 1.2	Water Performance Measurement - Submetering	Not Attempted		1
1	WE	Credit 2.1-2.3	Additional Indoor Plumbing Fixture and Fitting Efficiency	Project Team Administrator	Earned	3
	WE	Credit 3.1-3.3	Water Efficient Landscaping	Not Attempted		3
1	WE	Credit 4.1	Cooling Tower Water Management - Chemical Management	Project Team Administrator	Earned	1
	WE	Credit 4.2	Cooling Tower Water Management - Non-Potable Water Source Use	Not Attempted		1
19		Energy & Atmosphere			Possible Points:	30
Yes	EA	Prerequisite 1	Energy Efficiency Best Management Practices - Planning, Documentation, and Opportunity Assessment	Project Team Administrator	Earned	0
Yes	EA	Prerequisite 2	Minimum Energy Performance	Project Team Administrator	Earned	0
Yes	EA	Prerequisite 3	Refrigerant Management - Ozone Protection	Project Team Administrator	Earned	0
13	EA	Credit 1	Optimize Energy Efficiency Performance	Project Team Administrator	Earned	15
2	EA	Credit 2.1	Existing Building Commissioning - Investigation and Analysis	Project Team Administrator	Earned	2
2	EA	Credit 2.2	Existing Building Commissioning - Implementation	Project Team Administrator	Earned	2
	EA	Credit 2.3	Existing Building Commissioning - Ongoing Commissioning	Not Attempted		2
[illegible]						
1	EA	Credit 5	Refrigerant Management	Project Team Administrator	Earned	1
1	EA	Credit 6	Emissions Reduction Reporting	Project Team Administrator	Earned	1
7		Materials & Resources			Possible Points:	14
Yes	MR	Prerequisite 1	Sustainable Purchasing Policy	Project Team Administrator	Earned	0
Yes	MR	Prerequisite 2	Solid Waste Management Policy	Project Team Administrator	Earned	0
	MR	Credit 1.1-1.3	Sustainable Purchasing - Ongoing Consumables	Not Attempted		3
	MR	Credit 2.1	Sustainable Purchasing - Durable Goods, Electric	Not Attempted		1
	MR	Credit 2.2	Sustainable Purchasing - Durable Goods, Furniture	Not Attempted		1
1	MR	Credit 3	Sustainable Purchasing - Facility Alterations and Additions	Project Team Administrator	Earned	1
2	MR	Credit 4.1-4.2	Sustainable Purchasing - Reduced Mercury in Lamps	Project Team Administrator	Earned	2
	MR	Credit 5	Sustainable Purchasing - Food	Not Attempted		1



1	MR	Credit 6	Solid Waste Management - Waste Stream Audit	Project Team Administrator	Earned	1
1	MR	Credit 7.1-7.2	Solid Waste Management - Ongoing Consumables	Project Team Administrator	Earned	2
1	MR	Credit 8	Solid Waste Management - Durable Goods	Project Team Administrator	Earned	1
1	MR	Credit 9	Solid Waste Management - Facility Alterations and Additions	Project Team Administrator	Earned	1
13		Indoor Environmental Quality			Possible Points:	19
Yes	EQ	Prerequisite 1	Outdoor Air Introduction and Exhaust Systems	Project Team Administrator	Earned	0
Yes	EQ	Prerequisite 2	Environmental Tobacco Smoke (ETS) Control	Project Team Administrator	Earned	0
Yes	EQ	Prerequisite 3	Green Cleaning Policy	Project Team Administrator	Earned	0
	EQ	Credit 1.1	IAQ Best Management Practices - IAQ Management Program	Not Attempted		1
	EQ	Credit 1.2	IAQ Best Management Practices - Outdoor Air Delivery Monitoring	Not Attempted		1
	EQ	Credit 1.3	IAQ Best Management Practices - Increased Ventilation	Not Attempted		1
1	EQ	Credit 1.4	IAQ Best Management Practices - Reduce Particulates in Air Distribution	Project Team Administrator	Earned	1
	EQ	Credit 1.5	IAQ Best Management Practices - IAQ Management for Facility Alterations and Additions	Not Attempted		1
1	EQ	Credit 2.1	Occupant Comfort - Occupant Survey	Project Team Administrator	Earned	1
1	EQ	Credit 2.2	Occupant Comfort - Occupant Controlled Lighting	Project Team Administrator	Earned	1
	EQ	Credit 2.3	Occupant Comfort - Thermal Comfort Monitoring	Not Attempted		1
2	EQ	Credit 2.4-2.5	Occupant Comfort - Daylight & Views	Project Team Administrator	Earned	2
1	EQ	Credit 3.1	Green Cleaning - High Performance Cleaning Program	Project Team Administrator	Earned	1
2	EQ	Credit 3.2-3.3	Green Cleaning - Custodial Effectiveness Assessment	Project Team Administrator	Earned	2
2	EQ	Credit 3.4-3.6	Green Cleaning - Sustainable Cleaning Products and Materials	Project Team Administrator	Earned	3
1	EQ	Credit 3.7	Green Cleaning - Sustainable Cleaning Equipment	Project Team Administrator	Earned	1
1	EQ	Credit 3.8	Green Cleaning - Entryway Systems	Project Team Administrator	Earned	1
1	EQ	Credit 3.9	Green Cleaning - Indoor Integrated Pest Management	Project Team Administrator	Earned	1
7		Innovation in Operations			Possible Points:	7
1	IO	Credit 1.1	Innovation in Operations	Project Team Administrator	Earned	1
1	IO	Credit 1.2	Innovation in Operations	Project Team Administrator	Earned	1
1	IO	Credit 1.3	Innovation in Operations	Project Team Administrator	Earned	1
1	IO	Credit 1.4	Innovation in Operations	Project Team Administrator	Earned	1
1	IO	Credit 2	LEED Accredited Professional	Project Team Administrator	Earned	1
2	IO	Credit 3	Documenting Sustainable Building Cost Impacts	Project Team Administrator	Earned	2

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