CLAIMS IN CONSTRUCTION: ANALYSES OF CLAIMS BETWEEN
TRADITIONAL AND GREEN/SUSTAINABLE BUILDING CONSTRUCTION

BY

EBENEZER TACKEY-OTOO

DEPARTMENT OF
CIVIL, ARCHITECTURAL AND ENVIRONMENTAL ENGINEERING

Submitted in partial fulfillment of the
requirements for the degree of
Master of Science in Civil Engineering
in the Graduate College of the
Illinois Institute of Technology

Approved _________________________
Adviser

Chicago, Illinois
July 2014
ACKNOWLEDGEMENT

First of all, I give thanks to Almighty God for giving me life and strength to carry out this study. I also wish to express my profound appreciation to my mentor, advisor and thesis committee chair Dr. David Arditi for his guidance during the entire research. Special thanks my committee members; Dr. Cindy Menches and Dr. Jamshid Mohammadi for their guidance and support. I also wish to thank all the faculty members and staff of the Civil and Architectural Department, Illinois Institute of Technology. My final thanks go to my wife and family.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGEMENT</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>x</td>
</tr>
</tbody>
</table>

## CHAPTER

1. **INTRODUCTION** ................................................................. 1

2. **GREEN/SUSTAINABLE/HIGH PERFORMANCE BUILDINGS** ... 3

   2.1 Green Building Rating Systems ........................................ 5
   2.1.1 Leadership in Energy and Environmental Design ............ 6
   2.1.2 Building Research Establishment’s Environmental Assessment Method.......................................................... 9
   2.1.3 Green Globes .................................................................. 11
   2.1.4 Living Building Challenge ........................................... 13
   2.1.5 Comprehensive Assessment System for Building Environment Efficiency .......................................................... 13
   2.1.6 Building Environment Assessment Method ...................... 15
   2.1.7 Energy Star .................................................................... 16
   2.1.8 Green Star SA .............................................................. 17
   2.1.9 GBTool ........................................................................... 18
   2.1.10 Green Mark ................................................................... 19
   2.1.11 Green Guide for Healthcare .......................................... 20
   2.1.12 Pearl Rating System for Estidama ................................ 21
   2.1.13 Regional Residential Rating Systems ......................... 21
   2.2 Standard Form Green Documents ........................................ 22

3. **CONSTRUCTION CLAIMS IN TRADITIONAL BUILDINGS**.............. 26

   3.1 Filing a Claim ...................................................................... 27
   3.2 The Environment for Claims and Changes .......................... 28
   3.3 Types of Claims ................................................................... 30
3.3.1 Delay Claims ........................................................................... 30
3.3.2 Change in Scope Claims .......................................................... 36
3.3.3 Acceleration Claims ................................................................. 37
3.3.4 Changing-Site Condition Claims ............................................. 39
3.3.5 Disruption Claims ................................................................ 41
3.3.6 Termination Claims ................................................................. 42
3.3.7 Payment Delay Claims ............................................................ 44
3.3.8 Cost Claims ........................................................................... 45

4. CLAIMS IN GREEN BUILDING ......................................................... 48

4.1 Green Contracts .......................................................................... 49
4.2 Green Team Credentials .............................................................. 52
4.3 Green Materials and Technologies .............................................. 53
4.4 Green Representations and Advertising ........................................ 55
4.5 Green Guarantees and Warranties ................................................. 57
4.6 Certification Process and Special Risks of Green Builders .......... 58
4.7 Document Collection and Submittal .............................................. 60

5. METHODOLOGY ............................................................................ 62

5.1 Civil Board of Contract Appeals .................................................. 62
5.2 Dispute Resolution .................................................................... 63
5.3 Data Collection .......................................................................... 69

6. DISCUSSION AND FINDINGS ............................................................ 73

6.1 Data analyses for traditional buildings ........................................ 73
6.1.1 Number of cases per year ....................................................... 73
6.1.2 Amount of claim, amount granted and granted in part .......... 73
6.1.3 Parties involved (claim issues) ................................................ 75
6.1.4 Types of claims ..................................................................... 76
6.1.5 Decision (Claims) ................................................................. 79
6.2 Data analyses in green/sustainable buildings .............................. 83
6.2.1 Materials and technologies .................................................... 83
6.2.2 Faulty performance of building components ....................... 85
6.2.3 Failure to receive materials/products on time ...................... 86
6.2.4 Lack of expertise in sustainable products/technologies ....... 88
6.2.5 High cost of certification process .......................................... 89
6.2.6 Scarcity of insurance alternatives for sustainable solutions .. 91
6.2.7 Rental or resale value of green construction procedures and conditions ........................................... 94
6.2.8 Failure to use financial incentives........................................ 97
6.2.9 Inadequate definition of project parties’ contractual roles and responsibilities........................................ 98
6.2.10 Inconsistencies between formal regulations and LEED ..... 99
6.2.11 Concerns on stringent standard of LEED ......................... 101
6.2.12 Lack of green construction experience and qualification ... 103
6.2.13 Misrepresentation of expertise and competence .............. 104
6.2.14 Expected response rate.................................................. 106

7. CONCLUSION AND RECOMMENDATIONS ............................ 108

APPENDIX

A. FEDERAL LEADERSHIP IN HIGH PERFORMANCE AND SUSTAINABLE BUILDING MEMORANDUM OF UNDERSTANDING ..................................................... 110

BIBLIOGRAPHY ........................................................................ 121
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cases downloaded from Lexis Nexis</td>
<td>70</td>
</tr>
<tr>
<td>2. Legend for Lexis Nexis Cases</td>
<td>71</td>
</tr>
<tr>
<td>3. Number of cases downloaded from the Civil Board of Contract appeals website</td>
<td>71</td>
</tr>
<tr>
<td>4. Responses from survey on Green buildings</td>
<td>72</td>
</tr>
<tr>
<td>5. Number of cases per year</td>
<td>73</td>
</tr>
<tr>
<td>6. Amount of claim, amounts granted and granted in part</td>
<td>74</td>
</tr>
<tr>
<td>7. Types of claims</td>
<td>78</td>
</tr>
<tr>
<td>8. Decisions in relation to claims</td>
<td>81</td>
</tr>
<tr>
<td>9. Doubts about long-term viability and performance of untested sustainable materials, products, materials and technologies</td>
<td>84</td>
</tr>
<tr>
<td>10. Faulty performance of sustainable HVAC/electrical/plumbing Water/power systems</td>
<td>86</td>
</tr>
<tr>
<td>11. Failure to receive materials/products on time</td>
<td>87</td>
</tr>
<tr>
<td>12. Lack of expertise in sustainable products/technologies</td>
<td>88</td>
</tr>
<tr>
<td>13. High cost of certification</td>
<td>90</td>
</tr>
<tr>
<td>14. Scarcity of insurance alternatives for sustainable solutions</td>
<td>93</td>
</tr>
<tr>
<td>15. Loss of rental or resale value caused by green construction procedures and conditions</td>
<td>96</td>
</tr>
<tr>
<td>16. Failure to use financial incentives</td>
<td>98</td>
</tr>
<tr>
<td>17. Inadequate definition of projects parties’ contractual roles and Responsibilities</td>
<td>99</td>
</tr>
<tr>
<td>18. Inconsistencies between formal regulation and LEED</td>
<td>101</td>
</tr>
</tbody>
</table>
19. Concerns on stringent standard of LEED ........................................ 103

20. Lack of green construction experience and qualification ......................... 104

21. Contractors and subcontractors agreeing to standards that are not within their expertise and competence ......................................................... 105

22. Expected response rate ........................................................................ 107
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total amount granted and granted in part</td>
<td>74</td>
</tr>
<tr>
<td>2. Parties involved</td>
<td>76</td>
</tr>
<tr>
<td>3. Types of claims</td>
<td>79</td>
</tr>
<tr>
<td>4. Decisions in relation to types of claims</td>
<td>82</td>
</tr>
<tr>
<td>5. Doubts about long-term viability and performance of untested sustainable materials, products, materials and technologies</td>
<td>84</td>
</tr>
<tr>
<td>6. Faulty performance of sustainable HVAC/electrical/plumbing Water/power systems</td>
<td>86</td>
</tr>
<tr>
<td>7. Failure to receive materials/products on time</td>
<td>87</td>
</tr>
<tr>
<td>8. Lack of expertise in sustainable products/technologies</td>
<td>89</td>
</tr>
<tr>
<td>9. High cost of certification</td>
<td>90</td>
</tr>
<tr>
<td>10. Scarcity of insurance alternatives for sustainable solutions</td>
<td>93</td>
</tr>
<tr>
<td>11. Loss of rental or resale value caused by green construction procedures and conditions</td>
<td>97</td>
</tr>
<tr>
<td>12. Failure to use financial incentives</td>
<td>98</td>
</tr>
<tr>
<td>13. Inadequate definition of projects parties’ contractual roles and Responsibilities</td>
<td>99</td>
</tr>
<tr>
<td>14. Inconsistencies between formal regulation and LEED</td>
<td>101</td>
</tr>
<tr>
<td>15. Concerns on stringent standard of LEED</td>
<td>103</td>
</tr>
<tr>
<td>16. Lack of green construction experience and qualification</td>
<td>104</td>
</tr>
<tr>
<td>17. Contractors and subcontractors agreeing to standards that are not within their expertise and competence</td>
<td>105</td>
</tr>
<tr>
<td>18. Expected response rate</td>
<td>107</td>
</tr>
</tbody>
</table>
ABSTRACT

Construction professionals, irregardless of their experience, go through all these problems. These problems which in turn becomes disputes arise from the various stages or phases in the construction process - the pre-design stage, the design stage, bidding/negotiating stage and the construction stage.

The introduction of green/sustainable building construction has raised a lot of questions in the construction industry. Unlike the traditional building process, disputes in the green building construction process are not well known, with issues ranging from materials through to the certification process.

This research seeks to analyze the different disputes that arise from both the traditional and green building processes and determine which process has more risk associated with it.
CHAPTER 1
INTRODUCTION

As construction projects become more technically demanding and complex, contract claims become more technically oriented, requiring sophisticated analysis of the project's technical aspects for proper assessment and fault determination.

The construction industry is characterized by an increasing number and cost of disputes and claims between the contractors and the project owner or the owner's architect/engineer design firm. These disputes stem from many causes, including varied interpretations of contract specifications, unpredictable and somewhat uncontrollable project delays, and nonperformance of various firms involved in the construction process. Independent of the reason for a construction problem, dispute, or claim, such an incurrence jeopardizes a contractor's profitability and the financial success of the project for the project owner. Construction disputes and claims can and do occur on both publicly and privately funded projects, and on projects of small as well as large dollar amounts. Claim conditions occur even before workers and machines reach to the job site. Miscommunication, inadequate plans and specifications, rigid contracts, changes in site conditions, nonpayment, catch up profits, limitations on manpower, tools and equipment, improper supervision, notice requirements, constructive changes not recognized as such by owner, delays, acceleration measures arise with claims and often result in disputes (Adrian, 1988).

All design and construction projects have inherent risks that will be borne by the various participants - errors and omissions in the construction documents, untimely
design changes, and delays during construction, just to name a few. In a Green design project these risks are still present but they are now accompanied by numerous new concerns. The risks vary by project and are highly dependent on the requirements set forth by local jurisdiction and on any voluntary requirements that may be made mandatory by the project’s contract provisions.

The objective of this research is to analyze claims between green/sustainable buildings and non-green buildings. It looks at cases reviewed by Civil Board of Contract Appeals of Government agencies and cases downloaded from Nexis Lexis Academic. The topics covered in the following seven chapters of this research discuss green and sustainable construction, green construction risks, contract disputes and traditional building claims. The material covered in these chapters highlights claims and risks in both green and non-green building processes. The literature review which is made up of chapters 2, 3 and 4. Chapter 2 addresses green building construction and its various rating systems. Chapters 3 and 4, discusses the claims and risks related to non-green and green buildings respectively. Chapter 5 talks about the methodology of the research, the process of data gathering and any assumptions made in relation to data collection and analysis. Chapter 6 is devoted to studying and analyzing the results of the cases. Categorical analysis and statistical (frequency) analysis are included in the chapter. Chapter presents the conclusions from the results and recommendations.
“Green building” means different things to different people. There is no generally accepted definition for “green building.” It is, however, essentially the design, construction, operation, and maintenance of buildings to reduce the use of natural resources, encourage reuse of construction materials, and encourage site development to minimize injury to the natural landscape and community. The terms “sustainability” and “high performance building” are often associated with “green building”. One definition of “sustainability” is “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” The term “high-performance building” focuses on measurable and verifiable improved building outcomes through the use of cost-benefit analysis (Perkins, 2009).

The Office of the Federal Environment Executive offers a useful working definition. This agency defines this term as:

The practice of (1) increasing the efficiency with which buildings and their sites use energy, water, and materials and (2) reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal – the complete building life cycle

Similarly, the Environmental Protection Agency (EPA) defines green building as follows:

The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s life cycle from siting to design,
construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a “sustainable” or “high performance” building.

Both of these definitions mention life cycle assessment (LCA). LCA is the investigation and valuation of the environment and the economic, and social impacts of a product or service. In the context of green buildings, LCA evaluates building materials over the course of their entire lives and takes into account a full range of environmental impacts, including a material’s embodied energy; the solid waste management generated in its extraction, use, and disposal; the air and water pollution associated with it; and its global-warming potential. LCA is an important tool because it can demonstrate whether a product used in a green building is truly green (Howe, 2010).

Although green buildings represent the generation of buildings, the reality is that the vast majority of buildings are not green, and these buildings will continue to be used for many years to come. Improving the energy efficiency of existing buildings typically involves a process called retrofitting, which can mean anything from installing more energy-efficient fixtures to increasing the amount of insulation in a building. The U.S. Green Building Council has a rating standard specifically focused on existing buildings, referred to as LEED-EBOM (EBOM stands for “existing buildings operation and maintenance”). While greening existing buildings does not receive the attention that new green buildings do, it is certainly important when looking at reducing the environmental impacts of buildings nationwide (Howe, 2010).
2.1 Green Building Rating Systems

Green building standards seek to establish and implement measurable and attainable benchmarks to evaluate development impacts on the environment. The common theme found within all green building standards is to increase building efficiency and reduce the building’s impact on the environment and human health through the efficient use of energy, water, building materials, and operational practices. While this sustainable theme remains constant, the construction methods, building materials, and architectural/engineering design for green buildings are constantly evolving. Thus, the standards that are used to measure green buildings are evolving constantly as well.

Most green building standards look at the following six categories in determining sustainable building practices:

- Site location- using existing infrastructure, minimizing the impact to the surrounding environment, and selecting sites served by mass transit;
- Energy conservation- use of on-site renewable energy, efficient building methods, natural lighting, and efficient mechanical equipment;
- Water conservation- promoting water conservation through the use of low-flow fixtures, the capture and reuse of water, and the use of gray water for irrigation;
- Material selection- promoting the use of sustainable materials by emphasizing the use of products with low or no concentrations of hazardous chemicals and that are grown sustainably and locally;
- Indoor air quality- seeking to optimize indoor air quality through ventilation and the use of products that emit low or no volatile organic compounds; and
• Building operations and maintenance- ensuring that buildings are operated and maintained properly by, among other things, using automatic shutoffs for lighting and ensuring that the building’s mechanical systems are operating efficiently.

The U. S. Green Building Council’s LEED rating system is an established and widely used green building rating system in the United States. While the USGBC’s LEED portfolio remains the most widely used green building system, there are other rating systems also include the Building Research Establishment’s Environmental Assessment Method (BREEAM), Green Globes, Energy Star, and Green Guide for Healthcare (GGHC), Living Building Challenge (LBC), Comprehensive Assessment System for Building Environmental Efficiency (CASBEE), Building Environment Assessment Method (BEAM), Green Star SA, GBTool, Green Mark, Pearl Rating System for Estidama as well as several other regional residential rating systems (White et al., 2010).

2.1.1 Leadership in Energy and Environmental Design (LEED). USGBC was founded in 1993 as a nonprofit organization aimed at conveying sustainable building practices to the mainstream building construction industry. The organization sought to develop a comprehensive package of community-oriented, environmentally sound, and innovative development techniques to the building community to foster their efforts in the advancement of sustainable building practices. President Clinton established the “Greening of the White House” initiative on Earth Day 1993, and sought to improve energy and environmental performance of the White House grounds. This initiative was incorporated into a report, with many of the recommendations implemented into the
White House’s operations protocol. Since 1996, the White House has benefited from an annual savings of approximately $300,000. This appointment helped bring early national credibility to USGBC.

Following its inception, the USGBC established a set of criteria to evaluate and measure green building performance, which it referred to as Leadership in Energy and Environmental Design, or LEED. LEED defines which elements are pertinent to a building’s sustainable existence, such as structural materials, overall building design, landscaping, and site location. The LEED rating system seeks to promote whole-building integration by examining the design, construction, and operational practices of a building. In addition to whole-building integration, LEED takes into consideration the health and productivity of building inhabitants (White et al., 2010).

To achieve the desired level of LEED certification, the project must go through a certification process beyond standard building inspections. From a practical and legal perspective, the owner, the architect, and contractor should work together to determine the party that will serve as the primary LEED consultant for the project, or whether they are going to hire a third-party LEED consultant. The primary LEED consultant will register the project with the USGBC via the LEED online program. Upon registering, the party seeking LEED certification will have to pay a registration fee based on membership and a certification fee that is based on several factors, including the square footage of the project. During the design phase, the primary LEED consultant will indicate which points it expects to get and relevant information concerning how it expects to do so. The USGBC will thereafter mark each credit as anticipated or denied, although it cannot officially award any credits until after the building in completed. The party may appeal
these initial decisions in a manner similar to the final appeal process described below. The LEED consultant submits material during the construction phase that demonstrates how the project has met the requirements of each prerequisite and works with the various stakeholders to track credits and ensure that the requirements of each credit have been met. The USGBC will make a final decision on each credit request at the end of the construction phase, which is referred to as the final review (White et al., 2010).

If a design professional is serving as a LEED consultant on a project, he or she must carefully consider the impact of the submittal on his or her professional liability insurance. Most insurance policies for design professionals state that they do not apply to warranties and guarantees, nor any claims based upon or rising out of express warranties and guarantees (White et al., 2010).

If a design professional is sued for the failure to obtain a certain LEED certification level; a dispute could arise between the professional and his or her insurance provider if he or she is found liable. To avoid this potential exposure, the design professional should add something along the lines of the following statement to the LEED submittals: “The signing of this and any other submittal template is solely for the satisfaction of this LEED certification process and does not constitute any guarantee or warranty of any work or product.” Design professionals should discuss these issues with their insurance providers beforehand and also should note that this disclaimer may not suffice in avoiding coverage issues without confirmation from their insurance providers. Design professionals should include language in their contracts explicitly stating that they cannot guarantee LEED certification and that the reasonable standard of care will apply
to their performance of services relating to LEED design just as they apply to any other professional services (White et al., 2010).

A party has the opportunity to appeal a ruling by the USGBC (at a cost of $500 for each credit appeal) if a project fails to achieve the intended LEED certification level following the final LEED review. To challenge the final ruling, the project team must submit an appeal to USGBC within 25 days of the final review. If the denial is upheld, no further recourse is available. There is likely no recourse available against the USGBC for denying certification of a project, as it has no contractual duty to any of the parties. In addition, the forms completed during the project registration process include express disclaimers of any liability or reliance on obtaining certification, and all parties involved must also agree to hold the USGBC harmless (White et al., 2010).

### 2.1.2 Building Research Establishment’s Environmental Assessment Method (BREEAM)

The BREEAM green building rating system was established in 1990 by the Building Research Establishment (BRE), which is based in the United Kingdom. BRE was created in 1917 by the Department of Scientific and Industrial Research (DSIR), which was tasked with creating a government-funded organization that would explore innovative building materials and construction methods for use in the thriving housing market following World War I. Some of the early work BRE carried out includes research with reinforced concrete in floors and setting the British standard for brick.

According to BRE, BREEAM is the most widely used environmental performance rating system in the world, although it is not widely used in the United States. Since BRE’s inception, more than 818,943 homes and 22,972 buildings have been
registered. BRE is responsible for operating BREEAM as well as the EcoHomes rating systems, which provides ratings for new, converted, or an accumulation of points to achieve one of the following ratings: pass, good, very good, excellent, and outstanding. BREEAM rating system categories include courthouses, sustainable homes, EcoHomes, EcoHomesXB (existing buildings), health care, industrial, international, multifamily, prisons, office, retail, educational facilities, and communities. BRE has made a concerted effort to cover a multitude of building types and even includes the BREEAM Bespoke rating system for international and specialized buildings, which do not conform to the aforementioned categories.

Like LEED, both BREEAM and EcoHomes are voluntary and underwent significant updates in August of 2008. The most notable changes consist of a new two-staged evaluation process similar to LEED (where both the design and building as constructed are evaluated) and the introduction of mandatory credits (White et al., 2010).

BREEAM major categories of criteria for Design and Procurement include the following:

- Management (commissioning, monitoring, waste recycling, pollution minimization, materials minimization)
- Health & Wellbeing (adequate ventilation, humidification, lighting, thermal comfort)
- Energy (sub-metering, efficiency and CO2 impact of systems)
- Transport (emissions, alternate transport facilities)
- Water (consumption reduction, metering, leak detection)
• Materials (asbestos mitigation, recycling facilities, reuse of structures, facade or materials, use of crushed aggregate and sustainable timber)
• Land Use (previously used land, use of remediated contaminated land)
• Ecology (land with low ecological value or minimal change in value, maintaining major ecological systems on the land, minimization of biodiversity impacts)
• Pollution (leak detection systems, on-site treatment, local or renewable energy sources, light pollution design, avoid use of ozone depleting and global warming substances) (Fowler and Rauch, 2006).

2.1.3 Green Globes. Green Globes is an online building assessment tool for both residential and commercial structures. Green Globes helps both with the new construction of commercial buildings and with the maintenance and improvement of existing buildings. It is questionnaire-driven and is generally acknowledge to be less cumbersome and less expensive to administer than LEED, although not as well known or rigorous (White et al., 2010).

The first step toward a Green Globes certification is completing a self-reported online assessment survey, which is required at various stages throughout design and construction. At the construction documents phase and after substantial completion, a Green Globes Assessor will perform a site visit to verify the claims made in the survey. Based on a 1,000 point scale, projects can earn between one and four Globes, with four indicating the highest level of sustainability within the system (Vierra, 2011).

Green Globes was brought to Canada from the United Kingdom in 1996 following the introduction of BREEAM. Green Globes’ online assessment tool was
released in 2000 and provides green guidelines for residential and commercial structures. The Green Building Initiative (GBI), a nonprofit organization based in the United States acquired the rights to distribute Green Globes to the United States in 2004. In 2005, GBI became the first green organization accredited by the American National Standards Institute (ANSI), which promoted the establishment of Green Globes as an ANSI standard (White et al., 2010).

Green Globes major categories of criteria include the following:

• Project Management (integrated design, environmental purchasing, and commissioning, emergency response plan)
• Site (site development area, reduce ecological impacts, enhancement of watershed features, site ecology improvement)
• Energy (energy consumption, energy demand minimization, “right sized” energy-efficient systems, renewable sources of energy, energy-efficient transportation)
• Water (flow and flush fixtures, water-conserving features, reduce off-site treatment of water)
• Indoor Environment (effective ventilation systems, source control of indoor pollutants, lighting design and integration of lighting systems, thermal comfort, acoustic comfort)
• Resource, Building Materials and Solid Waste (materials with low environmental impact, minimized consumption and depletion of material resources, re-use of existing structures; building durability, adaptability and disassembly; and reduction, re-use and recycling of waste) (Fowler and Rauch, 2006).
2.1.4 Living Building Challenge (LBC). It is a performance-based system initially launched by the Cascadia Green Building Council. In April 2011, the International Living Future Institute became the umbrella organization for both the Cascadia Green Building Council and the Living Building Challenge. The LBC makes stringent demands such as 100% net zero energy, 100% net zero water, on-site renewable energy, and 100% recycling or diversion of construction waste. It examines site, water, energy, materials, health, equity, and beauty. All of its tenets are mandatory making it the most rigorous green building certification system in the market today. An on-site audit must occur by a member of the International Living Building Institute (ILBI).

After online registration, projects must join the living building community where discussions concerning compliance are held, and documentation occurs. Certification occurs twelve months after project completion, with an on-site audit to ensure compliance (Vierra, 2011).

2.1.5 Comprehensive Assessment System for Building Environmental Efficiency (CASBEE). CASBEE (Comprehensive Assessment System for Building Environmental Efficiency) was developed in Japan, beginning in 2001. The family of assessment tools is based on the building’s life cycle: pre-design, new construction, existing buildings, and renovation. CASBEE presents a new concept for assessment that distinguishes environmental load from quality of building performance. By relating these two factors, CASBEE results are presented as a measure of eco-efficiency or BEE (Building Environmental Efficiency). Results are plotted on a graph, with environmental load on one axis and quality on the other – the best buildings will fall in the section representing
lowest environmental load and highest quality. Each criterion is scored from level 1 to level 5, with level 1 defined as meeting minimum requirements, level 3 defined as meeting typical technical and social levels at the time of the assessment, and level 5 representing a high level of achievement. The CASBEE Technical Manual presents detailed definitions of each level for each criterion and includes reference material and calculation tools where needed (Fowler and Rauch, 2006).

CASBEE is composed of four assessment tools corresponding to the building life cycle. 'CASBEE Family" is the collective name for these four tools and the expanded tools for specific purposes. The CASBEE assessment tools are CASBEE for Pre-design, CASBEE for New Construction, CASBEE for Existing Building and CASBEE for Renovation, to serve at each stage of the design process. Each tool is intended for a separate purpose and target user, and is designed to accommodate a wide range of uses (offices, schools, apartments, etc.) in the evaluated buildings. CASBEE covers the assessment fields of energy efficiency, resource efficiency, local environment, and indoor environment. Both indoor and outdoor spaces are considered as part of the assessment but are assessed separately (Vierra, 2011).

CASBEE major categories of criteria include the following:

Building Environmental Quality and Performance

- Indoor environment (noise and acoustics, thermal comfort, lighting and illumination, and air quality)
- Quality of services (functionality and usability, amenities, durability and reliability, flexibility and adaptability)
• Outdoor environment on site (preservation and creation of biotope, townscape and landscape, and outdoor amenities)

Building Environmental Loadings

• Energy (thermal load, use of natural energy, efficiency of systems, and efficient operations)

• Resources and materials -water conservation, recycled materials, sustainably harvested timber, materials with low health risks,

• Reuse and reusability, and avoidance of CFCs and halons

• Off-site environment (air pollution, noise and vibration, odor, sunlight obstruction, light pollution, heat island effect, and local on local infrastructure) (Fowler and Rauch, 2006).

2.1.6 Building Environment Assessment Method (BEAM). Based in Hong Kong, BEAM is a comprehensive standard and supporting process covering all building types, including existing and newly constructed mixed use complexes. BEAM is an initiative that assesses, improves, certifies, and labels the environment performance of buildings. It is a voluntary program developed in partnership with, and adopted by the industry. BEAM is intended to: stimulate demand for more sustainable buildings in Hong Kong and other regions, giving recognition for improved performance and minimizing false claims; provide a common set of performance standards that can be pursued by developers, designers, architects, engineers, contractors and operators; reduce the environmental impacts of buildings throughout the planning, design, construction, management and demolition life cycle; and increase awareness in the building
community, and ensure that environmental considerations are integrated at the beginning of a project.

BEAM assessments are currently undertaken by the Business Environment Council (BEC), an independent, nonprofit, environmental information center, under the guidance of the BEAM Society Executive Committee. Certification can only be issued upon building completion due to a significant number of credits being based on actions taken during construction and upon completion (Vierra, 2011).

2.1.7 Energy Star. The U. S. Environmental Protection Agency (EPA) and the U. S. Department of Energy (DOE) introduced the Energy Star rating system in 1992. All appliances and electrical devices bearing the Energy Star logo have been evaluated and given a rating based on energy efficiency and utility cost savings as compared to traditional products. The program aims to educate consumers in the financial and environmental benefits gained by choosing a certified Energy Star product. The Energy Star product categories include appliances, HVAC systems, consumer electronics, office equipment, and lighting (White et al., 2010).

The Energy Star rating has also been expanded to include whole-home and commercial building efficiency. EPA has recently developed an energy efficiency assessment tool named Portfolio Manager, which allows a user to input energy usage information about a particular building and receive an energy performance score, thus determining the building’s eligibility to apply for the Energy Star certification. A building attaining a score of 75 or higher on a 100 point scale is eligible to receive the
Energy Star rating, meaning that it is in the top 25\textsuperscript{th} percentile based on EPA’s National Energy Performance Rating (White et al., 2010).

\textbf{2.1.8 Green Star SA.} It was developed by The Green Building Council of South Africa, and is based on the Australian Green Building Council tools to provide the property industry with an objective measurement for green buildings and to recognize and reward environmental leadership in the property industry. Each rating tool reflects a different market sector (office, retail, multi-unit residential, etc.). The objectives of the Green Star SA rating tools are to: establish a common language and standard of measurement for green buildings, promote integrated, whole building design, raise awareness of green building benefits, recognize environmental leadership, and reduce the environmental impact of development.

Green Star SA Certification is a formal process which involves a project using a Green Star SA rating tool to guide the design or construction process during which a documentation-based submission must be submitted as proof of the achievement. A "Design" certification can be submitted for and awarded at the end of the design phase of the project. At the end of construction, a project can submit for and be awarded "As Built" certification, certifying that all green building strategies were in fact incorporated into the final building. The Certified Rating can be achieved prior to practical completion, but must be achieved no later than 24 months after practical completion. As Built submissions must be submitted after practical completion, and the Certified Rating must be achieved no later than 24 months after practical completion (Vierra, 2011).
2.1.9 GBTool. GBTool was developed by the International Framework Committee for the Green Building Challenge, an international project that has involved more than 25 countries since 1998. GBTool is designed to be adapted by sponsors to reflect regional conditions and context. It includes criteria in categories such as Site Selection, Project Planning and Development; Environmental Loadings; Energy and Resource Consumption; Indoor Environmental Quality; Functionality; Long-Term Performance; and Social and Economic Aspects. Criteria are assessed using scales that are based on local benchmarks of “typical” practice; buildings can score -1 if below typical practice or from +1 to +5, representing good to very high performance. All criteria must be scored, thus providing a complete assessment of the building. Both benchmarks of typical practice and weightings of criteria are established by the sponsoring organization to represent national, regional, or local codes, practice, context, conditions, and priorities.

GBTool has evolved over time as it has been tested by participating countries and results have been presented at a series of international conferences. Originally addressing only an as-designed assessment, GBTool is developing versions to address pre-design, design, as built, and operations. The tool itself comprises two spreadsheets, one for data entry (to be completed by the project team) and one for establishing weights and benchmarks and completing the assessment (to be completed by third party sponsors or assessors).

GBTool major categories of criteria include the following:

- Energy consumption is assessed through total use of non-renewable energy (embodied and operational), electrical peak demand for operations, use of renewable energy, and commissioning.
• Resource consumption is assessed through materials use (salvaged, recycled, bio-based and sustainably harvested, locally produced, designed for disassembly, reuse, or recycling) and water use for irrigation, building systems, and occupant use.

• Environmental loadings include greenhouse gas emissions, other atmospheric emissions, solid wastes, storm water, wastewater, site impacts, and other local and regional impacts.

• Indoor environmental quality is assessed through indoor air quality, ventilation, temperature and relative humidity, daylight and illumination, and noise and acoustics.

• Other criteria include selection of appropriate site (in terms of land use, brownfields, access to transportation and amenities), project planning, urban design (density, mixed uses, compatibility, native plantings, and wildlife corridors), building controls, flexibility and adaptability, maintenance of operating performance, and a few social and economic measures (Fowler and Rauch, 2006).

2.1.10 **Green Mark.** Based in Singapore, Green Mark was launched by the Building and Construction Authority (BCA) in January 2005 to promote environmental awareness in the construction and real estate sectors. The BCA Green Mark Scheme rates buildings according to five key criteria including: energy efficiency, water efficiency, environmental protection, indoor environmental quality, and other green and innovative features that contribute to better building performance. The program outlines a six step scheme that also offers cash incentives to developers, especially focused on addressing
improvements to existing construction in areas such as energy use reduction and materials conservation (Vierra, 2011).

2.1.11 Green Guide for Healthcare. The leading vehicle for green building implementation in the health-care industry is the Green Guide for Healthcare (GGHC), a health care industry-driven system that the American Society for Healthcare Engineering created in 2002. There are a number of unique challenges in accomplishing standard green building practices in health-care facilities, including the following:

1. The need for hospitals and other health-care facilities to be open with all systems functioning around the clock;
2. The high level of dangerous waste that health-care facilities produce;
3. Patients’ increased sensitivities to chemicals and pollutants (along with related air circulation issues);
4. The need for health-care facilities to meet stringent regulatory standards that are not applicable to typical commercial developments; and
5. The fact that health-care facilities have different transportation expectations than some other places of business.

As a result of these differences, general green building standards for the health-care industry have taken longer to develop than standards for other types of buildings. The GGHC is a voluntary self-certifying program that borrows from, but is not formally connected to, the LEED rating system. In a manner similar to the LEED system, GGHC gives a certain number of credits for each environmentally friendly and energy-efficient characteristic incorporated into a building. GGHC includes metrics for both construction
and operations, which allows it to be used for existing facilities as well as new construction. Because GGHC is a self-certifying system, health-care entities that wish to use it must vouch for their own compliance with the program (White et al., 2010).

2.1.12 Pearl Rating System for Estidama. Estidama, which means ‘sustainability’ in Arabic, is intended to be the initiative which will transform Abu Dhabi into a model of sustainable urbanization. Its aim is to create more sustainable communities, cities, and global enterprises and to balance the four pillars of Estidama: environmental, economic, cultural, and social. The Pearl Rating System for Estidama aims to address the sustainability of a given development throughout its life cycle from design through construction to operation. Accordingly, three rating stages have been established: Design, Construction, and Operational.

Within each section there are both mandatory and optional credits and credit points are awarded for each optional credit achieved. To achieve a 1 Pearl rating, all the mandatory credit requirements must be met. To achieve a higher Pearl rating, all the mandatory credit requirements must be met along with a minimum number of credit points (Vierra, 2011).

2.1.13 Regional Residential Rating Systems. LEED did not focus on residential properties until the release of its LEED-Homes rating systems in 2008, in recent years a number of regional green residential rating systems have emerged. One example is California’s Build It Green system. Build It Green is a nonprofit organization whose mission is to promote healthy energy- and resource- efficient buildings throughout the
The organization has developed a residential rating program called “GreenPoint Rated,” which provides an objective, third-party verification system that equips consumers to find green homes and understand green benefits, and recognizes green features. Under the program, homes are graded on five categories: energy efficiency, resource conservation, indoor air quality, water conservation, and community. If a home meets the minimum point requirements in each category and scores at least 50 points, it earns the right to bear the GreenPoint Rated label. The system also provides a score that allows prospective purchasers to evaluate and compare the environmental performance of different homes. There are a number of similar state and local organizations that encourage green homes, including Built Green Colorado, Built Green Seattle, the California Green Builder Program, and the California Home Energy Rating System (HERS), to name a few (White et al., 2010).

2.2 **Standard Form Green Documents**

Despite the rising popularity of green building, most standard form construction contracts either fail completely to address or inadequately address the duties, responsibilities, and risks associated with green building. Currently, standard form contracts generally fail to adequately address the various green issues and allocate the green risks, including, but not limited to, the following:

- “Green” terminology, such as “sustainability” or “green certification,” are often not defined, which creates ambiguity in expectations.

- Party (ies) responsible for failure to achieve LEED or other green certification or sustainability goal may not be specified.
• Party responsible for registering the project and administering the LEED (or other green certification) process may not be designated.
• Appropriate insurance policies for green building issues may not be required, provided, or available.
• Consequences of decertification may not be addressed in the contract.
• Responsibility for due diligence regarding green products and technologies may not be addressed.
• Consequential damages associated with green building (such as lost tax credits and diminution in property value) may not be addressed.
• The impact of the long lead time to achieve a green certification may not be addressed or it may be inadvertently addressed in a detrimental manner.

Therefore, green project contracts must be supplemented or manuscripted to address the green issues, in order to minimize disputes, claims, and litigation/arbitration. Several organizations have made initial attempts to address green issues in their form contracts (Perkins, 2009).

The American Institute of Architects has slightly modified several of its standard form contracts to begin to address green building and sustainable design issues. For instance, pursuant to AIA B101-2007, architects are now required to address sustainability issues with owners. Relevant language from the AIA B101-2007 provides as follows:

Section 3.2.3: The Architect shall present its preliminary evaluation to the Owner and shall discuss with the Owner alternative approaches to design and construction of the
Project, including the feasibility of incorporating environmentally responsible design approaches.

Section 3.2.5.1: The Architect shall consider environmentally responsible design alternatives, such as material choices and building orientation, together with other considerations based on program and aesthetics, in developing a design that is consistent with the Owner’s program, schedule and budget for the Cost of the Work. While the language of these two provisions mandates that the architect discuss green design with the owner and consider green design alternatives, it remains to be seen just how much impact, if any, such provisions have (Perkins, 2009).

In addition, AIA B214-2007 (formerly, B214-2004), Standard Form of Architect’s Services: LEED Certification, is a scope of services document that establishes duties and responsibilities when the owner seeks LEED certification from the USGBC. Among other things, the architect’s services include conducting a pre-design workshop where the LEED rating system will be reviewed and LEED points will be targeted, preparing a LEED Certification Plan, monitoring the LEED Certification process, providing LEED specifications for inclusion in the Contract Documents, and preparing a LEED Certification Report detailing the LEED rating that the project achieved.

B214-2007 may be used in two ways: (1) incorporated into the owner-architect agreement as the architect’s sole scope of services or in conjunction with other scope of services documents; or (2) attached to G802-2007, Amendment to Professional Services Agreement, to create a modification to an existing owner-architect agreement. B214-2007 is a scope of services document only and cannot be used as a stand-alone owner-architect
agreement. B214-2007 was revised in 2007 to align, as applicable, with B101-2007 (Perkins, 2009).

Failure to follow these rules and regulations may result in disputes between the client and architect.


The GBA was developed to help guide green performance requirements and address risk allocation issues, which are not currently addressed in standard contract documents. The GBA identifies the project participants, the roles of the project participants, and the implementation and coordination efforts necessary to achieve a successful project with green building elements, especially one seeking a third-party green building rating. The GBA contemplates a green-building facilitator (“GBF”), who would be responsible for, among other things, overseeing the green certification process on a specific project. The GBF could be the architect, the contractor, or a third-party consultant. This document would provide much needed clarification concerning who is responsible for overseeing the certification process on the project. The GBA helps prevents issues that may arise from using standard contract documents that do not relate to green building construction (Perkins, 2009).
CHAPTER 3

CONSTRUCTION CLAIMS IN TRADITIONAL BUILDINGS

A claim is defined by the Federal Government as “a written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in sum certain, the adjustment or interpretation of contract terms, or other relief arising under or related to a given contract” (Levin, 1978)

The 1987 edition of the American Institute of Architects (AIA) standard form construction contract, General Conditions (AIA A201-1987, 4.3.1) added “A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract” (Levin, 1978).

Claims are becoming commonplace in many construction projects, especially in contracts for multi-million dollar amounts. The existence of a construction claim potentially affects the project owner, designer, and contractor team, including the general contractor and the subcontractors. The evolution of new project delivery systems, including the construction management (CM) process, has done little to reduce the number and dollar amount of claims. In fact, the existence of a construction manager has on occasion complicated the liability and damage issues that accompany a claim (Adrian, 1988).
3.1 Filing a Claim

Although the contractor may file a claim against the project designer, usually the contractor brings the claim against the project owner, even if the contractor believes the project designer to be at fault. The reason for this is that the contractor does not have privity of contract with the project designer. The contractor, and in particular, the general contractor, has a direct contract with the project owner. The fact that a contractor files a claim against the project owner does not mean that the project designer is without liability regarding the claim. The project owner, should he/she feel their designer to be the cause of the contractor’s claim, may pursue the claim damage from the designer. However, this seeking of damages by the project owner from the designer usually would not happen until the project owner lost in his attempt to defend against claim damage by the contractor. The project owner is put in a difficult position as to the project designer and the designer’s claim liability. Many construction claims are initiated by subcontractors. Although frequent, a subcontractor claim complicates the claim process, including the administration and resolution of the claim. The project subcontractor usually files the claim against the project owner, even though the subcontractor’s contract is with the project’s general contractor (Adrian, 1988).

When a prime contractor defaults, the greatest problem that the subcontractor or supplier usually faces is getting paid. Although the subcontractor or supplier always has the option of pursuing a breach of contract claim against the prime contractor, the fact is that the prime contractor default usually is an indicator that it is in trouble and may be unable or unwilling to pay. A second problem that the subcontractor or supplier may face is determining what its duties are in the event of a default. Specifically, the subcontractor
or supplier needs to know how to respond to a possible demand from a takeover prime contractor to perform the balance of the work covered under the subcontract (Lambe and Dann, 1989).

A subcontractor claim can also be placed against the project’s general contractor. The subcontractor may file a claim against the project owner through or by means of the project general contractor. This stems from the fact that the subcontractor look to the general contractor to present his claim argument or damage to the project owner, in view of the fact that the subcontractor has a contract only with the general contractor. Although, the general contractor is indebted to the subcontractor, the general contractor is put in the role of “going after” the project owner for the subcontractor’s claim. By doing so, the general contractor runs the risk of disrupting his needed favorable relations with the project owner. The general contractor is requested by the subcontractor to take this position despite the fact that the general contractor himself cannot realize any direct financial gain (Adrian, 1988).

3.2 The Environment for Claims and Changes

Here are several situations, often avoidable, that can lead to disputes and claims over changes:

Misunderstandings: There can be perfectly honest failures in communication. The field office may misunderstand or misinterpret what the home office has done, or how they think about a certain aspect of the work. It is important to make sure everyone understands the same version of what has been agreed to.
Pride: This is pride on the part of the architect or engineer who maintains that the design is “perfect,” and who thinks that any requests for changes or claims pertaining to those changes are a threat to the designer’s competence.

Greedy Owners: There are owners who think that “as long as the contractor is here, why can’t he/she do a little extra paving or painting here and there?” More frequently, what the owner might seek to extract from the contractor is to utilize the contractor’s men, plant, or equipment for longer periods of time at no extra cost. These amount to unacknowledged changes and can only lead to resentment and a job atmosphere ripe for claims.

Avaricious Contractors: There are contractors who knowingly enter agreements at below-cost prices with the plan that they will file many claims and receive their full costs and profits. No matter how enlightened an owner is, he/she could be dealing with such a contractor.

“Catch-up profit”: There are also contractors who realize late in the day that they are losing money on a job, and scurry to see where they can make it up. One way to do this is put in for claims for changes, even if there is only a shred of justification for doing so. This impulse will not be offset if the likelihood of succeeding with the claim is remote. Few truly unjustified claims are ever settled or recovered in court.

Rigid Contract Interpretation: Problems with interpretation are likely to occur when contract specifications are not absolutely clear. Sometimes this happens when an unreasonable owner or inspector goes beyond what is normal practice in the industry. The owner sets the tone for an adversary situation in this case.
Vindictiveness: Once an owner is presented with a claim, he/she can deal with it on a reasonable basis, or he/she can retaliate. Some owners adopt an “I will show him” attitude which can lead to rapid deterioration of the project climate and which is nothing but counterproductive. This attitude can be manifested by tougher inspection, rigid contract interpretations, and other unpleasant actions that only set the scene for more claims (Rubin et al., 1983).

3.3 Types of Claims

Every claim has its own unique characteristics as to why it occurred, calculation and presentation of the claim damage, and the defense against the claim. Although each claim is unique, it is possible to group into separate categories the many claims that have occurred on construction projects. The early recognition of claims is fundamental to preventing or winning a claim. Early recognition of a claim enables a firm to isolate the claim properly in order to calculate claim damage (Adrian, 1988).

3.3.1 Delay Claims. A delay claim essentially arises when a contractor is not able perform his/her work during the time in which he/she planned to do the work. The reason for the rapid increase in the number of delay claims is probably the result of several factors that have characterized the construction process over recent years. These are as follows:

- Increase in the cost of money
- Material shortages
- New delivery systems, including packaging of work
• New technology with regard to drawings and specifications

Increase in the cost of money is probably the main reason for the increase in delay claims. Uncertain events, decision-making delays, and the construction process’s dependence on a series of interdependent events cause delays in the construction process.

Material shortages, new delivery systems, and new technology have also probably had the effect of increasing the number of delay claims. New project delivery systems and/or new technology have the potential for causing delays. Confusion or uncertainty sometimes surrounds change and new procedures or practices. For example, a delay may arise because of the need for clarification for the general conditions regarding contractors of the use of a new curtain-wall system proposed for a building based on a question as to the proper means of installing the wall and/or the labor craft jurisdiction for the work (Adrian, 1988).

The modern construction project requires the coordinated efforts of the owner, the architect and its consultants, the general contractor or the construction manager, numerous contractors or subcontractors, and material suppliers all working together in close proximity of time and space to complete the work while optimizing the quality of the work, the cost of the project, and the overall time required for design and construction. The reality of the marketplace requires that in order to be the successful bidder, the contractor must compute its bid price assuming that all aspects of the work can be completed in an orderly, unhindered way without delays because of changes in the work, defects in the plans and specifications, or any of a host of other factors. If the contractor is delayed in completing the work, its cost of performance increases simply because those elements of its costs that are dependent on time require an extended period
of time. For example, the contractor will likely have field overhead costs for its field office, telephones, and field supervision costs which are directly time-related and which represent “pure” delay costs. In addition to the purely time related delay costs, the contractor’s cost of performance may increase because delayed work itself is completed in an unproductive manner or may cause subsequent related work to be done out of sequence or on a piecemeal basis instead of in an uninterrupted sequence as planned. Labor productivity rates may suffer as a result, causing the contractor’s cost to increase thereby resulting in disputes (Cushman et al., 1990).

Excusable delays, or delays that are beyond the control of the contractor, entitle the contractor to extensions of contract time (unless specifically stated otherwise in the contract). Or, the contractor can be considered to have constructively accelerated if the time extensions are due but not granted. Furthermore, the contractor cannot be terminated for default or assessed liquidated damages for excusable delays.

Contract time extensions for excusable delays are either non-compensable or compensable. Non-compensable delays, or sometimes more familiarly known as excusable delays, are delays to the completion of the work arising from conditions beyond the control and without the fault or negligence of the contractor or owner. Compensable delays are delays, suspensions, or interruptions to all or part of the contract by an act or failure to act by the owner. The distinction between a non-compensable and compensable delay, aside from the preceding definitions, is that for a compensable delay, the contractor is entitled to an adjustment for any increase in cost to the performance of the contract.
The Federal Acquisition Regulations (FAR) clause states that the contractor will not be terminated nor charged with damages for delays arising from "causes beyond the control and without the fault or negligence of the contractor." These include but are not restricted to:

- Acts of Cod
- Acts of the public enemy
- Acts of the Government in its contractual capacity
- Acts of another contractor in the performance of a contract with the government
- Fires
- Floods
- Epidemics
- Quarantine restrictions
- Strikes
- Freight embargoes
- Unusually severe weather
- Delays of subcontractors or suppliers at any tier arising from causes other than normal weather beyond the control and without the fault or negligence of both the Contractor and such sub-contractors or suppliers (Levin, 1978).

Non-excusable delays are delays to the performance of the work for which the contractor is entitled to neither time extensions nor extra costs. This includes delays that are directly caused by and/or the result of the contractor's, his subcontractors', and/or suppliers' actions; or due to external, foreseeable factors such as weather. For example,
delays attributable to underestimates of production rates, inadequate scheduling or management, construction mistakes, equipment breakdowns or just plain bad luck.

Other examples of non-excusable delays include:

- Ordinary and usual weather conditions.
- Delays to start-up and mobilization activities
- Failure to procure permits in a timely fashion
- Failure to plan activities in anticipation of, and to avoid, bad weather
- Failure to manage, coordinate, and schedule the project
- Lack of adequate working capital for purchase of supplies and/or equipment
- Delays in submission of shop drawings
- Delays in purchase, fabrication, and/or delivery of materials
- Poor workmanship, causing rework or delaying follow-on work
- Delays by subcontractors
- Ordinary and foreseeable weather conditions (Levin, 1978).

Compensable delays are delays to the performance of the contract and are governed generally by the Suspension of Work clause, which provides for an equitable adjustment to the contract (excluding profit). "If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified)

Such delays are not restricted simply to stop orders issued by the owner or directives to work on a different schedule or sequence. The owner is liable for his actions
and inactions that result in unreasonably delaying or disrupting the contractor (Levin, 1978).

Although many private contracts incorporate a provision barring the recovery of compensation or money damages for delay, the current AIA documents include no such limitation, and neither does the federal government form. In the absence of a so-called no damage for delay clause, or if the clause has been rendered unenforceable because one of the numerous exceptions applies, the contractor is entitled to compensation if it can show that it did not concurrently cause the delay and if it can quantify its damages with reasonable certainty (Cushman et al., 1990).

Once the contractor has established that the individual delay for which an extension of time is sought is excusable and, if compensation is sought, compensable as well, it is necessary to determine whether or not the contractor was independently delaying the work. If the contractor would have been delayed in any event by causes within its control, that is, if there was a concurrent non-excusable it delay, the general rule is that would be inequitable to grant the contractor either an extension of time or additional compensation, unless the contractor can segregate the portion of the delay which is excusable and/or compensable from that which is not.

On the other hand, when the owner and contractor concurrently delay the work, and the responsibility for the delay cannot be apportioned, the contractor is generally not liable for liquidated damages (Cushman et al., 1990).
3.3.2 Changes in Scope Claims. One of the top causes of construction contract disputes include changes and change orders, probably in a prominent position close to the top of the list. Indeed, most would agree that actual or constructive changes have provided the single most fertile ground for the explosive growth of litigation confronting the industry today. The tendency of changes in scope to cause serious problems in what is already a high-risk undertaking mandates a careful analysis and understanding of the legal framework surrounding the concept of "changes" to a construction contract, including the rights and remedies of the parties to that contract and the essentials of proving and pricing a change of scope claim.

Contractors generally fall into two schools of thought on the issue of changes: those who believe change orders and, more particularly, extras provide the only chance of making any profit on the job, and those who seek only to build the job as it was bid, get paid, and leave the jobsite. Although the correctness of either position can be debated, what is not subject to serious argument is the reality that, good or bad, changes in the original design are inevitable during the course of construction. In short, no construction of any significance has ever been built without changes.

The owner's admonition, therefore, often sternly and even angrily delivered at the preconstruction meeting, that budgetary requirements require that "this project will be completed with no change orders whatsoever," is as spurious as it is common. And the owner who undertakes a project not appreciating the disingenuous nature of that goal has already taken the first step down the road to litigation.

Changes are inevitable simply because they have so many sources and origins. The perfect set of plans and specifications has yet to be prepared. Design errors not
discovered during the review process will always be identified during construction. And, although a drawing that shows an eight-inch riser penetrating an eight-inch concrete beam may, at a later date, be the subject of protracted and expensive litigation to determine liability, the project cannot tolerate the luxury of such a debate at the time the error is found. The impossibility of proceeding with the design as it exists must be addressed, the contractor must have a revised design, and the progress must continue. A change to the contract must be made (Pepe and Haese, 1990).

3.3.3 Acceleration Claims. Every owner or developer knows or soon learns that a delay in the completion of a construction project can be a very damaging and costly event. For that reason, the owner frequently tries to pressure the contractor to overcome any delays encountered during construction and may even insist that the contractor perform ahead of schedule, regardless of any delays. But the contractor is entitled to the entire contract time, plus any justifiable extensions, within which to complete performance. If the owner takes away a portion of the contractor's time by forcing the contractor to complete its performance in advance of the date to which it is entitled, the owner has accelerated the contractor and is subject to liability for any increased costs incurred by the contractor.

Acceleration is the process by which the ordinary and expected progress of events in a construction contract is quickened. Acceleration occurs when the contractor performs its work at a faster rate than required by the original contract. When a contractor accelerates its performance rate voluntarily for its own purposes, it will not receive any additional compensation from the owner. However, when the contractor is ordered by the
owner to speed up its construction performance, the contractor may have a compensable claim against the owner for acceleration damages.

There are two types of compensable acceleration: directed and constructive. Directed acceleration occurs when the contractor is ordered by the owner to complete the construction project ahead of the contract completion date. Constructive acceleration, on the other hand, occurs when the owner denies the contractor's claim for a justified time extension and requires the contractor to complete the project by the contract completion date.

Acceleration is prevalent in construction projects because time is money. The fact that time schedules, completion dates, milestones, and critical path charts play a significant role in the bidding and awarding of construction contracts indicates that a major concern of the owner is the time of performance of the project. The time of performance is important to the owner because delays in the completion of the project mean that the owner incurs additional construction costs and possibly loses the use of an income-producing property during the delay. It is the desire to reduce costs and complete construction as soon as possible that often causes the owner to accelerate the contractor.

When ordered by the owner, the contractor can accomplish or attempt acceleration with a variety of techniques. These techniques include re-sequencing of work activities; increasing the labor force by increasing the number of crews and crew sizes, working overtime, and adding new shifts; adding extra equipment; and expediting material and equipment deliveries.

The use of these techniques can be characterized as the contractor's acceleration effort (Albers et al., 1990).
An acceleration claim (or loss of productivity claim) may result for several reasons, including the following:

- A contractor may be requested to work overtime
- A contractor may be requested to add additional workers to his crews
- A contractor may be requested to work two or more shifts
- A contractor may be requested to utilize equipment not planned
- A contractor may be "inadvertently" or intentionally directed by the project owner or designer to change his method of construction (Adrian, 1988).

3.3.4 Changing –Site-Condition Claims. The "differing site conditions" clause of the Federal Acquisition Regulation (FAR) [52.236-2 (Appendix 2)] classifies such conditions into two types. Type one conditions are "sub-surface or latent physical conditions at the site differing materially from those indicated in this contract." Latent conditions include natural or man-made conditions that are hidden from normal investigations. The substantiation of a type one claim is accomplished by demonstrating that the conditions actually encountered differ from those expected, as indicated by the plans and specifications. Type two conditions are "unknown physical conditions at the site of an unusual nature, which differ materially from those ordinarily encountered, and generally recognized as inhering in work of the character provided for in the contract." The key words here are "unknown," "unusual," and "differing materially." To substantiate a type two claim, the contractor must demonstrate that the conditions encountered could not be reasonably anticipated at the time of bid (Levin, 1978).
A changed-site-condition claim is similar to the scope-of-work claim. However, unlike most scope-of-work claims, one might argue that a changed-site condition really cannot be traced to any one person in particular: the project owner, designer, or contractor. Instead, a changed-site condition (relative to the conditions the contractor assumed in his bid) tends to be more related to the fact that soil conditions can never be predicted with certainty, regardless of the number of soil test borings that are taken. Thus one might suggest that unknown soil conditions are an inherent risk factor in a construction project (Adrian, 1988).

To the degree that unknown soil conditions are in fact an inherent risk factor of a project, it might follow that a contractor should include this risk in his estimate and is therefore not entitled to a claim damage when the excavation turns out to be different from that assumed in his estimate. Courts and arbitrators have often taken this position. Any cost or time overruns resulting from encountering unexpected soil conditions becomes the responsibility of the contractor.

There are at least two exceptions to this that make the owner responsible for changed site conditions. First, if the contractor can prove that the project designer did not take sufficient soil test borings or took them incorrectly (e.g., at non-representative locations), the contractor may have grounds for a claim. Second, should the soil conditions encountered be so unusual or so extreme that any "reasonable" contractor could not have predicted the conditions, the contractor may again be successful in his changing-site-condition claim. Owing to the often massive quantities of excavation work that must be done for heavy projects and highway projects, it follows that changing-site-condition claims often attach to these types of projects. The frequency of changing-site-
condition claims on heavy and highway projects also probably results because the types of projects are usually public-owner-funded projects (Adrian, 1988).

3.3.5 Disruption Claims. Disruption can be defined as any change in the method of performance or planned work sequence contemplated by the contractor at the time the job was bid which prevents the contractor from actually performing in that manner. In other words, disruption is a material alteration in the performance conditions that were expected at the time of bid from those actually encountered, resulting in increased difficulty and cost of performance.

Disruption encompasses three general principles with respect to contract performance. First, when a contractor bids on a contract, it is entitled to schedule its performance in a series of economical operations, with each stage of performance dependent upon a previous stage. Any disruption to one stage, therefore, may have a potentially disruptive impact upon the subsequent stages.

Second, parties to contract are expected to cooperate with one another and not hinder the performance of each other. A contractor plans to perform its work in a certain manner and sequence, and the owner has an implied duty not to hinder, interfere, or disrupt the contractor's planned performance.

Third, when a contractor plans its contract performance, it must do so reasonably. It may not make unrealistic assumptions about contract performance. For example, a contractor cannot make a valid disruption claim if it has assumed that it would have sole access to the site when the contract documents indicated that other contractors would be simultaneously on-site (Gavin et al., 1990).
3.3.6 Termination Claims. Construction project terminations arise in a variety of circumstances and are initiated by both owners and contractors. The first distinction is whether the termination is for convenience or for default (that is, cause). The rights of the parties and the recoveries available differ significantly depending on the type of termination.

The second distinction is whether the rights and remedies relating to termination are defined by the contract itself, by a statute or regulation, or by the common law (decisional law) that is jurisdictionally applicable. Federal procurement contracts long have provided for convenience terminations, and many private construction contracts now do too. Although terminations for convenience are purely the creation of contracts, terminations for default can be based on common law, on statutes or regulations, or on contracts. Common law traditionally has permitted one party to terminate performance of a contract upon material breach of the contract by the other party. The common-law rules have been codified in some states, and grounds for default termination sometimes are set out in regulations controlling contracts. Many construction contracts now explicitly state the grounds for default termination. The authority for termination—contract, statute, regulation, or common law—governs the procedures for termination and the remedies available.

The third distinction is which party initiated the termination. Under common law, either party to a contract may terminate performance upon material breach of the contract by the other party. Some statutes and regulations are to the same effect. But regulations and contracts are not always even-handed. Federal regulations, for example, allow grant recipients to terminate contractors for convenience or default but allow contractors to
terminate their performance only for default by the government. Thus, rights can vary significantly depending on which party to the contract seeks to assert them.

The fourth distinction is what kind of relief the aggrieved party seeks. Traditionally, remedies are discussed in terms of damages at law, equitable relief, and restitution. Because equitable relief rarely is appropriate for construction terminations, this chapter focuses on the remedies of damages and restitution. The distinction is important because, as will be shown, recoveries vary materially, depending on the theory advanced.

When only performance is terminated, the contract remains alive to govern the rights and recoveries of the parties to it. The contract itself may only be unilaterally terminated when the law permits it to be rescinded and one party exercises its right to do so. More precise terminology, depending on the circumstances, would be that the contractor ceased performance of the contract because of a material breach by the owner, or that the contractor materially breached the contract by ceasing performance without excuse, or both parties agreed (perhaps implicitly) to proceed without reference to contract requirements. Precision in terminology aids courts and juries in understanding the arguments being made and thereby improves the chance of success in litigation.

Finally, it should be noted that contractors act as owners in dealing with subcontractors, that construction managers stand in the place of owners in dealing with contractors, and that sureties can stand in the place of general contractors. Default terminations are examined from both the owner's perspective and from the contractor's perspective (Grover and Jacobsen, 1990)
3.3.7 Payment Delay Claims. When a construction contractor is paid in an untimely fashion, bottom-line profits are directly affected. The contractor prepares a bid based upon more than an analysis of the specifications and drawings; in today's climate of high interest rates, an accurate bid estimate must also take into account expected cash flow. Direct labor and material costs must be compared to anticipated progress or milestone payments that the bid's payments clause stipulates. The cost of any shortfall and the duration of that shortfall must be financed by the contractor, which results in a cost that must be worked into the bid price. A change in the anticipated financing obligation, therefore, must be treated like any other change to the contract: if the change has resulted in increased costs (damages), the contractor must be compensated.

Anticipated contract financing can be affected in two general ways. The most common occurs when the owner fails to make timely progress or milestone payments. If the payments clause provides that payments are to be made on the 10th of each month, based on the costs incurred during the preceding month, a failure to receive payments on the 10th increases the contractor's anticipated financing obligation.

A more subtle impact on the contractor's financing obligation occurs when the owner imposes extra or changed work or the contractor encounters changed conditions or delays and no timely contract modifications are made to increase the contract price. In these instances, also, the contractor's anticipated cash flow is adversely affected. Without a timely contract price adjustment, the increased costs incurred to perform the changed or extra work must be financed by the contractor. Indeed, if the changed or extra work is disputed, payment may not be received until after completion of the project, and perhaps not until after the matter has been litigated (Buxton et al., 1990)
3.3.8 Cost Claims. Although contractors in pursuit of additional funds from owners are the most frequent proponents of excess cost claims, the converse can be true as well. Occasionally, a prime contract between an owner and a general contractor has a price term that requires the owner to pay the reasonable cost of the contractor's work plus profit and overhead. Even under a fixed price contract there may be questions about overcharging and overpayment. The time-honored but questionable practice of front end loading requires an assessment of whether the amount billed for work completed at a particular stage was fair and reasonable given the construction activity to that point.

Changes in the scope of work also give rise to potential owner cost claims. Non-negotiated extras are usually determined on a cost-plus basis, again posing the question of whether the contractor has reasonably charged the owner for the work. Another type of owner cost claim arises when there is a failure to accord sufficient credit to the owner. Some construction contracts have a savings clause that enables an owner to reap all or a portion of the benefit when construction costs are less than originally anticipated. Accordingly, when an owner can demonstrate that a contractor has overstated the cost of construction, the owner should recover the overcharge pursuant to the savings provision. Similarly, when there are reductions in the scope of work (or some work is simply not completed) the question becomes whether the owner was accorded sufficient credit for the reduction. This claim necessitates a comparison of the reasonable cost of the entire scope of work with what was actually done.

The potential of an owners' cost claim arises also in a lien action against the owner by a subcontractor whose contract was with the general contractor or, perhaps, the owner's lessee. In those cases the extent of the lien is measured in essence by a quantum
meruit standard, which typically is the fair and reasonable cost of the improvement to the property. Although a fixed fee subcontract could be evidence of that fair and reasonable cost, it alone is not necessarily determinative. This point would normally arise as an owner's defense to or avoidance of a lien claim brought by a subcontractor. It could also, however, be the basis for an owner's claim against a contractor for fraud or for breach of trust. It might also be the basis for a suit against the general contractor's surety, pursuant to a contractual responsibility to protect the property from liens.

At issue in all of these situations is the fair and reasonable cost of work performed or to be performed. In most, if not all jurisdictions, reasonable cost is determined by an objective, fair-market standard. Each of the elements of cost must be judged by that standard. Thus, the amount of labor and material utilized as well as the per unit charge for that labor and material must be reasonable. When an amount for overhead and/or profit is also at issue that too must be assessed on an objective basis. Questions about these costs arise, for example, if the prime contract requires payment for profit and overhead but does not specifically set forth an amount. They also arise when a general contractor's claimed costs include the profit and overhead of its subcontractors. Under many circumstances, the owner should not be responsible for paying inflated or unreasonable amounts for the profit and administrative cost of the subcontractors, even if the contractor is entitled to a cost-plus price term.

It is plain that the actual cost paid by the contractor in any of these contexts is not enough by itself to establish the reasonableness of the cost. Nor is the sum for which the contractor has been billed by its subcontractors and suppliers necessarily determinative.
There must be additional evidence of the reasonableness of these costs, both in terms of quantity and per unit price, in order to establish the requisite proof.

The investigative approach, as well as the ultimate presentation of the evidence in court, will vary depending on whether the contractor has overstated costs because of an intentional design to defraud or because of incompetence and inefficiency. Naturally, the two are not exclusive; both fraud and incompetence can appear on the same project. Either will suffice to warrant a return of the overstated costs. But a coherent, logical explanation of the contractor’s conduct inevitably sharpens the investigation and makes the presentation of the evidence persuasive and compelling.

Often, however, the owner's investigators, particularly at the outset, may be uncertain of the contractor's motives. The decision of which explanation for the overcharges fits cannot be made prematurely; too narrow a focus obscures otherwise helpful information. The trick then is to assess the information continuously, testing the various hypotheses thoroughly without unduly prolonging the process (Pocalyko and Shea, 1990).
CHAPTER 4
CLAIMS IN GREEN BUILDING

According to McGraw-Hill Construction's 2013 Dodge Construction Green Outlook report, the U.S. green building market continues to grow. The value of green building has seen growth from $10 billion in 2005 to $78 billion in 2011. The total market — non-residential and residential — is expected to be worth $85 billion in 2012, between $98- $106 billion in 2013, and $204-$248 billion in 2016. According to the report, green building remains a bright spot in a still uncertain economy. Green is expected to represent 44% of all commercial and institutional construction in 2012, growing up to 55% by 2016. Residential green construction is also on the rise. It is expected that by the end of 2012, green homes will comprise 20% of the market, and in 2013 a 22-25% share by value is expected, equating to a $34-$38 billion opportunity. By 2016, this share by value is expected to increase to 29-38% - an estimated $89-$116 billion- based on the current single-family residential construction forecast.

In January 2006, a Memorandum of Understanding was signed by 19 Federal agencies, including GSA (General Service Administration) (See Appendix A). It states the Federal government commitment to “designing, locating, constructing, maintaining, and operating its facilities in an energy efficient and sustainable manner that strives to achieve a balance that will realize high standards of living, wider sharing of life’s amenities, maximum attainable reuse and recycling of depletable resources, in an economically viable manner, consistent with Department and Agency missions.”
However, despite a critical need, construction contracts and risk management have simply not kept pace. Indeed, many form construction documents fail to account for these dramatic changes, leaving basic issues regarding terminology, process and risk often unaddressed. It is therefore important to understand that building green encompasses new business practices and procedures. This should be addressed before the contract is signed and work commenced rather than rely upon ill-suited standard practices and standard documents. In other words, update your process, practices and contracts so that building green will benefit the environment, as well as your bottom line to avoid disputes (Washington and Pelberg, 2010).

The legal issues surrounding green building development and contracts and the green certification process, among many others, are at this point largely untested (Perkins, 2009). The discussion below identifies some of the major risk challenges associated with green building and provides some suggestions to contractors and their sureties on how to manage the same.

4.1 Green Contracts

Green contracts must be carefully drafted to achieve the desired goals. Such contracts should clearly define expectations and the meaning of “green” and/or “sustainability.” The contracts must delineate which, if any, specific third-party rating system and which version of that system is the desired goal for the project. As discussed more below, clarity through well-crafted contract provisions will assist all the stakeholders in understanding the roles and responsibilities of each party on the project.
Because green contracts are untested in the courts, we can begin to extrapolate how courts will construe various contract provisions from case law on non-green projects.

As discussed above, standard form construction contracts do not generally adequately address green risk allocation. This is a problem that can lead to disagreements between the parties, but that issue can be handled through contract supplementation. There is no magic “green paragraph” to address all the various additional issues that green construction projects carry, but each set of contract documents should properly allocate risks predicated on that project’s specifics. Clearly defined terms and risk allocations, particularly in the specifications and warranty provisions, will help avoid potential pitfalls. As always, contract provisions should shield a party from risks that the party cannot control. Contractors and their sureties should be especially mindful of specifications and warranty provisions that seek to shift the risk of a building’s performance to the contractor (Perkins, 2009).

One way to reduce the potential for disputes is to reduce uncertainty and ambiguity in contracts. Therefore, the applicable contract should address these items. Two of the key documents involved in the construction process are the contracts between the owner and its architect and also its engineer. Each will specify the role of either the architect or engineer, as well as the owner. Typically, such contracts describe the project, the professional’s scope of services, time frames for completion, and compensation. The parties should carefully review and draft the applicable contract to fit the green project, including specifying what is “green” for purposes of the contract and using an objective standard. (Randall, 2009)
Choosing between green building and a traditionally built project is fundamentally a business decision from an owner’s perspective. Estimates approximate increased construction costs of 2.5 to 6 percent for a typical green building project. State and local governments have attempted to mitigate this impact by extending an array of tax incentive programs to offset the tax impact on “green” projects which achieve and conform to certain performance criteria. By reducing the tax burden by as much as 70 to 80 percent, these credits can make the difference for owners deciding whether green projects are worth their increased costs. Still, though some studies show that there is a 10-fold payback on the increased costs, initial results from some projects are starting to raise doubts whether certified green buildings are performing any better than traditional designed and built buildings.

The U.S. Green Building Council (USGBC) has released a new third version of its rating system named Leadership in Energy and Environmental Design (LEED) called v3 that attempts to address performance accountability by mandating biannual recertification of building performance. Accountability for performance is a good thing for all parties, but a serious side effect is that a new type of uncertainty is thrown into the mix: tax credit incentives, which potentially were an essential part of financing, would presumably be subject to potential biannual decertification. Consequently, buildings failing to meet projected outcomes often lead to something that is all too common in the construction industry – claims and litigation (Washington and Pelberg, 2010).
4.2 Green Team Credentials

Although the green and sustainable building movement is rapidly growing, it is still a relatively new concept and practice to many design professionals, contractors, specialty contractors, and material suppliers. It is critical that each participant on a green project be familiar with sustainable design, green building rating systems, green products and systems, the applicable certification process, and the relevant green laws. Without designers, contractors, subcontractors, consultants, and material suppliers with extensive green knowledge and experience, a green project has a higher risk of failure. The numbers of construction industry entities with green experience is growing, but a desire by some entities to cut corners causes them to engage in “greenwashing.” Greenwashing (green + whitewash) is an exaggerated representation of green benefits or experience. Some entities disseminate disinformation in order to obtain green contracts for which they are not qualified. Due diligence by green project participants is important in order to execute a successful project that achieves the desired green results, on time and on budget (Perkins, 2009).

Furthermore, the owner, the design professional(s), the contractor, and subcontractors will likely all have roles and responsibilities that will impact whether a project achieves the desired green certification. If one of those parties with such responsibilities fails to understand and implement relevant green decisions, then the project is much more likely to fail to achieve the desired green goal.

There is a common misconception that, if a green building feature is awarded points in a green building rating system, it is no longer required to comply with code-related criteria. That is simply not so. Achieving a green credit does not alleviate the
necessity to comply with applicable code provisions. Knowledgeable green team members will understand this matter (Perkins, 2009). Consequently, lack of familiarity or knowledge with sustainable design, green building rating systems, green products and systems may pose a higher risk of failure which may result in disputes between parties involved.

4.3 Green Materials and Technologies

Green products and technologies are largely new to the market and lack much field testing. In addition, some green products manufacturers overstate the performance characteristics of their products (greenwashing). With so many new products being used in green construction, from vegetative roof materials to low-VOC flooring materials, a contractor could easily find itself in a dispute with the owner, as well as the product manufacturer (Perkins, 2009).

The overall goal of these new materials and procedures is to achieve a structure with reduced negative environmental impact, both during construction and throughout the building's life.

Some of the legal risks are fairly obvious, such as the risk of not meeting a building owner's expectation of achieving a certain level of LEED certification -- implied or even written warranties. Other risks are more obscure, such as:

- The failure of new products to meet their promoted performance levels, which is more likely with new materials compared to proven materials found in traditional buildings.
• Accepting the higher standard of care that a green building might present – what is currently considered "best practices" may now become the new expected "standard of care."

• Failing to recognize (or prepare for) the impact of a green building, in terms of unknowns in cost and schedules (Odom et al., 2010).

Such issues make it all the more important that a contractor construct in accordance with the plans and specifications and document the same, so that any new technology failure cannot be laid at the feet of the contractor. New construction technology often will have unintended consequences. Coordinating the interplay of building systems can be dicey when using experimental materials and technologies in new ways. A green project that takes advantage of building information modeling (“BIM”) is likely to present fewer risks because those potential conflicts can be identified and rectified during the virtual construction of the building rather than later in the field, where remediating the problem will be exponentially more expensive and almost certainly generate disputes and claims among the parties.

Contractors need to ensure that specified green products have been adequately tested and, furthermore, are in stock. Contracts must address who has the responsibility for due diligence regarding green products and technologies—architect, contractor, other? As we all know, project delays are highly likely to give rise to disputes.

The use of innovative and recycled products and materials could also generate unforeseen environmental issues as well. A current example of this problem is the Chinese drywall issue. Because of the alleged high sulfur content, the Chinese-manufactured drywall produces a low-grade sulfuric acid and impairs the integrity of
structure when exposed to moisture. Besides the structural failures caused by Chinese drywall, there is also a question whether the drywall negatively impacts indoor air quality and human health (Perkins, 2009).

4.4 Green Representations and Advertising

Any green owner, architect, engineer, contractor, subcontractor, supplier, vendor, or consultant should be very careful in articulating its green bona fides. Lack of clear standards for green building and mismanaged expectations increase the potential for misrepresentation and fraud-related claims. Representations and advertising, whether verbal, written, or internet, concerning green services and/or products must be verifiable, specific, and clear. A green contractor or design-builder must not misrepresent its experience and abilities in constructing (and designing) green projects. Overstating green qualifications could fall into the greenwashing trap.

Misleading statements or inaccurate advertising claims that cannot be backed up or verified may be considered fraud. Performance claims in marketing material could be construed as part of a warranty by courts. Therefore, a contractor or design–builder must avoid any health or productivity promises and any vague, undefined, or overstated terms, or any other non-verifiable representations that could be deemed deceptive marketing claims.

The Federal Trade Commission (“FTC”), which regulates marketing claims in all industries, has developed Guides for the Use of Environmental Marketing Claims, otherwise known as the FTC “Green Guides.” The Green Guides provide examples of proper and improper environmental claims. Greenwashing could expose contractors to
liability under misrepresentation and fraud theories and breaches of warranty. The Green Guides articulate principles that are useful guidance in avoiding false advertising and marketing claims concerning green building: green qualifications should be clear, prominent, and understandable; a clear distinction should be made between benefits of the product or service or a component of the product or service; environmental claims should not be overstated, expressly or implicitly; and claims should be clear, specific, and verifiable to avoid disputes (Perkins, 2009).

Until the FTC provides additional guidance, the construction industry and marketers of building products need to make certain that any claims about the green attributes of their products or services are clear, truthful, and independently substantiated. If a company engages in greenwashing,” it may face more consequences than simply potential FTC enforcement. Companies engaged in greenwashing could be subject to claims by consumers or competitors based on breach of contract, fraud, unfair competition, or detrimental reliance. They could find themselves restricted from selling their products through retailers who have announced plans to assess independently the green attributes of the products they sell. They could also experience consumer backlash and brand dilution if the green claims are perceived by the public as bogus. Consumer blogs are happy to identify and rate green marketing claims. So, while consumer demand will continue to require building product and construction companies to advertise the green attributes of their products and services, they need to be sure that any such green claims are legitimate (Boyd, 2009).
4.5 Green Guarantees and Warranties

Contractors -and their sureties- should ensure that green contracts expressly disclaim any warranty or guarantee that any certification level will be achieved. This is the green building liability issue that most concerns architects, contractors, and sureties. And it should: standard LEED contract templates include such terms as “declare,” “affirm,” or “certify,” which might indicate a warranty or guarantee that the work will achieve a certain level of performance, such as a LEED standard. The contract should not obligate the contractor to guarantee a certain level of fuel and/or energy efficiency. Any guarantees should be eschewed in favor of certain desired “goals.” To the extent any “green” criteria in a contract are deemed performance specifications, a contractor--and its surety--may inadvertently be guaranteeing the performance standards of the sustainability objectives.

In addition, a contract should specify that innovative products and technologies may be used and that all project objectives may not be realized. The specifications should not shift the obligation of certifying the contents of recyclable material used in construction to the contractor. Another consideration is whether failure to achieve a green certification will activate the contractor’s warranty obligations.

Contractors warrant, of course, workmanship: that the project will be built according to the plans and specifications. Contractors--and their sureties--should ensure that any reference to a desired green certification and design specifications are phrased so that they are not interpreted as performance specifications. The more performance related and results oriented a specification is, the more likely that it will be deemed a performance specification. This is significant, of course, because with a design
specification, the architect/engineer and owner are responsible for the specifications; and with performance specifications, the contractor is responsible for the specifications.

Another method to manage this issue is to provide in the contract that failure to achieve a desired certification is deemed a consequential damage—and ensure that the contract waives consequential damages (Perkins, 2009).

4.6 Certification Process and Special Risks of Green Design Builders

It is critical that the contract documents set forth who is responsible for registration of the project for green certification and for management of the certification process. It might be the architect, an engineer, the contractor, or a third-party certification manager; but the certification process adds an additional layer of requirements to the project. A contractor provides the work that is in the specifications, so it must be wary of incomplete green specifications.

Even when one specific entity is tasked with managing the certification process, various stakeholders in the project may have responsibilities associated with achieving certification credits, including the owner, design professionals, the general contractor, and subcontractors.

Because achievement of the desired certification involves multiple parties, a knowledgeable and experienced green team is critical as is the proper risk allocation in the event that the building fails to achieve the desired certification (Perkins, 2009).

Due to the lack of control over attaining final certification, liability may result for all participants on these projects if certification is not achieved. This will be highly dependent on contract language, the coordination and experience with green building of
participants, and an awareness of how the use of 3rd party rating systems alters the traditional scope of liability for all members of the construction industry (McLachlan, 2011).

Even if a project is properly constructed, without the proper documentation to support the certification request, green points will not be awarded. A contractor should take care that substantial completion is not tied to achieving a green certification. First, it is likely to take a minimum of six months after substantial completion for a certification to be obtained. Second, an owner could take beneficial occupancy of a building and still claim delay damages or liquidated damages prior to obtaining certification. A contractor should also be wary that an owner might insert language into the contact that retainage can be withheld until the green certification is achieved (Perkins, 2009).

For contractors and designers, a failure to achieve certification could lead to lawsuits from owners seeking consequential or liquidated damages for breach of contract. Additionally, owners may seek damages from contractors or designers in the amount of a building’s diminution in value. For subtrades, this may result in holdbacks while the other parties sort out their rights and obligations, await final certification on a completed building, or attempt to blame Subtrades for faulty or negligent work (McLachlan, 2011).

Green design-builders take on extra risks, so those must be managed through, among other things, contract language. The contract documents should specify that any representations on credit submittals are made solely for the purpose of satisfying the rating system credit and are not intended as a guarantee or warranty of functionality or performance.
Because a design-builder has no control over operations or maintenance, there is significant potential liability if the design-builder guarantees or warrants a specific performance. There is generally an expectation that the plaintiffs’ bar will attempt to argue that green design builders should be subject to a different—a rising—and standard of care if a green project is challenged for not meeting a consumer’s expectations.

In addition, a green design-builder must beware of a contract provision that entitles the owner to withhold funds until the project receives the desired green certification. As noted above, it can take a minimum of six months, and more than a year after substantial completion, for a building to obtain the desired green certification (Perkins, 2009).

Therefore, the inability for a building to achieve its required performance and certification level may arise in disputes.

4.7 Document Collection and Submittal

While all projects require contractors to make submittals for various materials used, LEED projects require a heightened level of collection and submittal. The details required of the contractor are greater, and the impacts of non-compliance are greater. The most salient consideration is this: a green credit will only be awarded if there is the proper documentation to back it up. Therefore, while a product might have been manufactured locally, if that information is not documented, the project will lose any credit it might have otherwise obtained for using local products.

In addition, a contractor must ensure that its subcontractors similarly provide the proper submittal information for materials they supply. One way to encourage such
compliance is to include in the subcontract a provision that progress payments will be predicted on, among other things, timely submittal of required documentation. In other words, a contractor should ensure that its green building obligations flow down to its subcontractors (Perkins, 2009).
CHAPTER 5

METHODOLOGY

5.1 Civil Board of Contract Appeals

The 1978 law allows claimants to bypass the boards and go directly to the U. S. Court of Claim if they choose. At this writing the effect of this change is known Most think that the case load of agency boards will be only minimally and that few cases will go directly to court. The federal boards have great advantages over, most state and local government forums. One is that the procedures are fairly uniform. The rules are the same, however, practices in different agencies may vary somewhat. The federal boards conduct hearings in a quasi-legal atmosphere. Many of the formalities and the rights that one would have in the courts obtain such as the right to subpoena. Another legalistic aspect in that the findings of the boards may be appealed

Contractors who deal with the federal government should be familiar with the workings of these boards or should have staff or consultants who are. The federal agencies naturally have staff schooled in these procedures.

Some important points about the federal board procedures follow:

1. Each agency that lets contracts must set up an appeals procedure. Each must have a case load that justifies three full-time board members. Those agencies that do not have a sufficient case load refer disputes to another agency board, or to the Office of Federal Procurement Policy.
2. The boards must have a minimum of three full-time members. Each member must have five years experience in public contract law. The board members are appointed by the head of the agency.

3. The boards have jurisdiction over contracts that deal with the procurement of property and services. Services include construction, alteration, repair and maintenance of real property, and the disposal of personal property.

4. All disputes relating to contracts may be heard before an agency board. The claim may be under the provisions of the contract, or it may arise from an alleged breach of contract.

5. A government contract may include a clause that states that the contractor must proceed with work while disputes are pending. In other words, the contractor has no grounds on which to stop work while the dispute is being resolved. (Rubin et al., 1983)

The Civilian Board of Contract Appeals (CBCA) is an independent tribunal housed within the General Services Administration. The CBCA presides over various disputes involving Federal executive branch agencies. Its primary responsibility is to resolve contract disputes between government contractors and agencies under the Contract Disputes Act. The CBCA encourages the use of alternative dispute resolution (ADR) in all appropriate cases (http://www.cbca.gsa.gov/).

5.2 Dispute Resolution

Efficiently resolving claims can mean the difference between the survival and failure of the project or parties to the project. And, while most would agree that modern
day litigation is a preferable alternative to a duel, there is no real consensus whether it’s a lot or just a little better (Sanacory, 2012).

The Contract Disputes Act of 1978, 41 U.S.C. section 7101-7109, directs that boards of contract appeals provide informal, expeditious, and inexpensive ways to resolve contract issues in controversy. Toward this end, the Civilian Board of Contract Appeals (CBCA) encourages parties to consider the use of Alternative Dispute Resolution (ADR) procedures at all stages of a contract controversy: pre-appeal, post-appeal, and post-hearing - whenever the parties believe that a neutral third person may be helpful to the settlement process. The CBCA makes its judges available to serve as ADR Neutrals.

ADR is always voluntary and all parties as well as the ADR Neutral must agree ADR is appropriate for the matter. The ADR procedures described below are not intended to replace a party's right to fully adjudicate its appeal, but are meant to supplement that right and provide more flexible choices for parties to resolve their differences. Adoption of an ADR procedure as early in the appeal process as feasible can save parties substantial costs and delay and can help them maintain or restore amicable relations. (http://www.cbca.gsa.gov/). The following ADR procedures are voluntary and consensual, and both the parties and the ADR Neutral must agree to their use. The names or titles given to various ADR procedures are not controlling, but rather articulate what role the ADR Neutral is to play.

**Arbitration:** AAA defines arbitration as “the submission of a dispute to one or more impartial persons for a final and binding decision, known as an ‘award.’” Awards are made in writing and are generally final and binding on the parties in the case.”
Arbitration is touted as a faster, more private, more efficient, and more final alternative to court litigation because of the procedures employed (hired judges, perhaps with expertise related to the subject matter of the dispute, and with the ability to give specialized attention to the case). Until recently, a common approach in dispute resolution contract provisions has been a requirement that parties first consult with a non-binding neutral, then mediate any claims on which the parties cannot agree. If they cannot reach an agreement with the assistance of a mediator, then they litigate through arbitration. (Sanacory, 2012)

**Facilitative Mediation:** Normally, mediations begin with a joint session, with the parties making informal presentations to one another and the ADR Neutral regarding the facts and circumstances giving rise to the issues in controversy as well as an explanation of their respective legal positions. The ADR Neutral, as mediator, aids the parties in settling their case, frequently by meeting with each party separately in confidential sessions, engaging in private discussions for the purpose of facilitating the formulation and transmission of settlement offers.

**Evaluative Mediation:** In addition to engaging in facilitative mediation, as described above, if authorized under the terms of the parties' ADR Agreement, the ADR Neutral, as mediator, may also discuss informally with the parties, either jointly or in private sessions, the strengths and weaknesses of their respective positions.

**Mini-Trial:** A mini-trial is a somewhat more formal procedure in which the parties make abbreviated presentations to an ADR Neutral who sits with the parties' designated principal representatives as a mini-trial panel to hear and evaluate evidence relating to an issue in controversy. The Neutral may thereafter meet with the principal representatives
to attempt to mediate a settlement. The mini-trial process may also be a prelude to the Neutral's provision of a non-binding advisory opinion or to the Neutral's rendering a binding decision.

**Non-Binding Advisory Opinion**: The parties present to the ADR Neutral information on which the Neutral bases a non-binding, advisory opinion on the merits of the case, which opinion may be delivered to the parties jointly either orally or in writing. The manner in which the information is presented will vary from case to case, depending upon the circumstances and the terms of the parties' ADR Agreement. Presentations may range from an informal proffer of evidence together with limited argument from the parties to a more formal presentation, with oral testimony and documentary evidence and argument from counsel, such as may be done in the context of a mini-trial.

**Summary Binding Decision**: This is a binding ADR procedure similar to binding arbitration under which, by prior agreement of the parties, the ADR Neutral renders a brief, written decision that is to be binding, non-precedential, and non-appealable. As in a procedure under which the Neutral provides a non-binding advisory opinion, the manner in which information is presented for a summary binding decision may vary depending on the circumstances of the particular case and the wishes of the parties as outlined in their ADR Agreement. Parties considering ADR are encouraged to adapt for their purposes any provisions in the CBCA's rules which they believe will be useful for ADR (http://www.cbca.gsa.gov/).

**Dispute Review Boards**: Dispute review boards (DRBs) are the least intrusive and often the most effective of the ADR procedures for reducing claims as well as providing timely procedure to resolve claims quickly. A DRB typically comprises three members,
selected jointly by the contractor and owner, to monitor the progress of construction and provide recommended resolutions to disputes that are brought before it. The members are typically familiar with the type construction involved, are respected in the industry, and approach their responsibilities with neutrality and impartiality.

The DRB board members are usually selected at the outset of a project, and visit the jobsite on a periodic basis (typically quarterly), keeping current with job activities and developments through progress reports and relevant documentation, and they are available to meet and hear disputes on an as-needed, as-requested basis. The contemporaneous familiarity with the project puts the board in the unique position of being able to make quick, informed, and reasonable recommendations to resolve disputes at early stages. The first two members of the board are typically selected by the contractor and the owner, with each member being approved by the other party. These two members then select a third person, a chairperson, who must also be approved by the contractor and owner. The board should hold its first meeting as soon as possible after the work begins. Frequency of subsequent visits depends on activity levels at the jobsite, but one meeting every three to four months appears to be appropriate for the more active phases of the project. In addition to routine visits, special, private meetings and hearings are held, at locations selected by the board members themselves.

As soon as a dispute becomes unresolvable at the job level, the board will arrange a hearing. Position papers will be provided to the board from each of the parties, accompanied by any supporting documentation, jointly prepared by the parties. The DRB hearing is typically held at the jobsite and is relatively informal. Witnesses, experts, and other resources that might provide the board with any information helpful to the board in
making a decision can be used in the hearings. Note, either party can request a DRB hearing at any time. As soon as possible after the conclusion of the hearing, the board will make a recommendation in writing that clearly describes its reasoning in reaching its decision. Although desirable, unanimous decisions are not required for a recommendation. The board may be asked to render a recommendation on entitlement, quantum, or both. The DRB’s recommendations are nonbinding, but are usually admissible as evidence in later arbitration or litigation. Some owners are writing in their specifications that DRB recommendations are not admissible, detracting from the effectiveness of the entire DRB process. (Levin, 1998)

The Court System: Circuit courts are the basic trial arena in the court system. If the decision of the circuit court is acceptable to the parties, the trial will end. If not, the unsatisfied party may then appeal to the state appellate court. Consequently, appellate courts hear only a small subset of cases brought to circuit courts.

The appellate courts are the second stage in the court system. In contrast to the circuit courts, the appellate court judges the circuit decision. In other words, the appellate court may either affirm or reverse and remand the lower court’s (circuit court) decision. The appellate court also has the right to give judgments such as ‘affirmed in part’ or ‘dismissed and remanded’ or ‘affirmed in part and reversed in part and remanded’ or ‘reversed and remanded in part’ depending on the counts it agrees.

Appellate court decisions may be appealed to the state supreme court which is the final authority. If the state Supreme Court decides not to hear the case, the matter is ended. If it decides to hear the case, briefs and oral arguments are presented to the court. The state supreme court usually rejects petitions for hearings unless the matter involves
either a conflict between circuit courts or a very important legal issue. The decision of the Supreme Court may be sent back to the circuit court on particular counts, or the decision may be affirmed or dismissed (Tunca, 1992).

5.3 Data Collection

The data for this research were gathered from two different websites. One part of the data was all Government related cases, which were downloaded from the Civil Boards of Contract Appeals website (www.cbca.gov) (2001-212) and the other part which involved both government and private related cases were downloaded from Lexis Nexis Academic through the Illinois Institute of Technology Library website. (http://www.lexisnexis.com.ezproxy.gl.iit.edu/hottopics/lnacademic/?) (2004-20012). A total of 1095 cases were downloaded from both websites. 224 from the Civil Board of Contract Appeals and 982 from Lexis Nexis Academic. Out of the lot stated here, only 337 were related to the purpose of this research, 224 from the Civil Board of Contract Appeals and 113 from Lexis Nexis. Table 1 and 3 represent the data collected from Lexis Nexis and the Civil Board of Contract Appeals respectively. Table 2 is a legend for Table 1.
Table 1. Cases downloaded from Lexis Nexis

<table>
<thead>
<tr>
<th>Types of Courts</th>
<th>Known Claims</th>
<th>Injury/Accidents</th>
<th>Labor Trust funds</th>
<th>Insurance claims policies</th>
<th>Labor Issues</th>
<th>Patent Infringement</th>
<th>Bankruptcy</th>
<th>Financial Issues</th>
<th>Not construction related</th>
<th>Unknown claims</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38</td>
<td>33</td>
<td>109</td>
<td>50</td>
<td>33</td>
<td>21</td>
<td>7</td>
<td>11</td>
<td>75</td>
<td>111</td>
<td>488</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>H</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>I</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>J</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>N</td>
<td>31</td>
<td>6</td>
<td>56</td>
<td>15</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>53</td>
<td>45</td>
<td>229</td>
</tr>
<tr>
<td>O</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Q</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>S</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>T</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>U</td>
<td>10</td>
<td>46</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>14</td>
<td>84</td>
</tr>
<tr>
<td>V</td>
<td>15</td>
<td>27</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>33</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>117</td>
<td>168</td>
<td>77</td>
<td>45</td>
<td>26</td>
<td>14</td>
<td>21</td>
<td>151</td>
<td>250</td>
<td>982</td>
</tr>
</tbody>
</table>
Table 2. Legend for Lexis Nexis Cases

<table>
<thead>
<tr>
<th>Letter</th>
<th>Court Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US District Court Cases</td>
</tr>
<tr>
<td>B</td>
<td>TX Court of Appeals and Court of Civil Appeals Cases</td>
</tr>
<tr>
<td>C</td>
<td>Federal Court of Appeals</td>
</tr>
<tr>
<td>D</td>
<td>NC Court of Appeals</td>
</tr>
<tr>
<td>E</td>
<td>NC Supreme Court Cases</td>
</tr>
<tr>
<td>F</td>
<td>NJ Supreme Court Cases</td>
</tr>
<tr>
<td>G</td>
<td>US Bankruptcy Court Cases</td>
</tr>
<tr>
<td>H</td>
<td>US Court of Appeals Cases</td>
</tr>
<tr>
<td>I</td>
<td>WA Supreme Court Cases</td>
</tr>
<tr>
<td>J</td>
<td>Minnesota District Courts- Trial Level</td>
</tr>
<tr>
<td>K</td>
<td>Illinois Supreme Courts</td>
</tr>
<tr>
<td>L</td>
<td>HI Courts of Appeals</td>
</tr>
<tr>
<td>M</td>
<td>CT Superior Court - Common Pleas Cases</td>
</tr>
<tr>
<td>N</td>
<td>US District Court Cases- Combined</td>
</tr>
<tr>
<td>O</td>
<td>MN Supreme Court Cases</td>
</tr>
<tr>
<td>P</td>
<td>MA Superior Court Cases</td>
</tr>
<tr>
<td>Q</td>
<td>WI Court of Appeals</td>
</tr>
<tr>
<td>R</td>
<td>IN Appeals Court Cases</td>
</tr>
<tr>
<td>S</td>
<td>Common Wealth Court Cases</td>
</tr>
<tr>
<td>T</td>
<td>IL Court of Appeals</td>
</tr>
<tr>
<td>U</td>
<td>NY Lower Court Cases</td>
</tr>
<tr>
<td>V</td>
<td>NY Lower Court Cases - Appellate Division</td>
</tr>
</tbody>
</table>

Table 3. Number of cases downloaded from the Civil Board of Contract Appeals website

<table>
<thead>
<tr>
<th>Related to thesis</th>
<th>Disclosed claims</th>
<th>Undisclosed claims</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>131</td>
<td>93</td>
<td>224</td>
</tr>
</tbody>
</table>

The cases downloaded from Lexis Nexis were divided into different categories. These cases are related to parties involved in the construction industry but are not related to the research topic being discussed.
Data for green construction was collected in the form of opinion surveys. First, information (email addresses of Chief Executives) of companies involved in green construction were gathered from the United States Green Building Council website (www.usgbc.com). A total of 4000 companies’ information were collected. Using survey monkey (www.surveymonkey.com) - an online survey software- opinion surveys were sent to all companies whose information were gathered. Table 4 represents the number of responses for each of the survey questions sent.

Table 4. Responses from survey on Green Buildings

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Doubts about long-term viability and performance of untested sustainable products, materials and technologies</td>
<td>350</td>
</tr>
<tr>
<td>B Faulty performance of sustainable HVAC/electrical/plumbing/water/power systems</td>
<td>350</td>
</tr>
<tr>
<td>C Failure to receive materials/products in a timely fashion</td>
<td>346</td>
</tr>
<tr>
<td>D Lack of expertise in sustainable products/technologies</td>
<td>351</td>
</tr>
<tr>
<td>E High cost of certification process</td>
<td>348</td>
</tr>
<tr>
<td>F Scarcity of insurance alternatives for sustainable solutions</td>
<td>338</td>
</tr>
<tr>
<td>G Loss of rental or resale value caused by green construction procedures and conditions</td>
<td>346</td>
</tr>
<tr>
<td>H Failure to use financial incentives (tax deductions, loans discounts, low financing rates, etc.) because of delays or lower certification levels than expected</td>
<td>347</td>
</tr>
<tr>
<td>I Inadequate definition of projects parties’ contractual roles and responsibilities</td>
<td>347</td>
</tr>
<tr>
<td>J Inconsistencies between formal regulations (e.g., existing federal, state and local legislation and standards) and LEED</td>
<td>349</td>
</tr>
<tr>
<td>K Concern that project owners and participants lose potential benefits of the stringent standards of LEED</td>
<td>349</td>
</tr>
<tr>
<td>L Lack of green construction experience and qualification</td>
<td>349</td>
</tr>
<tr>
<td>M Contractors and subcontractors agreeing standards that are not within their expertise and competence</td>
<td>349</td>
</tr>
</tbody>
</table>
CHAPTER 6
DISCUSSION AND FINDINGS

6.1 Data analysis for Traditional buildings

This is the first part of analyzing the results, it analyzes the data for non-green buildings.

6.1.1 Number of cases per year. The number of cases per year for this research are not the total number of cases filed or decided for that particular year. The cases are those that were accessible to at that particular time. Table 5 represents the number of cases per year between 2001-2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Civil Board of Contract Appeals</th>
<th>Lexis Nexis Academic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>21</td>
<td>-</td>
<td>21</td>
</tr>
<tr>
<td>2002</td>
<td>8</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>2003</td>
<td>22</td>
<td>-</td>
<td>22</td>
</tr>
<tr>
<td>2004</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>2005</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>2006</td>
<td>15</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>2007</td>
<td>23</td>
<td>18</td>
<td>41</td>
</tr>
<tr>
<td>2008</td>
<td>18</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>2009</td>
<td>23</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>2010</td>
<td>20</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>2011</td>
<td>34</td>
<td>12</td>
<td>46</td>
</tr>
<tr>
<td>2012</td>
<td>18</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>224</td>
<td>113</td>
<td>337</td>
</tr>
</tbody>
</table>

6.1.2 Amount of claim, amounts granted and granted in part. Out of 337 cases, some cases had disclosed amounts. A total of 169 cases had disclosed amounts. Out of the cases with disclosed amounts 65 cases were fully granted and 31 cases were granted in
part. 73 cases were neither granted nor granted in part. Table 6 shows the total amounts being claimed, granted and granted in part.

Table 6. Amount of claim, amounts granted and granted in part

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount being claimed</th>
<th>Granted</th>
<th>Granted in part</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$10,853,376</td>
<td>$2,949,360</td>
<td>$3,954,385</td>
</tr>
<tr>
<td>2002</td>
<td>$29,106,447</td>
<td>0</td>
<td>$13,000,000</td>
</tr>
<tr>
<td>2003</td>
<td>$128,492,731</td>
<td>$87,500,882</td>
<td>$5,650,000</td>
</tr>
<tr>
<td>2004</td>
<td>$97,765,625</td>
<td>$770,039</td>
<td>$284,25000</td>
</tr>
<tr>
<td>2005</td>
<td>$31,218,403</td>
<td>$49,912</td>
<td>$1,580,000</td>
</tr>
<tr>
<td>2006</td>
<td>$22,482,703</td>
<td>$174,470</td>
<td>$8,537,812</td>
</tr>
<tr>
<td>2007</td>
<td>$35,782,120.57</td>
<td>$32,173,668</td>
<td>$47,183</td>
</tr>
<tr>
<td>2008</td>
<td>$27,635,682.06</td>
<td>$2,282,988.81</td>
<td>$13,000,110</td>
</tr>
<tr>
<td>2009</td>
<td>$40,130,787.6</td>
<td>$8,760,842</td>
<td>$7,952,396.59</td>
</tr>
<tr>
<td>2010</td>
<td>$175,38,035.35</td>
<td>$13,752,668</td>
<td>$1,196,273.64</td>
</tr>
<tr>
<td>2011</td>
<td>$66,770,355.88</td>
<td>$49,261,754</td>
<td>$2,219,570.75</td>
</tr>
<tr>
<td>2012</td>
<td>$36,675,253.91</td>
<td>$33,725,184.91</td>
<td>$1,369,934</td>
</tr>
<tr>
<td>Total</td>
<td>$544,451,520</td>
<td>$231,401,769</td>
<td>$86,932,665</td>
</tr>
</tbody>
</table>

Figure 1 represents the amount granted and granted in part in a pie chart. With 65 of the cases with disclosed amounts representing 73% and 31 representing 27%.
6.1.3 Parties involved (Claim issues). Parties to the cases are grouped as follows:

- Owner
- Design team/Architect
- General Contractor
- Subcontractor
- Sub-subcontractor
- Supplier

Out of 337 cases, only 236 cases had disclosed claims. 283 individual issues/claims arose from the 236 cases. The majority of the plaintiffs and defendants were the general contractor and owner respectively. The design team/architect together with the supplier had fewer claim issues than the subcontractor and sub-subcontractor. Some claims involved third party plaintiffs and defendants of which subcontractors and owners were the majority. See Figure 2.
6.1.4 Types of Claims. The intention of the study was to identify and analyze the claims associated with green and non-green construction. The section of this chapter will concentrate on claims in traditional construction. Table 7 shows the different types of claims.

The majority of the claims were seeking compensation for breach of contract for unpaid work and retainages, underperformance resulting in construction defects, failure to adhere to contract requirements, fraudulent construction practices, wrongful termination of contracts, wrongful detention of money owed, defective performance and incomplete work, abandoning of the project and suspension of work from owner. Other claims that were also prominent include extra work and changes, which occurred as a
result of scope of work, constructive changes made by owner, change orders and work not included in contract document.

Delay related claims also occurred frequently. These delays were caused by differing site conditions, changes made by owners, extra work not included in the contract, design deficiencies, suspensions of work, disruption of work, owner’s late approval of design documents and submittals, errors in contract documents, unavailability of funds, architect’s failure to obtain required permits, faulty work, and late payments. An equitable adjustment, in government contracting, is a contract adjustment pursuant to a changes clause, to compensate the contractor expense incurred due to actions of the Government or to compensate the Government for contract reductions. An equitable adjustment includes an allowance for profit; clauses that provide for adjustments, excluding profit, are not considered "equitable adjustments" (www.wikipedia.com). A few cases were about equitable adjustment to the price of contract. Other categories include site related claims, - which were basically wrong information or not enough information about the site- negligence and misrepresentation, defective design and errors and omission on the part of the design team or owner, Internal administrative and legal interpretation of contracts, inefficiency and productivity claims resulting from action of owner (Government), profit and cost claims seeking additional funds for increased taxes, time related and accelerated claims, bond payment and security claims, scope of work claims arising from differing site conditions and failure to include amount of actual work, and mechanic’s lien on owner’s property. Table 7 shows information gathered. Figure 3 illustrates the information provided.
<table>
<thead>
<tr>
<th>Claims</th>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Breach of Contract</td>
<td>92</td>
</tr>
<tr>
<td>B</td>
<td>Site-related claims</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>Delay-related claims</td>
<td>34</td>
</tr>
<tr>
<td>D</td>
<td>Negligence and Misrepresentation</td>
<td>14</td>
</tr>
<tr>
<td>E</td>
<td>Design Omissions and Errors</td>
<td>15</td>
</tr>
<tr>
<td>F</td>
<td>Equitable Adjustments</td>
<td>20</td>
</tr>
<tr>
<td>G</td>
<td>Internal administrative and legal interpretation of contracts</td>
<td>11</td>
</tr>
<tr>
<td>H</td>
<td>Inefficiency, productivity claims</td>
<td>6</td>
</tr>
<tr>
<td>I</td>
<td>Profit claims and cost claims</td>
<td>9</td>
</tr>
<tr>
<td>J</td>
<td>Termination for default and convenience</td>
<td>15</td>
</tr>
<tr>
<td>K</td>
<td>Extra work and Changes claims</td>
<td>51</td>
</tr>
<tr>
<td>L</td>
<td>Time related claims</td>
<td>6</td>
</tr>
<tr>
<td>M</td>
<td>Bond Payment and security</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>Scope of work claims</td>
<td>1</td>
</tr>
<tr>
<td>O</td>
<td>Mechanic's Lien</td>
<td>3</td>
</tr>
</tbody>
</table>

283
6.1.5 Decisions (Claims). For this section, we used all the decisions for all disclosed claims which is a total of 283 claims out of 236 cases. Some cases had more issues and were difficult to count the decision if it had different decisions assigned to two or more claims in the same case. So to avoid multiple counting cases with more than one issue and one decision given about each issue would be divided by the total number of issues associated with the case.

The decisions that were made regarding the cases include granted, granted in part, dismissed, dismissed with prejudice, dismissed without prejudice, dismissed for lack of jurisdiction, and denied. Some cases contained arbitration clauses and as such they were referred to arbitrators, but some of them were granted. Some cases also were transferred to other courts. Cases that were denied were as a result of the
plaintiff/appellant not having enough information to state such claim, or did not follow contract documents. For cases that were dismissed it was a result of both parties agreeing to a settlement or plaintiff/appellant filing a motion to dismiss case. Cases that were dismissed for lack of jurisdiction, the board or judge did not have the right to adjudicate such a case. Some cases had undisclosed claims, such claims were dismissed with prejudice as a result of parties reaching an agreement or plaintiff/appellant requesting the case to be dismissed with prejudice, and cases with disclosed claims were also dismissed with prejudice. Only a few of the claims were dismissed without prejudice. Table 8 shows information regarding the decisions. Legend for Table 8 can be found in Table 7. Figure 4 illustrates the table clearly.
<table>
<thead>
<tr>
<th>Claim/Issue</th>
<th>Granted</th>
<th>Granted in Part</th>
<th>Dismissed</th>
<th>Dismissed with prejudice</th>
<th>Dismissed without prejudice</th>
<th>Dismissed for lack of jurisdiction</th>
<th>Denied</th>
<th>Arbitration</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>41</td>
<td>4.7</td>
<td>4</td>
<td>3</td>
<td>1.5</td>
<td>0.25</td>
<td>10.5</td>
<td>10.75</td>
<td>4.33</td>
<td>80.03</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>0.67</td>
<td>0</td>
<td>0.33</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.25</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>4.03</td>
<td>4</td>
<td>1.33</td>
<td>0</td>
<td>0.5</td>
<td>5.5</td>
<td>1.25</td>
<td>1.33</td>
<td>25.94</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>0.5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>11.5</td>
</tr>
<tr>
<td>E</td>
<td>2.5</td>
<td>0</td>
<td>1</td>
<td>0.3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0.33</td>
<td></td>
<td>8.13</td>
</tr>
<tr>
<td>F</td>
<td>9.5</td>
<td>2.13</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1.75</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>18.38</td>
</tr>
<tr>
<td>G</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.25</td>
<td>0</td>
<td>0</td>
<td>6.25</td>
</tr>
<tr>
<td>H</td>
<td>1.5</td>
<td>1.67</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.42</td>
</tr>
<tr>
<td>I</td>
<td>0.5</td>
<td>1.33</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.08</td>
</tr>
<tr>
<td>J</td>
<td>1</td>
<td>1.67</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>3.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11.92</td>
</tr>
<tr>
<td>K</td>
<td>13</td>
<td>9.9</td>
<td>2</td>
<td>5</td>
<td>0.5</td>
<td>3.75</td>
<td>7</td>
<td>1.75</td>
<td>0</td>
<td>42.9</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0.5</td>
<td>0.25</td>
<td>0</td>
<td>3.25</td>
</tr>
<tr>
<td>M</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
</tr>
<tr>
<td>N</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
</tr>
<tr>
<td>O</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88</strong></td>
<td><strong>30.1</strong></td>
<td><strong>15</strong></td>
<td><strong>16.96</strong></td>
<td><strong>2</strong></td>
<td><strong>6.75</strong></td>
<td><strong>41.75</strong></td>
<td><strong>15</strong></td>
<td><strong>5.99</strong></td>
<td><strong>221.55</strong></td>
</tr>
</tbody>
</table>
Figure 4. Decisions in relation to type of claims
6.2 Data analysis in green/sustainable buildings

This section analyzes data collected from opinion surveys for green construction. Just like traditional/non-green construction, green construction procedures follow the same process as traditional building processes - the pre-design stage, the design stage, bidding/negotiating stage and the construction stage.

Many of these green construction risks are very similar to issues traditionally associated with construction projects - uncoordinated drawings, construction delays, and noncompliant construction, just to name a few. But other risks can be specifically related to sustainable design and construction practices primarily because of the use of green materials, systems, and procedures (Nutter, 2012).

This section is to analyze the risk in green construction and to determine which risk is more prominent.

6.2.1 Materials and technologies. Green buildings incorporate the use of new and innovative construction technologies and materials. Every new material or application of materials should be tested to determine the capabilities for the intended use. Surveys have indicated that minimal analysis and testing are incorporated, and the first projects to use the products are the beta tests. The owner and design professional should evaluate new materials, technologies, checking other projects where the product has been used, and comparing it to the performance of similar products. Identifying the depth and length of analysis of new products and material is also a key component for the design professional. Hiring independent testing laboratories is also a consideration, however, that comes at an additional cost to the project. Design professionals should not accept a
new product based only upon the manufacturer’s product data sheets and sales literature. The design professional should inform the owner of the potential risks in specifying new materials and technologies (Corbett, 2014). Table 9 displays information from the survey about doubts concerning long-term viability and performance of untested sustainable products, materials and technologies which shows a moderate response Figure 5 shows a graphical presentation of the data.

Table 9. Doubts about long-term viability and performance of untested sustainable products, materials and technologies.

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely High</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>13</td>
<td>67</td>
<td>141</td>
<td>113</td>
<td>16</td>
<td>350</td>
</tr>
</tbody>
</table>

Figure 5. Doubts about long-term viability and performance of untested sustainable products, materials and technologies.
6.2.2 Faulty performance of building components. To effectively minimize the risk of moisture problems while increasing ventilation, designers may need to increase the complexity and capacity of the HVAC components and control systems to achieve proper dehumidification. This adds to contractor risk, as complex systems historically fail more often than simple systems. Additionally, the complexity of the system operation can result in unintended pressurization relationships where local depressurization causes humid outdoor air to be drawn into interstitial building cavities, causing condensation and mold growth. Building owners, designers, and contractors all assume more risk when they deal with complex -- and possibly untried -- technologies not generally found in traditional buildings. Pinpointing whether the problem is design- or construction-related may be very difficult after problems have already occurred. LEED requirements are that a minimum of 14,000 cubic feet per square foot of floor area is required for flush-out. This presents multiple problems: Most HVAC systems are not designed to dehumidify that amount of outdoor air which, in a 100,000 square-foot building, is 1,400,000 cubic feet of outside air. Depending on outside conditions at the time of the flush-out, as much as 240,000 gallons of water can be added to a 100,000-square-foot building. This added moisture will be absorbed into building materials, finishes, and furnishings, increasing the risk of mold growth. Most specifications put the general contractor in charge of the flush-out, including controlling relative humidity levels during flush-out. If the system is not designed to handle such loads, then the contractor faces a difficult challenge that may require the addition of a temporary (and extremely costly) dehumidification system (Odom et.al, 2010). Table 10 shows how moderate the issue is from the survey. Figure 6
illustrates the response on faulty performance of sustainable HVAC/electrical/plumbing/water/power systems.

Table 10. Faulty performance of sustainable HVAC/electrical/plumbing/water/power systems.

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>36</td>
<td>123</td>
<td>137</td>
<td>40</td>
<td>14</td>
<td>350</td>
</tr>
</tbody>
</table>

Figure 6. Faulty performance of sustainable HVAC/electrical/plumbing/water/power systems.

6.2.3 Failure to receive materials/products on time. Failure to receive materials on time results in delays. Delay is one of the most commonly litigated issues in construction and often represents the largest dollar values in a dispute. While construction contracts
may lean toward liquidated damages as motivation to keep a contractor on schedule, the magnitude of the resulting damages often causes the dispute to end up in litigation. Obviously, delay is not a new green issue; however, the impact of delay on green projects may lead to unexpected results (Nutter, 2012). Table 11 represents the data collected for this section which shows a response of low. Figure 7 illustrates it graphically.

Table 11. Failure to receive materials/products on time

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>33</td>
<td>127</td>
<td>115</td>
<td>59</td>
<td>12</td>
<td>346</td>
</tr>
</tbody>
</table>
6.2.4 Lack of expertise in sustainable products/technologies. Green construction is still relatively a new concept and practice to many design professionals, contractors, specialty contractors, and material suppliers. It is critical that each participant on a green project be familiar with sustainable design, green products and technologies. Without designers, contractors, subcontractors, consultants, and material suppliers with extensive green knowledge and experience, a green project has a higher risk of failure. Due diligence by green project participants is important in order to execute a successful project that achieves the desired green results (Perkins, 2009). Table 12 and Figure 8 give information about the response and graphical interpretation respectively, which gives us a moderate response.

Table 12. Lack of expertise in sustainable products/technologies

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>14</td>
<td>69</td>
<td>125</td>
<td>107</td>
<td>36</td>
<td>351</td>
</tr>
</tbody>
</table>
6.2.5 High cost of certification process. LEED is one of the world’s most known rating systems. Registration and certification fees are roughly 3¢–5¢ per square foot, depending on the size of the project and other factors. This cost could be for an outside consultant hired just for that task, someone on the staff of the design firm, the contractor, or the owner. This is a big project for someone doing it for the first time and not such a big deal for someone who has done it enough to have figured out the process. If your baseline is the cost to have a design team create a variant on their last few non-LEED projects, then designing to meet LEED standards will take some extra effort. But these added costs shouldn’t be attributed just to LEED—they are the costs of getting a better building. LEED introduces a few requirements that add costs if they are not already part of the scope of the project. If energy models aren’t code-required, then the LEED-specific
model represents an added cost that starts at $5,000–$10,000 and goes up, depending on the complexity of the project. From the survey there was high response to the cost of certification. (http://dev2.buildinggreen.com/article/cost-leed-certification) Table 13 and Figure 9 give information about the survey and graphical interpretation respectively.

Table 13. High cost of certification

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>23</td>
<td>43</td>
<td>117</td>
<td>118</td>
<td>47</td>
<td>348</td>
</tr>
</tbody>
</table>

Figure 9. High cost of certification
6.2.6 **Scarcity of insurance alternatives for sustainable solutions.** Surveys conducted by insurance providers in the United States indicated that they regularly give green projects more scrutiny due to the use of novel material or techniques often involved. This increased scrutiny is the result of the potential for incorrect installation of green roofs, energy systems or other material use by inexperienced contractors resulting in claims of faulty workmanship and construction defects. Professionals may be held to an altered standard of care in the green building context which may result in exclusion from standard insurance policies. This may occur due to (i) representations made to a client or (ii) through promotional material representing the professional as an expert in green building or design. Additionally, this may apply to professionals who have attained LEED AP designation. The “ordinarily competent design professional” will most likely not include a consideration of sustainable or green design. As a result, coverage for errors or omissions and other negligent acts related to the sustainable or green goals of a project may not be covered without additional insurance.

In response, some insurance companies have already tailored products for “independent firms that provide technical consulting on sustainability requirements, create and submit the LEED required documentation, or serve as a Green Building Facilitator in an overall management role”. These same companies recommend that projects involving LEED AP designated individuals ensure that coverage is obtained for negligently provided “sustainability services”.

Apart from “green” professional liability insurance there are products available to help offset the risk associated with other aspects of green building including:
- **Energy Saving Insurance:** This covers losses associated with unmet efficiency gains. This may reduce costs on a project by reducing interest charged on loans and through quality control (that is, help cover replacement costs on non-conforming equipment).

- **Upgrading after Damage:** If damage occurs to a building then this will allow the owner to upgrade the building to a greener standard. For a total write off on a non-LEED certified building, the costs of creating a LEED Silver building may be covered. For a partial loss, costs associated with greener office equipment, lighting, and indoor air quality may be covered. Additional insurance can be obtained to help cover additional soft costs which may accompany remediation work on a green project including: diverting debris to recycling centers, flushing out contaminated indoor air, or re-registration with LEED certification. This type of insurance may also cover any losses which resulted from high efficiency power or water systems that were operational prior to the need for remediation.

- **Indoor Environment:** This covers any claims grounded in personal injury due to specialized material or equipment use on green buildings. This is particularly salient given the uncertain future of mold or water damage claims which may arise in relation to green roofs or alterations to standard building envelope design on green projects.

- **Reputation Damage:** This covers costs associated with reputation damage following a failure to achieve the advertised level of certification sought on a project. Claims may relate to higher lease rates that were agreed to under representations that a certain level of certification was to be attained. Additional
coverage may be obtained to hire crisis management consultants to respond to adverse media coverage of the project’s failure to obtain certification.

- **Director and Officer Protection**: This covers claims that “allege harm that is attributable to the governance or management of an organization” including errors and omissions, neglect or breach of contract (British Columbia Construction Association, 2011).

Table 14 show the data response and Figure 10 illustrates graphically the moderate response received from the survey.

<table>
<thead>
<tr>
<th>Table 14. Scarcity of insurance alternatives for sustainable solutions.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green Building Survey</strong></td>
</tr>
<tr>
<td>Answer Options</td>
</tr>
<tr>
<td>Likelihood of Occurrence</td>
</tr>
</tbody>
</table>

![Figure 10](image)

Figure 10. Scarcity of insurance alternatives for sustainable solutions.
6.2.7 Rental or resale value of green construction procedures and conditions. Energy efficient green buildings have lower energy bills and building designs that improve the occupants’ experience and worker productivity. Logically, all this should translate into greater building value, as owners and tenants anticipate in survey after survey.

Owners and tenants alike recognize that monthly operating costs should be significantly lower in green buildings, since energy is the highest operating cost in most offices today, and the net present value of future energy savings can be added to the resale value. However, some of the co-benefits of an energy efficient space, such as daylighting that improves the customer and employee experience and worker productivity, may be somewhat harder to quantify.

Studies increasingly show that all of this logic is prevailing in the market. Existing analyses of data demonstrate that green buildings have increased resale value, increased rental rates, higher occupancy rates, lower operating expenses, higher net operating income, lower capitalization rates and productivity gains.

Most available data does show increased value for ENERGY STAR or LEED buildings in the United States compared to standard buildings in the U.S. market. ENERGY STAR numbers are more representative of the entire existing building market because many of the research studies were completed before the recent significant growth in the LEED Existing Buildings certification. LEED data does provide a snapshot of relatively newer buildings compared to the U.S. building stock as a whole (most of the LEED stock was built in the last 10 years).

With 1.5 billion square feet of LEED-certified space and 2.5 billion square feet of ENERGY STAR-certified commercial space in the market today, there is an ever more
robust set of data for analysis to demonstrate statistically significant financial benefits of energy efficient buildings. A large data set is needed because an energy efficient green building can only be compared to its peer conventional building – a building of similar age, height, size, and sub-market location. U.S. studies find:

1. Increased rental rates: 2-17%

   - ENERGY STAR properties had a rental premium of 4.8%, or $1.26 per square foot (Pivo 2008).
   - ENERGY STAR offices had a rental premium of 3% in 2004 – 2007 (Eichholtz 2009).
   - ENERGY STAR or LEED office buildings had a rental premium of 2% in 2007-2009 (Eichholtz 2010).
   - ENERGY STAR and LEED certified office space had a rental premium of 6% (Fuerst 2009).
   - Rental premium of 7-9% for ENERGY STAR buildings and a rental premium of 7-9% LEED buildings 15-17% (Wiley 2010).

2. Improved resale value: 5.8-35%

   - ENERGY STAR properties had a 13.5% higher market value relative to non-ENERGY STAR properties (Pivo 2008).
   - Building sale price increases by 10% with LEED certification and 5.8% with ENERGY STAR certification in an analysis of building sales from 2003-2007 (Miller 2008).
   - A sale price premium of 19% was found for ENERGY STAR offices between 2004 and 2007 (Eichholtz 2009).
• A sale price premium of 13% was found for ENERGY STAR and LEED office buildings between 2007 and 2009 (Eichholtz 2010).

• A sale price premium of 31% was reported for ENERGY STAR and 35% for LEED certified offices (Fuerst 2009).

• A sale price premium of $130 per square foot LEED and $30 per square foot for ENERGY STAR was found in 25 metropolitan markets (Wiley 2010).

Studies are consistently showing that the market is pricing green building features like lower energy bills, better design and improved worker productivity. Evidence strongly shows that these features of energy efficient green buildings are translating into greater value in the form of increased rental rates, higher sale prices, increased occupancy rates, lower operating expenses, higher net operating income, lower capitalization rates, and increased worker productivity (Institute of Building Efficiency, 2011).

From the survey conducted, the results are congruent with the explanation above. See Table 15 for survey information and Figure 11 for graphical presentation.

Table 15. Loss of rental or resale value caused by green construction procedures and conditions

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>178</td>
<td>119</td>
<td>37</td>
<td>9</td>
<td>3</td>
<td>346</td>
</tr>
</tbody>
</table>
6.2.8 Failure to use financial incentives. Some green incentives are available across the nation because they are offered by the federal government, which offers two major tax credits along with a mortgage incentive and subsidy tax exemption. The tax credit one is eligible for depends on whether one is installing an energy efficient system or a renewable energy system (Whitehead, 2014). The Federal, State and local governments, as well as manufacturers and utilities, often offer rebates and tax incentives for conservation projects. See Table 16 and Figure 12 for information regarding financial incentives which received a low response from the survey.
Table 16. Failure to use financial incentives

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>50</td>
<td>128</td>
<td>112</td>
<td>45</td>
<td>12</td>
<td>347</td>
</tr>
</tbody>
</table>

Figure 12. Failure to use financial incentives

6.2.9 Inadequate definition of project parties’ contractual roles and responsibilities.

The design professional, the contractor, and the subcontractors all have roles and responsibilities that impact a project's desired green certification. If either party fails to understand and implement relevant green decisions, then the project is much more likely not to achieve the desired goal. (Perkins, 2009) The result from the survey shows that it received a moderate response. See Table 17 and Figure 13.
Table 17. Inadequate definition of project parties’ contractual roles and responsibilities

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>30</td>
<td>90</td>
<td>123</td>
<td>81</td>
<td>23</td>
<td>347</td>
</tr>
</tbody>
</table>

Figure 13. Inadequate definition of project parties’ contractual roles and responsibilities

6.2.10 Inconsistencies between formal regulations and LEED. Congress’s first foray into the green building arena came in 1992 with passage of the Energy Policy Act. The act required that states establish minimum commercial building energy codes and consider minimum residential codes based on then-current voluntary codes. Signed into law on December 19, 2007, the Energy Independence and Security Act of 2007 is the most ambitious congressional action to date with respect to green buildings and energy
efficiency. Title IV of the act contains provisions designed to green federal and private buildings and to require more energy-efficient heating and cooling devices for buildings. The American Recovery and Reinvestment Act (AARA) – better known as the Obama Administration’s stimulus bill – became effective on February 17, 2009. It provides some $787 billion in government spending. Among other objectives, these investments are designed to encourage development of green technologies, including advances in renewable electricity, green buildings, and other sustainable infrastructure (Mugdan et.al, 2010)

The Federal Government is the largest single "landlord" in the United States, overseeing approximately 500,000 buildings. Over $20 Billion is spent annually on acquiring or substantially renovating Federal facilities. More than $3.5 Billion is spent on energy for these facilities. This represents significant opportunity to incorporate sustainable technologies and practices, transforming Federal Buildings in design and development. As a result, one of the important sustainable frameworks used by the Government in building design and development is the LEED (Leadership in Energy and Environmental Design) rating system maintained by the U.S. Green Building Council. Different levels of green building certification are awarded based on total credit points earned. LEED gives credits for incorporating specific sustainable design strategies into a building design. The design strategy categories include the following: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process. (http://www.bradleycorp.com/government/LEED). Table 18 and Figure 14 illustrate the results from the survey about inconsistencies between formal regulations and LEED.
Table 18. Inconsistencies between formal regulation and LEED

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>44</td>
<td>72</td>
<td>116</td>
<td>88</td>
<td>29</td>
<td>349</td>
</tr>
</tbody>
</table>

Figure 14. Inconsistencies between formal regulation and LEED

6.2.11 Concerns on stringent standard of LEED. LEED—the USGBC’s acronym for Leadership in Energy and Environmental Design—is a point system that many consider to be the definitive, nationally accepted benchmark for the design, construction, and operation of green buildings. The LEED system is intended to give building owners and operators the tools they need to gauge the performance of their buildings.
The framework of LEED is flexible enough to work with all construction sites, from commercial to residential. While the bulk of the work is in a building's development, the framework provides guidance throughout the building's life-cycle. By looking at sustainable building strategies in the development cycle, project owners are able to take advantage of early adoption. Major stakeholders, such as the developer or owner of the property, architect, engineer and property manager, should be involved in implementing an integrated approach to a greener project design before the project begins. LEED measures nine areas for performance: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, locations and linkages (how well does the building fit into the community), awareness & education (implementation tools), innovation in design (bonus for innovation technologies that go beyond LEED requirements); and, regional priority (act global, think local mentality). Registration fees are paid up front. The cost is $450 for USGBC members and $600 for non-members. Certification fees are based on the rating system the project is applying under. Rates vary for multiple building projects. Each project must meet minimum requirements in order to qualify for certification. All projects must comply with environmental laws, be a complete permanent building or space, have a site boundary (distinct property lines), have minimum floor area requirements (1,000 gross floor area), comply with minimum occupancy rates, commit to sharing whole building energy and water usage data, and comply with a minimum building area to site-area ratio. (http://www.ehow.com/about_5379036_leed-certification-requirements.html). Table 19 and Figure 15 illustrate the data collected from the survey.
### Table 19. Concerns on stringent standards of LEED

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>84</td>
<td>107</td>
<td>89</td>
<td>52</td>
<td>17</td>
<td>349</td>
</tr>
</tbody>
</table>

Figure 15. Concerns on stringent standards of LEED

#### 6.2.12 Lack of green construction experience and qualification.

Because of the relative youth of the sustainable building industry, there are fewer qualified personnel available than there are for standard construction projects. There is also lack of familiarity or knowledge with sustainable design, green building rating systems, green products and systems between parties involved. Table 20 gives information about the response and Figure 16 illustrates it graphically.
6.2.13 Misrepresentation of expertise and competence. The numbers of construction industry entities with green experience is growing, but a desire by some entities to cut corners causes them to engage in “green washing.” Green washing is an exaggerated representation of green benefits or experience. Some entities disseminate disinformation in order to obtain green contracts for which they are not qualified. Due diligence by green project participants is important in order to execute a successful project that achieves the
desired green results, on time and on budget (Perkins, 2009). The response from the survey suggests a high response. See Table 21 and Figure 17.

Table 21. Contractors and subcontractors agreeing to standards that are not within their expertise and competence

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Occurrence</td>
<td>12</td>
<td>65</td>
<td>105</td>
<td>125</td>
<td>42</td>
<td>349</td>
</tr>
</tbody>
</table>

Figure 17. Contractors and subcontractors agreeing to standards that are not within their expertise and competence
6.2.14 Expected Response Rate. The expected response rate will be calculated as follows.

- Using the answer options for each issue, each issue is rated from 1-5, with extremely low as 1 and extremely high as 5.
- Using the number of responses under each issue the expected value of each issue is found and divided by the total number of responses associated with it.

This is to determine which issue discussed above is more prominent since each issue has different total response. Table 22 shows all calculated values for likelihood of occurrence. Use Table 4 as a legend. From Figure 18, which shows a graphical representation of the expected response rates. One can see that parties involved in green construction are concerned about misrepresentation of qualifications, experience of construction personnel, high cost of certification, inexperience in sustainable products and technologies, and the performance of materials and technologies. The other issues also play less of a role in the outcome of green construction.
Table 22. Expected response rate

<table>
<thead>
<tr>
<th>Green Building Survey</th>
<th>Extremely Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Extremely High</th>
<th>Response Count</th>
<th>Expected value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>13</td>
<td>67</td>
<td>141</td>
<td>113</td>
<td>16</td>
<td>350</td>
<td>3.15</td>
</tr>
<tr>
<td>B</td>
<td>36</td>
<td>123</td>
<td>137</td>
<td>40</td>
<td>14</td>
<td>350</td>
<td>2.64</td>
</tr>
<tr>
<td>C</td>
<td>33</td>
<td>127</td>
<td>115</td>
<td>59</td>
<td>12</td>
<td>346</td>
<td>2.68</td>
</tr>
<tr>
<td>D</td>
<td>14</td>
<td>69</td>
<td>125</td>
<td>107</td>
<td>36</td>
<td>351</td>
<td>3.23</td>
</tr>
<tr>
<td>E</td>
<td>23</td>
<td>43</td>
<td>117</td>
<td>118</td>
<td>47</td>
<td>348</td>
<td>3.35</td>
</tr>
<tr>
<td>F</td>
<td>51</td>
<td>103</td>
<td>123</td>
<td>46</td>
<td>15</td>
<td>338</td>
<td>2.62</td>
</tr>
<tr>
<td>G</td>
<td>178</td>
<td>119</td>
<td>37</td>
<td>9</td>
<td>3</td>
<td>346</td>
<td>1.67</td>
</tr>
<tr>
<td>H</td>
<td>50</td>
<td>128</td>
<td>112</td>
<td>45</td>
<td>12</td>
<td>347</td>
<td>2.54</td>
</tr>
<tr>
<td>I</td>
<td>30</td>
<td>90</td>
<td>123</td>
<td>81</td>
<td>23</td>
<td>347</td>
<td>2.93</td>
</tr>
<tr>
<td>J</td>
<td>44</td>
<td>72</td>
<td>116</td>
<td>88</td>
<td>29</td>
<td>349</td>
<td>2.96</td>
</tr>
<tr>
<td>K</td>
<td>84</td>
<td>107</td>
<td>89</td>
<td>52</td>
<td>17</td>
<td>349</td>
<td>2.46</td>
</tr>
<tr>
<td>L</td>
<td>27</td>
<td>72</td>
<td>124</td>
<td>98</td>
<td>28</td>
<td>349</td>
<td>3.08</td>
</tr>
<tr>
<td>M</td>
<td>12</td>
<td>65</td>
<td>105</td>
<td>125</td>
<td>42</td>
<td>349</td>
<td>3.37</td>
</tr>
</tbody>
</table>

Figure 18. Expected response rate for each issue
CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

Disputes arise frequently in the construction industry. Traditional building processes have been in existence for a very long time, but issues still arise in the construction process. The parties involved in this process are human, thus not perfect. So there are bound to be risks and issues. Contract documents and their specifications are a guidance to these processes.

The study presented in this thesis analyzed two different construction processes. The study showed that, in the traditional building process general contractors and owners were mostly plaintiffs/appellants and defendants/respondents, respectively. Also the subcontractor filed some claims against the owner. Breach of contract, extra work resulting from changes, and delays were the most outstanding claims filed by these parties. Decisions by either the courts or contract appeal boards were granted and denied a lot with claims associated with breach of contract. Some cases were resolved by arbitration as a result of the contract documents having arbitration clauses. Many of the claims that were granted include extra work resulting from changes and equitable adjustment to the contract price. Time-related claims, mechanic’s liens, and bond payments and security claims were encountered less in the study. Cases that were denied resulted from plaintiff/appellant not conforming to requirements and also not paying attention to the contract documents.

Claims in conventional construction are similar to ones in green construction, but green construction claims are more complicated. The materials and technologies used in
sustainable construction are different from traditional construction. Also since green construction was established a few years ago, experience and expertise of construction personnel are lacking. To add to it, the process of achieving certification makes it difficult and expensive. Some major factors considered in the certification process include energy savings and the use of recyclable materials. The study showed that parties involved in the green process are concerned about misrepresentation of expertise and competence of contractors and subcontractors, the cost of certification and untested materials. No matter how small the response of an issue from the survey, there seems to be some concern with other risks in the green construction process. These include the components of the building, delivery of materials, insurance alternatives, roles and responsibilities of parties involved, interruption of formal regulations and qualification, and experience of personnel involved in the construction process. From the survey, issues like the strict standards of LEED, the use of financial incentives and loss of resale or rental value do not have much impact on the risks in the green construction industry.

For further study, a one-on-one comparison (e.g., delay claims in conventional building construction versus delay claims in green building construction) may be appropriate to determine which of these claims constitute a more important issue in both traditional and green construction.
APPENDIX A

FEDERAL LEADERSHIP IN HIGH PERFORMANCE AND SUSTAINABLE BUILDING MEMORANDUM OF UNDERSTANDING
FEDERAL LEADERSHIP IN HIGH PERFORMANCE AND SUSTAINABLE BUILDING MEMORANDUM OF UNDERSTANDING

FEDERAL LEADERSHIP IN HIGH PERFORMANCE and SUSTAINABLE BUILDINGS
MEMORANDUM OF UNDERSTANDING

PURPOSE: With this Memorandum of Understanding (MOU), signatory agencies commit to federal leadership in the design, construction, and operation of High-Performance and Sustainable Buildings. A major element of this strategy is the implementation of common strategies for planning, acquiring, siting, designing, building, operating, and maintaining High Performance and Sustainable Buildings. The signatory agencies will also coordinate with complementary efforts in the private and public sectors.

BACKGROUND AND FEDERAL POLICY: The Federal government owns approximately 445,000 buildings with total floor space of over 3.0 billion square feet, in addition to leasing an additional 57,000 buildings comprising 374 million square feet of floor space. These structures and their sites affect our natural environment, our economy, and the productivity and health of the workers and visitors that use these buildings.

Therefore, the Federal government is committed to designing, locating, constructing, maintaining, and operating its facilities in an energy efficient and sustainable manner that strives to achieve a balance that will realize high standards of living, wider sharing of life's amenities, maximum attainable reuse and recycling of depletable resources, in an economically viable manner, consistent with Department and Agency missions. In doing so and where appropriate, we encourage the use of life cycle concepts, consensus-based standards, and performance measurement and verification methods that utilize good science, and lead to sustainable buildings.

GOALS AND OBJECTIVES OF THIS MOU: Consistent with and in addition to Federal policy, statutes, executive orders and supplemental agency policies and guidance, the Parties to this MOU collaboratively seek to establish and follow a common set of sustainable Guiding Principles (attached) for integrated design, energy performance, water conservation, indoor environmental quality, and materials aimed at helping Federal agencies and organizations:

- Reduce the total ownership cost of facilities;
- Improve energy efficiency and water conservation;
- Provide safe, healthy, and productive built environments; and,
- Promote sustainable environmental stewardship.

OTHER LAWS AND MATTERS: This MOU is for internal management purposes of the Parties involved. It is not legally enforceable and shall not be construed to create any legal obligation on the part of any of the signatories. This MOU shall not be construed to provide a private right or cause of action for or by any person or entity. This MOU in no way restricts the Parties from participating in any activity with other public or private agencies, organizations or individuals.
The Parties mutually recognize and acknowledge that MOU implementation will be subject to financial, technical, and other mission-related considerations. It is not intended to create any rights, benefits, or trust responsibilities, either substantive or procedural, nor is it enforceable in law by a party against the US, its agencies, its officers, or any other person.

Collaboration under this MOU will be in accordance with applicable statutes and regulations governing the respective Parties. Nothing in this MOU is intended to affect existing obligations or other agreements of the Parties.

**EFFECTIVE PERIOD:** This MOU will become effective upon signature. It shall remain in effect unless otherwise modified or terminated. Any Party may withdraw upon 30 days written notification to the others.

**MODIFICATIONS:** This MOU can be modified through mutual written agreement among the Parties.

**ADMINISTRATION:** Agencies will strive to incorporate and adopt, as appropriate and practical, the attached *Guiding Principles* into existing agency policy and guidance within 180 days of signature. To assist with this effort, the Interagency Sustainability Working Group (ISWG) will provide technical guidance and updates for the *Guiding Principles*.

The Office of the Federal Environmental Executive will work with the ISWG and Federal Green Building Council to develop methods of reporting on progress towards this MOU in a manner that is least burdensome to the agencies. This may include incorporating reporting into existing mechanisms, such as executive order reports, but in any case with a goal of avoiding a separate reporting process.
GUIDING PRINCIPLES
FOR
FEDERAL LEADERSHIP IN HIGH PERFORMANCE AND SUSTAINABLE BUILDINGS

I. Employ Integrated Design Principles

Integrated Design. Use a collaborative, integrated planning and design process that

- Initiates and maintains an integrated project team in all stages of a project’s planning and delivery,
- Establishes performance goals for site, energy, water, materials, and indoor environmental quality along with other comprehensive design goals, and,
- Ensures incorporation of these goals throughout the design and lifecycle of the building; and,
- Considers all stages of the building’s lifecycle, including deconstruction.

Commissioning. Employ total building commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met. This should include a designated commissioning authority, inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.

II. Optimize Energy Performance

Energy Efficiency. Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star 7.0 targets for new construction and major renovation where applicable. For new construction, reduce the energy cost budget by 30 percent compared to the baseline building performance rating per the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) Standard 90.1-2004, Energy Standard for Buildings Except Low-Rise Residential. For major renovations, reduce the energy cost budget by 20 percent below pre-renovations 2003 baseline.

(www.eere.energy.gov/femp/highperformance/index.cfm)
III. Protect and Conserve Water

**Indoor Water.** Employ strategies that in aggregate use a minimum of 20 percent less potable water than the indoor water use baseline calculated for the building, after meeting the Energy Policy Act of 1992 fixture performance requirements.

**Outdoor Water.** Use water efficient landscape and irrigation strategies, including water reuse and recycling, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities). Employ design and construction strategies that reduce storm water runoff and polluted site water runoff.

IV. Enhance Indoor Environmental Quality


**Moisture Control.** Establish and implement a moisture control strategy for controlling moisture flows and condensation to prevent building damage and mold contamination.

**Daylighting.** Achieve a minimum of daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks. Provide automatic dimming controls or accessible manual lighting controls, and appropriate glare control.

**Low-Emitting Materials.** Specify materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings.

**Protect Indoor Air Quality during Construction.** Follow the recommended approach of the Sheet Metal and Air Conditioning Contractor=s National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 1995. After construction and prior to occupancy, conduct a minimum 72-hour flush-out with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.

V. Reduce Environmental Impact of Materials

**Recycled Content.** For EPA-designated products, use products meeting or exceeding EPA=s recycled content recommendations. For other products, use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project.
Biobased Content. For USDA-designated products, use products meeting or exceeding USDA’s biobased content recommendations. For other products, use biobased products made from rapidly renewable resources and certified sustainable wood products.

Construction Waste. During a project’s planning stage, identify local recycling and salvage operations that could process site-related waste. Program the design to recycle or salvage at least 50 percent construction, demolition and land clearing waste, excluding soil, where markets or on-site recycling opportunities exist.

Ozone Depleting Compounds. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.
SIGNATORIES

The undersigned individuals hereby execute this MOU on behalf of their respective agencies. The Parties envision that other Federal agencies may wish to join this MOU. The Parties encourage all Federal agencies that support the MOU goals and objectives to do so by signing the MOU and applying the Guiding Principles.

[Signature]
Philipp W. Grone
Deputy Under Secretary of Defense for Installations and Environment
Department of Defense

[Signature]
Douglas L. Faulkner
Acting Assistant Secretary for Energy Efficiency and Renewable Energy
Department of Energy

[Signature]
David L. Winstead
Commissioner, Public Buildings Service
General Services Administration

[Signature]
Robert J. Henke
Assistant Secretary for Management
Office of Management
Department of Veterans Affairs

[Date] 24 January 2006

[Date] 28 January 2006

[Date] 2/28/06
P. Lynn Scarlett  
Deputy Secretary  
Department of the Interior  

Ronald L. Deacon  
Director, Facilities and Administrative Services  
Department of Justice  

Thomas C. Dorr  
Under Secretary for Rural Development  
Department of Agriculture  

Olga M. Dominguez  
Deputy Assistant Administrator for Infrastructure and Administration  
National Aeronautics and Space Administration  

Donald Balthurst  
Chief Administrative Services Officer  
Department of Homeland Security
William C. Stamper  
Deputy Assistant Secretary  
Office for Facilities Management & Policy  
Department of Health and Human Services  

Linda J. Washington  
Deputy Assistant Secretary for Administration,  
Department of Transportation  

John E. Long, Jr.  
Executive Vice President, Administrative Services  
Tennessee Valley Authority  

Luis A. Luna  
Assistant Administrator  
Administration And Resources Management  
Environmental Protection Agency  

Henrietta H. Fore  
Under Secretary of State for Management  
Department of State
General Charles E. Williams  
Director/COO  
Overseas Buildings Operations  
Department of State  

Frank J. Coulter, Jr.  
Deputy Assistant Secretary  
Representing the Agency  
Environmental Executive  
Department of State  

Keith Nelson  
Assistant Secretary of Administration  
Department of Housing and Urban Development  

Ronald C. Flom  
Associate Director, Management Services Division  
Office of Personnel Management  

Bryan Hansegen  
Chief of Staff,  
Council on Environmental Quality  
Executive Office of the President  

5/6/06  
1-26-06  
3/02/06  
1/24/06  
1/24/06  
Date  
Date  
Date  
Date  
Date
Patrick Fizzella  
Assistant Secretary for Administration and Management,  
Environmental Executive  
Department of Labor

Otto J. Well  
Chief Financial Officer and  
Assistant Secretary for Administration,  
Department of Commerce

Source: http://www.epa.gov/oaintrnt/projects/buildings_mou.htm
BIBLIOGRAPHY


