



Portland State University

Important Factors in LEED's Water Efficiency Strategies

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Abstract

This report identifies the important factors and the subsequent decisions which lead to identifying and incorporating water-saving strategies and the resulting credits for LEED certification. Furthermore, the report will try to demonstrate how the creation of a LEED's measurement system, has led to a rise in new water saving technologies. Buildings can obtain certification by achieving LEED credits in categories consisting of: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality and additional points for innovative design and regional priority. Data for the report was gathered through interviews with companies and individuals who had applied water efficiency strategies to meet LEED's credit requirements.

Background

The Leadership in Energy and Environmental Design - LEED -, certification program, developed by USGBC - United States Green Building Council -, in 1993, is a tool to examine how “Sustainable/Green” buildings are designed and operated. This certification and rating system for “Green Building” was the outcome of the market’s demand for a quantitative rating system[1]. The rating system consists of the sum of a series of numerical points distributed across five major categories and earned based on sustainability effectiveness. The categories consist of; Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality and additional points for innovative design and regional priority[2][3].

Introduction

Why make your building green? Less resources, and reduce their impact can be a good reason to make green building. The fact accomplished by the wide range of green buildings, lower construction costs, and tremendous opportunities offered to save energy, conserve natural resources, improve air and water quality, and reduce waste, are reasonable[4]. The three biggest factors that impact the environment are: building design, construction, and operations. In the United States, more than 30% of total energy and 60% of electricity is consumed by building [5][6][7]. Practices encouraged by USGBC help reduce or eliminate the negative impact of the aforementioned factors through innovative market leading design, high - performance construction and sustainable operational practices. These innovative technologies and practices have had the additional and important benefits of reducing buildings’ operating costs, enhanced marketability and increase in workers’ productivity. The economic benefits have now become the driving force behind adoption of “Green” practices in building design[8][9].

Research Aims

The research's outcome should help us understand these technologies and whether the technologies/strategies currently in use have been successful in addressing the needs in terms of lowering the cost and reducing waste effectively. This report focuses on identifying water efficiency technologies and strategies based on LEED and its ramification in introducing new technology and processes in construction and architecture trade.

LEED System

LEED - Leadership in Energy and Environmental Design is a framework created by the US Green Building Council – a nonprofit organization dedicated to sustainable building design -, upon which questions and issues pertaining to a building's "Green" footprint can be contextualized and answered through clear and objective measures. The design and construction industry uses the LEED approach to decide whether the expenditure in resources will result in a "Green" building, reduce cost, or increase livability. This voluntary national certification program was created in 1993 and was first implemented in 1999 [10].

The goal of this program is to encourage environmentally responsible, economically effective buildings and healthy places to live and work. LEED tries to achieve the aforementioned by promoting integrated design practices for the whole building[11].

LEED originally was slow to be accepted by the building industry. The attitude of the industry began to change in the middle of the last decade as the increase in the cost of energy and other natural resources congregated with the understanding of the businesses that sustainability should no longer be viewed as a luxury but a necessity. Furthermore, consumers begun demanding a more socially responsible approach from businesses they patronize. Today, all businesses include sustainable practices as an integral part of their brand's message and attribute.

Once businesses understood the need for "Green" practices, and were aware that such practices required expenditure for unfamiliar or non-standard activities and or materials, they looked to justify these

expenditures by demonstrating that the benefits associated with these expenditures far outweigh the cost.

That is where LEED was able to provide a set of concrete standard processes for measuring activities in design and building industry and provide a platform to assess costs and benefits of these activities [11].

When a company or organization has decided to pursue LEED certification for a project, the project is first registered on the USGBC website. After registering, the project team members use a LEED Reference Guide and LEED Letter Templates both of which are critical to the certification process. The team first decides what the project's strategies should be to earn LEED points. Some points are straightforward and easy to earn, others require the incorporation of the costs and the resulting benefits of technologies and designs. Once the team has reviewed the project based on LEED, they can then understand what certification level the project can earn. The next step is to decide if the certification level based on the strategies makes "financial" or "marketing" sense. The financial and marketing stakeholders in the project team may decide to push for a higher or lower level certification based on the outcome of their cost benefit analysis.

As the project nears completion, the project team submits an application for certification to the USGBC. Once received, the USGBC reviews the application, requests any additional information needed to verify compliance, and selects up to six points for audit. Following the final review of the application and additionally submitted information, the USGBC awards the project its appropriate certification. Only then is the project referred to as "certified" [11][7]. The LEED green building rating system is a "voluntary, consensus-based national standard for developing high-performance, sustainable buildings". LEED consists of four levels of certification – Certified, Silver, Gold, Platinum, which are awarded based on numerical point system for a defined set of activities identified by USGBC.

Points	Certification
40-49	Certified
50-59	Silver
60-79	Gold
80 +	Platinum

Points can be earned in the following areas:

Sustainable site development, water efficiency, energy efficiency and atmosphere, material and resource selection, indoor environmental quality, and innovation and design process. Credit points are awarded for meeting the requirements specified in an area or subsections, Credit points for each area is weighted based on the importance of the area or objective it is trying to achieve. To help interpret, implement and document performance, LEED certification is customized for different type of construction such as:

- LEED – NC New Constructions
- LEED – EB Existing Buildings
- LEED – CI Commercial Interiors
- LEED – CS Core & Shell
- LEED – BD & C Building Design & Construction
- LEED – ID & C Interior Design & Construction
- LEED – ND Neighborhood Development
- LEED – HOMES

LEED certification focuses on the areas of sustainable site development, energy efficiency, and atmosphere and water efficiency. LEED also focuses on indoor environment quality, material selection, resource selection, innovation and design process. The study detailed below is focused on wafer efficiency and deals with LEED-NC / EB standards for ascertaining water efficiency credits [12].

LEED – Water Efficiency Credit

Our planet contains 1.4 billion km³ of water of which only 2.5% is classified as fresh water, and only 54% of the fresh water is accessible by the earth's population. Furthermore, water is a finite natural resource whose supply will not remain constant.

The three main human activities that utilize fresh water include agriculture, industry and household. Unfortunately, the shortage of this vital resource is further accelerated by most societies contaminating the arable and drinkable water at their disposal - 70% of industrial waste in developing countries is dumped untreated into freshwater systems.

Political experts believe future wars will be fought for water security rather than energy independence and security [13].

Since conserving water of the magnitude to make a difference for the environment requires participation of every one of us, this was an opportunity to focus this study on Water-Efficiency category.

There are numerous names and terminologies describing key technologies and processes for design and implementation of water conservation strategies. A few key terms which are critical to understanding water efficiency in Green building practices. LEED identifies 4 key types of water:

- Portable water
- Graywater
- Blackwater
- Process water

1. LEED - Portable water, standard meets quality standards for human consumption

2. LEED – Graywater, standard is used for non-portable applications such as landscaping

3. LEED – Blackwater, is not suitable for direct or indirect human contact.

4. LEED - Process water, is defined as water which is used in cooling towers, chillers and boilers. LEED rating system does not regulate the use of process water. However it limits the use of portable water for process water application[14]

- Water efficiency strategies:

Dry Plumbing Fixtures, It conserves water by replacing showerheads or installing dual flush toilet.

- High Efficiency Irrigation and Plumbing Systems, where efficiency of irrigation can be increased by using new and innovative technologies.
- On-site Waste Water Treatment is another strategy where onsite wastewater can be treated by using Bio-microbics technologies.
- Rainwater Collection & Usage, where rainwater is used for irrigation or toilet flush.
- Xeriscaping, This strategy refers to a method of landscaping and gardening were it eliminates excess water from irrigation.
- Public Education[15]

Research Methodology

Literature review and interviews were conducted in the study of LEED with focus on effective factors relating to water-efficiency strategies. The literature review presented a brief description regarding LEED technology service and its important role to measure sustainability and “Green Building”. This study focused on water efficiency credit because LEED and all its features is a broad subject with a lot of details, and requires a large scale study to cover all aspects of LEED.

In order to collect the data it was necessary to find experts who were working at LEED consulting companies and those who provide LEED measuring tools to measure how buildings are meeting the mandate. To get quicker response, interviewees were found through recourses of those buildings that were LEED-certified and identified the relevant consultant companies. Through analysis of the input data from the interviews a rating system was created. According to the graphs, the important factors were based on incorporated and non-incorporated water efficiency strategies. The factors that we considered were identified through research and interviews. . Interview questions can be classified in 5 groups:

- Project Scope, which incorporated the goal of the project and how LEED was incorporated into it.
- Incorporated/ Not incorporated strategies
- Considered Factors, the LEED project managers use the list of factors below to prioritize a strategy and its incorporation into the building. The factors below were derived from our discussion with experienced LEED project managers and suggest that one or more of the following factors may play a role in their decision:
 - Educational demonstration
 - Public relations/marketing
 - Financial benefits
 - Building code
 - Incentives provided
 - Water concerns and/or shortages
 - Owner demand
 - Other regulatory requirements

Similarly, when a water efficiency strategy is not incorporated, one or more of the following factors may play a role in the decision:

- Cost constraints
- Time constraints
- Space constraints
- Regulatory restrictions
- Owner disapproval
- Lack of understanding

It is also essential for LEED project planners to know if water efficiency strategies save money and water as intended, which demonstrates the need for data collection from operations of the building

(The interview questionnaire is provided in appendix)

Interview Demographics

Interviewee Status		Project status						
Name	Position	Overall Budget	Project Type	Owner Type	Size (sq. ft.)	Name & Location	Certified Year	Certified Level/Registered
Jonathan Gray	Professional Project Manager/ Construction Manager Current at Brian Roberts Architecture	\$130 million	Office	Federal Government	512,400	Edith Green – Wendell Wyatt Federal Building Portland, OR	2009	Platinum
Norm Dowty	Vice President, LEED® AP Current at R&H Construction	\$30 million	Health Care & Institutional	Federal Government	225,000	Pacific University Health Professions Campus	2006	Gold
Renee Loveland	Sustainable Real Estate Professional Current at Gerding Edlen	General information and not related to a specific project						
Eric Baxter	Director of Existing Buildings Services Current at Brightworks	General information and not related to a specific project						

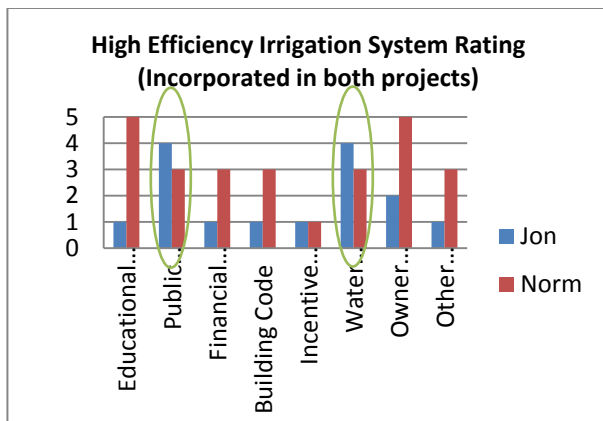
The table above indicates the information about the interviewees and their projects according to the data provided by them.

Result/Analysis

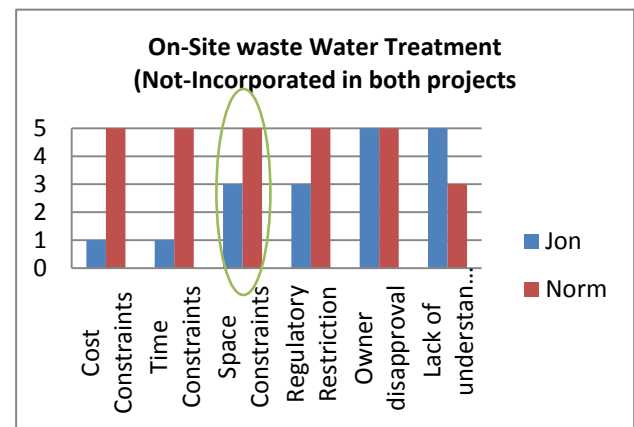
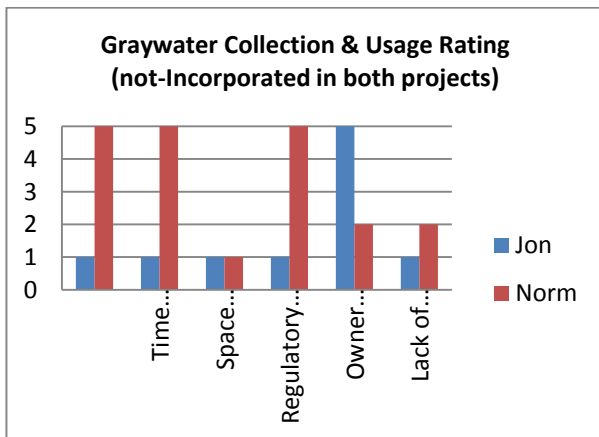
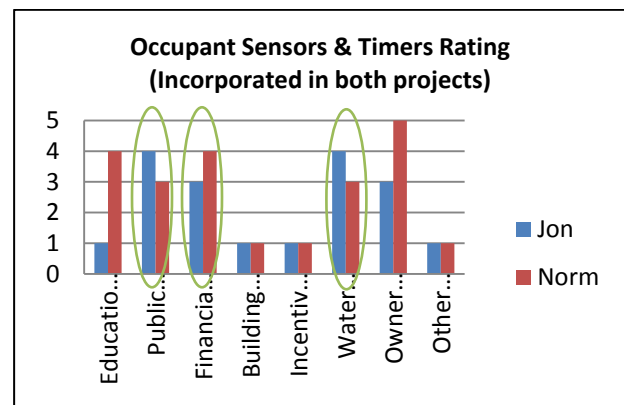
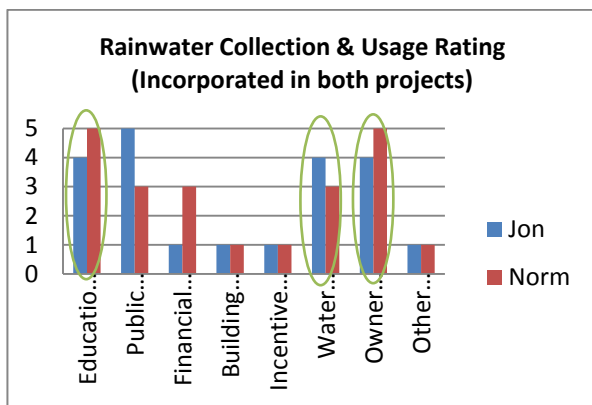
Data were collected through emails, over the phone, and in person. Since most of the answers were general and the interviewees were not able to answer any question related specifically to a particular project, they rated the factors based on their level of importance to incorporating and non-incorporating water-efficiency strategies. The table in the next page indicates rated factors based on how important they were in incorporating and non-incorporating strategies to get LEED certification regardless of the certification type.

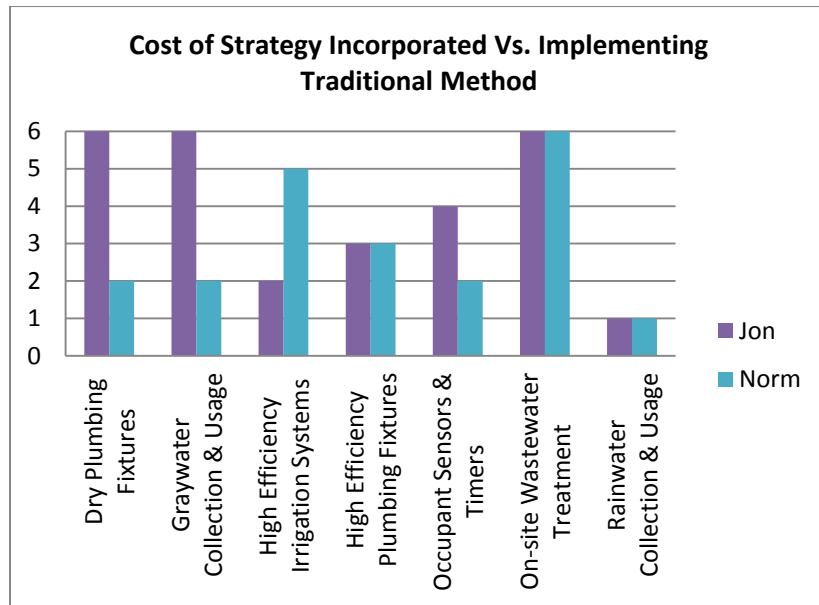
Strategies		Dry Plumbing Fixtures		Graywater collection and usage		Rainwater collection & usage		High Efficiency Irrigation System		Occupant Sensors & Timers		On-Site waste Water Treatment	
Interviewee		Jon	Norm	Jon	Norm	Jon	Norm	Jon	Norm	Jon	Norm	Jon	Norm
Incorporated		N	Y	N	N	Y	Y	Y	Y	Y	Y	N	N
Factors	Educational Demonstration	-	5	-	-	4	5	1	5	1	4	-	-
	Public relation/Marketing	-	1	-	-	5	3	4	3	4	3	-	-
	Financial Benefits	-	2	-	-	1	3	1	3	3	4	-	-
	Building Code	-	1	-	-	1	1	1	3	1	1	-	-
	Incentive Provided	-	1	-	-	1	1	1	1	1	1	-	-
	Water Concerns/Shortage	-	5	-	-	4	3	4	3	4	3	-	-
	Owner Demand	-	3	-	-	4	5	2	5	3	5	-	-
	Other regulator requirements	-	1	-	-	1	1	1	3	1	1	-	-
	Cost Constraints	1	-	1	5	-	-	-	-	-	-	1	5
	Time Constraints	1	-	1	5	-	-	-	-	-	-	1	5
	Space Constraints	1	-	1	1	-	-	-	-	-	-	3	5
	Regulatory Restriction	1	-	1	5	-	-	-	-	-	-	3	5
	Owner disapproval	5	-	5	2	-	-	-	-	-	-	5	5
	Lack of understanding	1	-	1	2	-	-	-	-	-	-	5	3

Rated factors according to their impact on incorporated/not incorporated strategies



The following graphs represent aggregate of the information/answers collected from the respondents. The graphs help to eliminate the answer that were inconsistent and provides focus on the consistent information.





It is understood from Jon and Norm’s responses that although both interviewees were agreed that “Rainwater Collection & Usage” is more expensive than traditional method still the financial benefits wasn’t the most important factor and other factors such as: Public Relations/Marketing, Water Concern / Shortage, Owner Demand, Educational Demonstration were more effective factors to convince them to incorporate the strategy. Apparently they both are agreed that implementing High Efficiency Plumbing Fixtures strategy cost was within 1% of traditional methods. According to the graphs public relation/marketing, financial benefits, water concern/shortage, owner demand are the factors that convinced them to incorporate occupant sensors & timers rating strategy. It is indicated in the graph above- Cost of Strategy Incorporated vs. Implementing Traditional Method- that Norm agrees that its Cost was 1 - 10% greater than traditional methods but still he considered the strategy for the stronger effect of the other factors.

Strategies		Incorporated			Not incorporated	
		High Efficiency Irrigation System	Occupant Sensors & Timers Rating	Rainwater Collection & Usage	Graywater collection & usage	On-Site waste Water Treatment
Factors	Public Relation/Marketing	+	+	+	Inconsistency in the answers	
	Financial Benefits		+			
	Water Concerns/Shortage	+	+	+		
	Owner Demand		+	+		
	Educational Demonstration			+		
	Owner Disapproval					-

The following list is the aggregate of the graphs and the table above which demonstrates the factors – in order of no specific priority -, that have had the most impact in incorporating/not incorporating a strategy to obtain LEED credits.

- The most important factors in incorporating High efficiency Irrigation System
 - Public Relations/Marketing
 - Water Concern/Shortage
- The most important factors in incorporating occupant sensors & timers rating strategy
 - Public Relations/Marketing
 - Financial Benefits
 - Water Concern/Shortage
 - Owner Demand
- The most important factors in incorporating rainwater collection and usage strategy
 - Public Relations/Marketing
 - Water Concern/Shortage
 - Owner Demand
 - Educational Demonstration
- The most important factors in not-incorporating on-site waste water treatment strategy
 - Owners' Reluctance

Conclusion

According to the research conducted for this report, it is clear that LEED water efficiency credits are worth pursuing and can be effective, both environmentally and economically. This conclusion is based on surveys of four Interviews which consist of two general and two LEED projects based responses.

The results indicate that Public Relations/Marketing and Water Concern/Shortage are the most important factors in pursuing a particular strategy and/or technology.

The surprising finding in this report was that contrary to popular assumptions financial benefits was not as important of a factor in incorporating water efficiency strategy as we thought.

Future Works

There are still opportunities for better understanding of the motivating factors and various available technologies that can make a strategy more appealing. The list below represents a few of the issues that may be pursued in the future;

- Study of the traditional water efficiency strategies vs. LEED's innovative water-efficiency strategies.
- Study of the effective factors to incorporate Graywater collection & usage due to challenges that this system requires.

On-site waste water treatment is the least likely strategy to be included in future LEED projects due to systems' complexity, cost, additional permits and intensive maintenance.

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Appendix

Questionnaire structure:

PSU Graduate Course Work 2013
ETM Program

Date of Interview:
Interviewer:
Interviewee:
Would you like the compiled survey information? () Yes () No
Project Title:
Project size:
Project Location:
Year of certified (expected to be):
Brief description of the project:

Purpose of Study:

There are important factors that impact the decisions for incorporating/not incorporating water-efficiency strategies to receive LEED's water-efficiency credits. This report seeks to understand how when and why new technology service LEED's measurement system has contributed to the expansion and improvement of methods and strategies in building and design industry. The study's outcome should help us understand the growth of these technologies and whether the technologies/strategies currently in use have been able to address the needs effectively.

The information provided will be compiled and Individual project information will remain confidential. The compiled survey information will be shared with survey respondents. If you have worked on or are working on more than one project, please complete one survey for each project. Furthermore, this questionnaire is a combination of questions from an existing survey performed for another research related to our topic as well as questions we developed. If there are any questions please contact me, at sara.bahreini@gmail.com or 971-400-31091. My team and I thank you in advance for your time and effort.

Questionnaire:

Indicate your selection with an "X"

Feel free to write comment

1. The project is:
 - Certified
 - Registered
2. Registered or certified project by owner type:
 - Individual Nonprofit Corporation
 - Profit Corporation State Government
 - Local Government Federal Government
 - Other
3. Project type:
 - Residential Commercial Industrial
 - K-12 Facilities Health Care Retail
 - Laboratory Institutional Multi-use
 - Non-Profit/NGO Hotel/Resort Other(please specify)
4. How do you assess the rates of technology service (LEED - Water efficiency) performance and growth in demand compare to the last10 years? **In rating these items, use the following scale: 1 = Very Low; 2 = Low; 3 = Medium; 4 = High; 5 = Very High**
 - Performance
 - Growth of demand
5. How do you assess the rates of technology service (LEED - Water efficiency) performance and growth in demand compare to the last (2-3) years? **In rating these items, use the following scale: 1 = Very Low; 2 = Low; 3 = Medium; 4 = High; 5 = Very High**
 - Performance
 - Growth of demand
6. Please indicate the certification level the project achieved (expects to achieve):
 - Bronze Certified Silver Gold Platinum
7. In the following section, please indicate whether each of the strategies were (are being) incorporated or not incorporated in the project.
How to answer:
For those strategies that were (are being) incorporated, please indicate ("X") the importance of each of the factors listed in deciding the use of the strategy (left column). Similarly, for those strategies that were not (are not being) incorporated, indicate ("X") the importance of each factor in deciding not to use the strategy (right column). ?
1 = not important; 2 = slightly important; 3 = moderately important; 4 = very important; 5 = extremely important

Dry Plumbing Fixtures

Yes ()

Incorporated

No ()

Not-Incorporated

Factors

Educational Demonstration
 Public Relation/Marketing
 Financial Benefits
 Building Code
 Incentives Provided
 Water Concerns +/- Shortages
 Owner Demand
 Other Regulatory Requirements
 Other (Specify)

Cost Constraints
 Time Constraints
 Space Constraints
 Regulatory Restriction
 Owner Disapproval
 Lack of Understanding
 Other (Specify)

High Efficiency Plumbing Fixtures	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		
High Efficiency Irrigation System	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		
Occupant Sensors & Timers	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		
On-Site waste Water Treatment	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		
Rainwater Collection & Usage	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)

Other Regulatory Requirements
Other (Specify)

Graywater Collection & Usage	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		

Xeriscaping	Yes () <u>Incorporated</u>	No () <u>Not-Incorporated</u>
<u>Factors</u>		
Educational Demonstration		Cost Constraints
Public Relation/Marketing		Time Constraints
Financial Benefits		Space Constraints
Building Code		Regulatory Restriction
Incentives Provided		Owner Disapproval
Water Concerns +/- Shortages		Lack of Understanding
Owner Demand		Other (Specify)
Other Regulatory Requirements		
Other (Specify)		

8. For each strategy incorporated, please compare the cost of implementing it relative to the cost of implementing traditional methods. Select "not applicable" if the strategy was not incorporated.

Dry Plumbing Fixtures

- () Cost was more than 10% greater than traditional methods
() Cost was 1 - 10% greater than traditional methods
() Cost was within 1% of traditional methods
() Cost was 1 - 10% less than traditional methods
() Cost was more than 10% less than traditional methods
() Not applicable

Graywater Collection & Usage

- () Cost was more than 10% greater than traditional methods
() Cost was 1 - 10% greater than traditional methods
() Cost was within 1% of traditional methods
() Cost was 1 - 10% less than traditional methods
() Cost was more than 10% less than traditional methods
() Not applicable

High Efficiency Irrigation Systems

- () Cost was more than 10% greater than traditional methods
() Cost was 1 - 10% greater than traditional methods
() Cost was within 1% of traditional methods
() Cost was 1 - 10% less than traditional methods
() Cost was more than 10% less than traditional methods
() Not applicable

High Efficiency Plumbing Fixtures

- () Cost was more than 10% greater than traditional methods
() Cost was 1 - 10% greater than traditional methods
() Cost was within 1% of traditional methods
() Cost was 1 - 10% less than traditional methods
() Cost was more than 10% less than traditional methods
() Not applicable

Occupant Sensors & Timers

- () Cost was more than 10% greater than traditional methods
() Cost was 1 - 10% greater than traditional methods
() Cost was within 1% of traditional methods

- ☐ Cost was 1 - 10% less than traditional methods
☐ Cost was more than 10% less than traditional methods ☐ Not applicable

On-site Wastewater Treatment

- ☐ Cost was more than 10% greater than traditional methods
☐ Cost was 1 - 10% greater than traditional methods
☐ Cost was within 1% of traditional methods
☐ Cost was 1 - 10% less than traditional methods
☐ Cost was more than 10% less than traditional methods ☐ Not applicable

Rainwater Collection & Usage

- ☐ Cost was more than 10% greater than traditional methods
☐ Cost was 1 - 10% greater than traditional methods
☐ Cost was within 1% of traditional methods
☐ Cost was 1 - 10% less than traditional methods
☐ Cost was more than 10% less than traditional methods ☐ Not applicable

Xeriscaping

- ☐ Cost was more than 10% greater than traditional methods
☐ Cost was 1 - 10% greater than traditional methods
☐ Cost was within 1% of traditional methods
☐ Cost was 1 - 10% less than traditional methods
☐ Cost was more than 10% less than traditional methods ☐ Not applicable

9. What is the project's estimated baseline yearly water usage? Please include the units.
 Portable water usage: _____ Irrigation water usage: _____

10. Indicate the use of the LEED project: **(1 = primary; 2 = secondary;**

X = doesn't apply) Indicate all that apply.

Housing (Higher Ed)	Classrooms	Retail
Laboratory	Food Service	Offices
Research	Manufacturing	Meeting/Conference
Multi-Family Housing	Other	
(Private)	(please specify)	

11. What was (is) the overall budget for the project?
 12. Please provide any individual comments you feel would help in understanding how decisions about the strategies employed in LEED projects are made.
 13. On a 5 point scale, rate how important was the level of certification to the owner?
☐ not important
☐ slightly important
☐ moderately important
☐ very important
☐ extremely important