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# Technical Assignment 3

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## Executive Summary

The following report is to determine methods of analyzing important issues in the construction of the Bed Bath & Beyond / Christmas Tree Shops in Paramus, NJ, as well as some potential changes that could be applied to future prototypes. Critical issues for the project have been determined and now methods of analyzing these issues will be laid out. Focusing on the retail market in particular, the application of sustainable construction methods will be analyzed. Additionally, methods of offsetting the potential initial cost of building green via value engineering will be addressed. Means of obtaining data to analyze these aspects will be listed as well as the importance of the research.

Project durations are always important to owners, therefore determining the cost to accelerate a schedule is an important aspect to research. Research methods, to determine the cost of compressing the schedule, are discussed in this report under the technical analysis section.

Finally, the amount of work being focused on each of these topics of research will be displayed in a weighting table to project the approximate forthcoming efforts.

## Critical Issues Research Method

### Overview:

One aspect of the construction industry that has become more prevalent in the past years is sustainable construction, also referred to as green building. Although tremendous progress has been made in recent years including; creation of green rating systems such as LEED's, government and institutional requirements to build in accordance to LEED, and an increase in owner interest in green building, there is still a lot of room for further growth. I anticipate, within the near future, for there to be an increase in sustainable projects as it becomes more popular with owners and government regulations become more thorough throughout the country. This increase in sustainable projects will require the industry to be prepared to address green building issues and design-build projects may become even more common. The problem facing the retail industry is design-build projects aren't as common due to the fact many of their buildings are mass produced after establishing prototype building. Creative and cutting-edge construction companies aren't given the opportunity as they are in other markets to produce green projects, but rather the decision to build green has to come from the owner.

### The Problem:

In a highly competitive and profit driven industry of retail construction, the bottom-line cost to build their retail locations has a lot of importance. When a company makes plans to build 50 new retail buildings in the following year an increase in initial cost is going to be magnified 50 times. The accepted notion that sustainable design will always cost more to build is a misconception and restricting concept in the progression of green construction. Many construction companies have not had the proper exposure and LEED experienced staff in the past and naturally this can lead to an increase in initial cost. I believe that with the right experienced team, planning to build sustainably from the beginning of the project design, project costs don't need to increase. Additionally, life cycle costs for the building have potential to be significantly lower, but many skeptics are waiting for more long term results to come in to support this. Sufficient research and improvements in design teams could help resolve this problem.

### The Solution:

I propose to make an appeal to owners in the retail market to build more environmentally conscious at the benefit of the industry, the environment, and themselves. Providing some data on past projects, built under LEED certifications, on how they are performing throughout their life cycle cost wise. Compiling information that establishes the potential long term benefits of building green could help sway owners into investing more efforts to build this way. I would also be interested in questioning some companies that have built some LEED rated buildings to find out some of the challenges and results of their endeavors. Using a combination of D4 Cost databases and case studies I will compile a table of project results.

### Expected Results:

I expect to find that the more companies build green the better they will become at doing it. By repeating similar projects they have the opportunity to be come more familiar and more efficient in their projects. It may cost more for companies to receive certification on their building but, I also foresee that the majority of green projects will save money in their life time cost regardless of whether or not there was a premium initial cost spent to upgrade the building.

### Sample Data Table

<i>Building Name</i>	<i>Square Footage</i>	<i>LEED Rating</i>	<i>Initial Cost</i>	<i>Initial Cost/SF</i>	<i>20 Year Total Cost</i>	<i>20 Year Cost/SF</i>	<i>Projected Savings</i>	<i>Savings/SF</i>
Building 1	100,000	None	####	####	####	####	####	####
Building 2	100,900	Silver	####	####	####	####	####	####
Building 3	50,000	None	####	####	####	####	####	####
Building 4	49,650	Gold	####	####	####	####	####	####

### Sample Company Questionnaire

1. How many LEED certified buildings have your company built?
2. How many LEED Accredited Professionals or sustainable design experts does your company currently employ?
3. What are some difficulties that your company has come across in completing LEED rated buildings?
4. Have you found there to be a premium initial cost to design sustainably?
5. Do you believe the buildings, that have successfully received LEED certification, are performing more efficiently then non LEED buildings?
6. As the quantity of completed LEED buildings for your company increases, has there been an improvement in the outcome of these projects?
7. How do predict green building will advance in the near future? Will it be more or less common?

# Technical Analysis Method

## Project Acceleration Analysis

### Overview

Due to the change of general contractor midway through the Bed Beth & Beyond / Christmas Tree Shops project, a schedule acceleration analysis would be very beneficial. This project in particular felt the pressure to finish on schedule despite setbacks, similarly to many other retail projects. The retail market is even more schedule dependent than most of the construction industry. The faster the projects are completed the sooner the stores can open for sales and become profitable. Time is a significant factor in determining whether or not a project is successful from an owner's standpoint.

### The Problem:

Tying in with sustainable construction methods, an accelerated schedule may be necessary to compensate for some of the additional durations of trying new green construction methods. Some of these construction methods and materials are unfamiliar to specialty contractors; time for a learning curve would be beneficial. In sustainable projects, usually there must be extra scheduled time for additional commissioning and ventilating periods. Additionally scheduled tasks may be detrimental to a project that needs to be completed quickly and owners will not be interested in green projects if they prove to compromise their grand opening dates.

### The Solution:

The cost to reduce the project duration by 10-15% will be analyzed. Research will be presented on the benefits of completing the project faster and potentially opening the store earlier. With these results a comparison will be produced to show the benefits of accelerating a schedule in the retail industry. Additionally, the cost of accelerating the project can be analyzed for an application of making up lost time on a project compared to the penalties for late completion. I will determine how many more crews of workers will be needed to speed the project up and how much cost it will add. Alternatively phasing the project differently can provide for some schedule reduction without having to pay a premium for overtime work and more laborers. R.S. Means will be used to determine crew labor output and labor costs.

### Expected Results:

I anticipate there will be a consistent increase in the cost of a scheduled task, however I believe in the majority of the cases the increase in cost will be significantly lower than the penalty for completing the project late. Another aspect of completing a project on schedule, that can't be quantified with a cost value, is the maintaining of a good relationship between the owner and the general contractor as well as maintaining a good reputation.

Sample Date Table:

<i>Scheduled Task</i>	<i>Initial Duration</i>	<i>Initial Cost</i>	<i>New Duration</i>	<i>New Cost</i>	<i>Change in Duration</i>	<i>Change in Cost</i>
<i>Flooring</i>	####	####	####	####	####	####
<i>Drywall</i>	####	####	####	####	####	####
<i>Plumbing</i>	####	####	####	####	####	####
Total Additional Cost					####	
Money Made By Opening Early or					####	
Money Saved By Not Opening Late					####	
<b>Net Profit</b>					<b>####</b>	

## Value Engineering Analysis

### Overview:

Some aspects of building more sustainable projects have premium price tags that go along with them. Value engineering can provide the perfect opportunity to save in total project cost and offset these premiums.

### The Problem:

The retail market spends a lot of money to insure that their retail locations reflect the quality of the products they sell. They are displaying their company logo all over the building and can't afford to reduce the quality of their building just to save money. This situation will direct my efforts to portions of the construction that won't have visible downgrades associated with their cost reduction.

### The Solution:

Value engineering the building to retain the same visible quality, for a cheaper cost can save the company enough money to allow them to invest in a higher quality and more efficient building. I will be analyzing different systems to find portions of the building that can be redesigned and built more cost effectively. The large columns that support the 2 retail floors, interior finishes, plumbing systems, and exterior facades are just some of the items that can be analyzed and replaced with equal quality features. Both the materials used in the processes and the constructability of them will be looked into to make sure that the construction task is compatible with the rest of the planned construction of the building. R.s. Means will be used for the cost information in this portion.

**Expected Results:**

I anticipate that, although the building has been professionally and thoughtfully designed, there will be portions of the design and construction that have more efficient solutions. I also believe that there are enough value engineering opportunities on the project to offset a high percentage of any additional costs for getting LEED certification.

**Sample Data Table:**

<i><b>Task Description</b></i>	<i><b>Original Cost</b></i>	<i><b>Proposed Cost</b></i>	<i><b>Change in Cost</b></i>	<i><b>Change in Duration</b></i>	<i><b>Change in Quality</b></i>
Concrete Columns	####	####	####	####	No
Plumbing	####	####	####	####	No
Interior Finishes	####	####	####	####	No
Exterior Façade	####	####	####	####	No
			<b>Total Cost Savings</b>	<b>####</b>	
			<b>Total Duration Change</b>	<b>####</b>	

## Research Weight Matrix

Description	Research	Value Eng.	Const. Rev.	Sched. Reduc.	Total
Sustainable Construction Issues Research	50.00%	0.00%	0.00%	0.00%	50.00%
Value Engineering Analysis	0.00%	15.00%	10.00%	0.00%	25.00%
Project Acceleration Analysis	0.00%	0.00%	0.00%	25.00%	25.00%
<b>Total</b>	50.00%	15.00%	10.00%	25.00%	100.00%