EXECUTIVE SUMMARY

The following proposal gives a more detailed analysis of my project and the proposed changes to the existing building process and systems. These proposed changes have been analyzed during the course of the past semester. There are four core areas of investigation that must be addressed and they are as follows: critical issues research, value engineering analysis, constructability review, and schedule reduction / acceleration proposal.

The next task at hand was to find particular breadth topics that would fall under these categories and to find a topic for research within the construction management field that could be best applied to this project. By talking with the project manager and taking tours of the construction site during the summer, I got most of the information that I needed to assign breadth topics and begin research into the critical industry issue.

The topic of my critical issues research deals with integrated design management, which could in turn also deal with schedule revision. The basement and foundation system will be analyzed for possible schedule revisions and value engineering recommendations. The mechanical room and HVAC layout will undergo the same kind of analysis. Lastly, the structural system will also be evaluated for schedule revision, but mainly for the main purpose of construction review.

CRITICAL ISSUES RESEARCH METHOD

Integrated Design Management

Running into a problem or conflict during any construction process is inevitable. Trade conflicts and unforeseen conditions are just some of the problems that can cause delays in the schedule and add heavy costs to the budget. The best way to eliminate, or at least reduce the impact of these problems is to carefully plan out the project. The only way to minimize conflicts as much as possible is by having the owner, architect and construction manager all collaborate in the planning.

The idea behind integrated design management is to have more collaboration between all the entities. The main purpose of this synergy is so that everything is well coordinated, so that impedances in the construction progress are reduced to a minimum, and to generate innovative design ideas to make the building more efficient, without sacrificing design or increasing cost of construction.

- **Audience**

The issue at hand, in my opinion, affects everyone involved in the construction industry. I know that this may be a wide spectrum, but the statement is true. For example; with proper planning during the design stage, the owner will have a team on his project that is well coordinated and can communicate effectively. This in turn can guarantee a project delivered on time, with minimal occurrences of conflicts and setbacks. Similarly, for construction managers; it can mean less conflict with or within different contractors/trades, minimal amount of setbacks or unforeseen conditions, and being able to understand the architect's concepts. Besides this, if there are certain companies that are looking for a LEED rating; the extra time taken to plan out the construction process and to generate inventive ideas to make the building more efficient, can ensure the goal of a LEED rated building. The benefits that can be had by the contractors are similar to those of the construction manager; less conflict with other trades, better understanding of the drawings, a well planned out schedule etc.

- **Research**

My main method for conducting my research would be to find as much information as I can by getting various different points of views. I plan on establishing my credibility by reporting the information that I am going to personally gather. Besides this, I plan on reading articles relating to the topic of integrated design management. Documents such as these will help me determine how helpful integrated design management can actually be to the industry and which type of construction companies it can benefit the most. My ideal article would consist of two similar projects being built; one using integrated design management and the other not using IDM.

SAMPLE QUESTIONS:

How much will it cost to implement integrated design management?

Will it save money?

What are some possible conflicts or barriers in using this method?

How can performance specifications hurt/help design management?

Can alternate forms of delivery be helpful? How so?

What motivates owners to pursue a different delivery method?

PROBLEM IDENTIFICATION METHOD

Basement and Foundation Analysis

The first problem that I will be analyzing deals with the structure of the basement walls. I was told by the project manager that when the architects designed the building, they used the standards and norms for basic design issues. The main example in this case is having the basement walls rise all the way to the ceiling. Yet, due to seismic regulations, walls must be braced to the ceiling/slab in order to pass inspection. If the walls were designed to not touch the ceiling, on the other hand, it would have been fine and passed inspection just as well. However, because the walls needed to have bracing, it added on time to the schedule along with an extra $75K in extra costs.

- **Research**

One of my main goals is to actually see the seismic regulation that states that steel angles must be used to brace any basement walls to the ceiling if they are touching. I am also taking a look at the drawings and want to ask the architects if they were aware of such regulations and/or have come across a problem like this before. I already have an idea of how much money could have been saved by avoiding this problem, so I need to formulate a plan on how to compare if the costs of the extra planning outweigh the costs of fixing the problem. In addition to this, I need to talk to the project manager to get an idea of how much time could have been saved by avoiding this problem, as well as finding out if having the angles installed conflicted with any other trades and/or caused any inconveniences and unnecessary impedances.

Mechanical Room and HVAC System Analysis

The next issue that stood out was the equipment and design of the mechanical system. According to the project manager of this project, Mr. Loren Luedeman, the pressures from the equipment in the mechanical room were difficult to calibrate. Furthermore, due to the height that the piping had to rise, as well as some turns that it had to make, the system would function improperly. I also remember that he mentioned that there were some redesign issues regarding some of the connections. Besides this, there were also some problems regarding the ductwork. The building has two '1/2 levels' or staggered floors. This would cause the ductwork to rise, dip and fit into some tight spaces. Not only did this pose problems regarding the efficiency of air distribution but I can imagine that it also messed with some aesthetic concepts and presented problems with the mechanical trades in the installation of the ductwork (which in turn causes increased cost in labor).

● **Research**

My knowledge in this area is very limited and will have to perform much research. I need to know exactly what was wrong with the piping and why the pressures were so hard to calibrate. I am going to ask if it was an unforeseen problem with the materials. I want to know how much of a schedule and a cost impact the mechanical room problems had on the project. I am also going to find out how they resolved the problem and how much extra money was spent on the testing, calibrating and installation of any new equipment/parts. The main contractor that handled the ductwork installation and coordination for this project was Dee Cramer. I plan on talking to the foreman of this project and asking if he remembers any complications in this project and how he resolved it, along with any recommendations that he had regarding the project that were not used.

Structural System Analysis

The last problem that I will be analyzing deals with the structural beams used in different areas of the building. More specifically, I will be taking a look at the indoor track and office area. Regarding the track area, I will be taking a look at the load distribution in that general area. During my visits at the site during the summer, I did not hear anything regarding the track from Mr. Luedeman, but I am sure that when you have an indoor track that is suspended above an open level, there are problems that arise. In addition to this, Mr. Luedeman informed me that there were inconsistencies with beam sizes in the office area. Apparently some of the beams were too deep and caused the ceiling height to be 4" below the required height. This drew attention to the area and the inspectors would not give approval until the ceiling height was raised another 4 inches. A problem like this causes major delays to the construction process and forces the above ceiling trades to format/re-do their work.

- **Research**

This area of my investigation will take much analysis. I will first have to find out exactly what problems the track area had and if it was a design issue, coordination issue etc. I will have to analyze the drawings and find out if the beams that were used were the proper ones used for the load expectancy. Also, I want to find out how the mix up with the beams in the office area occurred. Was there a mistake in the order? Was there a mistake in the drawings? How could this have been prevented? Could an earlier meeting with the architect and the construction manager have helped avoid this problem? I especially want to find out how much of an extra cost it was to raise the ceiling the extra four inches and re-format all the work that had already been done: electrical, carpentry, mechanical etc. Again, I will have to come up with a plan to figure out the costs of extra, collaborative planning vs. the costs that were added due to this mistake.

WEIGHT MATRIX

Description	Research	Value Eng.	Const. Rev.	Sched. Rev.	Total
Basement/Foundation		20%		10%	30%
Mech. Room/HVAC		15%		10%	25%
Structural			20%	5%	25%
Integrated Design Mgmt.	10%			10%	20%
Total	10%	35%	20%	35%	100%