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Sunnyvale Plaza

Mid-Atlantic Region, United States

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Thesis Proposal - Revised

FACULTY CONSULTANT: CRAIG DUBLER

EXECUTIVE SUMMARY

The owner for Sunnyvale Plaza was not necessarily concerned about a forecasted opening date due to the primary focus of the hotel being a convention center headquarters. Due to this, the expected opening was forecasted for just one month after a national festival. The hotel is expected to run at considerable capacity in conjunction with the convention center events.

This duration of one month is the target for several schedule acceleration analyses being conducted. The first analysis will evaluate the benefits of decreasing the schedule duration. The second analysis will evaluate the schedule and cost benefits in reassessing the renovation of the existing building. The third analysis will examine the schedule and cost benefits of alternative excavation methods. The fourth analysis will examine the long-term cost savings of implementing a stormwater harvesting system.

Analysis 1 will consider the benefits of forecasting an opening just before the national festival, while also considering the benefits of opening even earlier than that. Decreasing the project schedule by just one month will allow the hotel to take reservations just before a national festival. This will allow the hotel to fill capacity and charge higher rates for guestrooms. It is important to evaluate the risks involved in taking reservations for such a popular event. The profitability will be analyzed based off of a schedule decrease per month.

Analyses 2 will focus on the consideration of the existing building located in the southeast corner of the project site. This building has been renovated and tied into the new construction of the hotel. Analysis 2 will evaluate the cost and schedule benefits of utilizing façade retention to maintain the historic features of the brick building while destroying the structural components and interior.

Analysis 3 will focus on the alternatives in the excavation process available due to the change in the existing building conditions. The excavation process took an extensive amount of extra time due to the unique top-down process utilized. The entire excavation took an estimated year longer than typical excavation methods. Although the top-down excavation allowed for the superstructure to begin early, it created a longer initial excavation duration. Alternative excavation methods will be evaluated to consider schedule and cost benefits. It is important to evaluate the changes in the allowable start date for the superstructure construction and the effects on the overall project schedule.

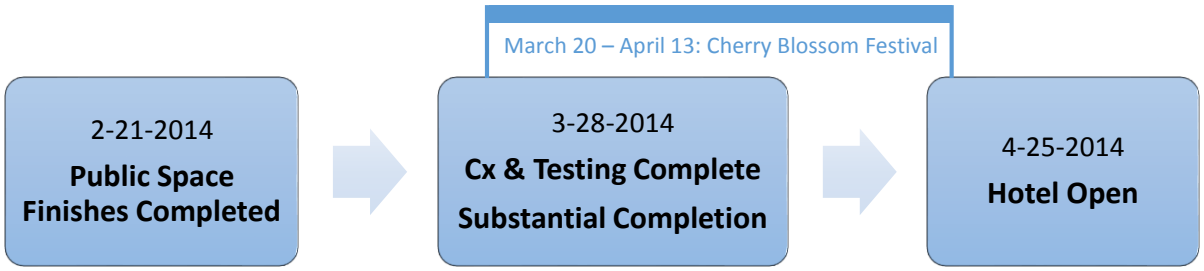
Analysis 4 will consider the extensive water utility costs for the area and evaluate an alternative method of decreasing the amount of water needed from the city. This analysis will greatly decrease the long-term costs of the hotel. Utilizing a stormwater harvesting system will decrease the amount of water needed from the city through a greywater recycling system. Implementing this system produces the possibility of increasing the LEED certification as well as the value of the hotel.

CONTENTS

ANALYSIS 1 – PROFITABILITY OF EARLY SCHEDULED OPENING

PROBLEM IDENTIFICATION

The hotel is forecasted to open approximately one month after The National Cherry Blossom Festival takes place. The festival consists of 25 days of events, ending just 18 days before the opening of the hotel. Due to the primary focus of the hotel being a convention headquarters, a uniquely forecasted opening was not entirely explored.



It is important to guarantee an on-time completion when forecasting an opening just before a national festival. Any delays in the hotel opening can result in problems arising from reserved guestrooms and events. Forecasting an opening date just before the national festival can allow for the hotel to fill capacity and charge higher rates for guestrooms.

BACKGROUND RESEARCH PERFORMED

The profitability of opening earlier than the festival will be analyzed in one month increments from January 20th to March 20th with the last month being aligned with the festival. This is to analyze the benefits of exceeding the one month decrease of the schedule duration.

Research will be conducted to gain a better understanding of hotel operations and expectations. This research will include extensive guestroom rate data collection and interviews with hotel industry members. Guestroom rates will be compiled from three similar hotels within the surrounding area. This will help improve the final process in which to forecast the hotel opening.

POTENTIAL SOLUTIONS

The results of this analysis will render the following possible solutions:

- Profit of forecasting an early opening date of one month for festival
- Profit of forecasting an early opening date of a larger duration
- Feasibility of opening earlier compared to accelerated construction costs
- Recommendation of the best scenario for increasing profit for financial gain

METHODOLOGY

The following steps will be utilized to properly complete this analysis:

- Research guestroom rates of various four-star hotels located within city
    - Research will be conducted for three different hotels
    - Rates will be recorded every other week for the 20th of each month
- Determine average income by utilizing monthly guestroom rate data
- Conduct interviews with hotel industry members
- Evaluate average cost of hotel to be open per month
- Evaluate the average profitability based off of cost and income of hotel per month
- Explore savings and losses per month of schedule decrease
- Develop recommendation

EXPECTED OUTCOME

It is expected that each extra month that the hotel is opened will produce extensive profit that can be used for financial return for the developer. The month in which the festival takes place will be the most profitable month available.

ANALYSIS 2 – REMOVAL OF RENOVATED BUILDING SECTION

PROBLEM IDENTIFICATION

The brick union building that is located on the southeast corner of the project site will be renovated and included in the new hotel construction. This existing building created a large amount of deconstruction work and temporary structural requirements throughout the lower levels. Complicated concrete construction also took place within the lower levels of the existing structure. This created a lengthier construction process and delays.

BACKGROUND RESEARCH PERFORMED

The union building was kept as a historic feature of the new hotel. Efforts to keep the façade of the existing building through façade retention will be analyzed to maintain the historic brick feature of the hotel. The building is fairly small, but accounted for a lengthy deconstruction process. Several key additions within the lower floors also took extensive time. This can all be avoided with the construction of a new building.

Figure 1: Image of Project Site

The existing building also created problems with the excavation process, leading to a much more extensive excavation. The benefits of completely destroying the existing building may lead to unforeseen benefits in the excavation process.

A structural analysis will need to be completed for the new foundation on the corner where the existing building used to stand. New footings, slabs, columns, and beams will be designed.. See Appendix A for structural breadth details.

POTENTIAL SOLUTIONS

The results of this analysis will render the following possible solutions:

- Recommend complete destruction and construction of existing building excluding façade
- Recommend preservation and renovation of historic existing building
- Recommend alternative method with improved renovation and deconstruction techniques

METHODOLOGY

The following steps will be utilized to properly complete this analysis:

- Research façade retention methods available to new construction
- Evaluate feasibility of new construction method involving façade retention
- Estimate or acquire cost of deconstruction and construction for existing building
- Estimate cost of complete destruction of existing building and construction of additional section
- Evaluate schedule and cost changes utilizing new construction method
- Evaluate unforeseen benefits of utilizing new construction method

EXPECTED OUTCOME

The use of façade retention to maintain the historic features can allow the existing building to be completely destroyed and rebuilt with the rest of the hotel. This will create a less complex construction process while still maintaining the historic feature. The schedule duration may be reduced due to the implementation into the entire building construction. This will also benefit the excavation methods utilized.

ANALYSIS 3 – ALTERNATIVE EXCAVATION METHODS

PROBLEM IDENTIFICATION

The project team was required to utilize top-down excavation for Sunnyvale Plaza. This excavation process took an extensive amount of extra time to complete. The duration was estimated to be an entire year more than typical excavation methods. The only benefit of utilizing top-down excavation was to allow the team to begin construction upward before the excavation was complete.

BACKGROUND RESEARCH PERFORMED

The excavation process utilized by the project team consisted of a top-down excavation. This procedure included pouring each below-grade slab as an on-grade pour with various openings located throughout the slab, then digging the soil out from underneath. Once the first three levels below grade were completed, construction upwards to the eleventh level were allowed to begin. The top-down excavation was found to be necessary due to the depth that the excavation was required to achieve and the two existing structures located on-site.

This analysis will be performed under the conditions listed within Analysis 2. The existing brick building located on the southeast corner of the project site will not be renovated, but completely rebuilt. Utilizing the façade retention method to allow the complete destruction of the structural components can allow for alternative excavation methods. The allowable start date of upward construction for the above-grade structure will need to be considered while analyzing alternative excavation methods.

Analysis 3 will also consist of a research study and structural breadth topic in conjunction with analysis 2. A structural analysis will need to be completed for the load placed on the soil by the existing buildings and the force needed for pinning. See Appendix A for structural breadth details.

POTENTIAL SOLUTIONS

The results of this analysis will render the following possible solutions:

- Recommend alternative method of excavation in conjunction with façade retention method
- Recommend alternative method of excavation without façade retention method
- Do not recommend alternative method of excavation

METHODOLOGY

The following steps will be utilized to properly complete this analysis:

- Evaluate current excavation method in conjunction with existing building
- Research alternative excavation methods in conjunction with façade retention
- Evaluate several alternative excavation methods for feasibility
- Fully analyze chosen alternative excavation method for full schedule and cost savings
- Document comparison of current excavation and alternative excavation

EXPECTED OUTCOME

The utilization of an alternative excavation process will generate a substantial decrease in the project schedule. The alternative method may delay the allowable start date of the above-grade structure, but the extensive decrease in the excavation duration will provide ample time for the superstructure to be completed on time.

ANALYSIS 4 – STORMWATER HARVESTING SYSTEM

PROBLEM IDENTIFICATION

Water utilities within the city that Sunnyvale Plaza is located can be very expensive. With such a high volume of restroom facilities located within the hotel, the water utility is a major expense to the hotel manager. The hotel consists of 1,175 guestrooms, 49 suites, 5 restaurants, and 5 below-grade levels of meeting rooms and ballrooms.

BACKGROUND RESEARCH PERFORMED

Stormwater harvesting systems can create a large amount of reusable water for the mechanical system. With such a high volume of restroom facilities located in Sunnyvale Plaza, utilizing a water recycling system can be of great benefit. Pursuing a stormwater harvesting system will also earn several LEED points that can improve the overall certification of the hotel. Utilizing a stormwater harvesting system may create more up-front costs, but can generate substantial long-term savings and improve the value of the hotel. It is also important to analyze the construction schedule increase due to the addition of the system. This analysis will include a mechanical breadth analysis. See Appendix A for mechanical breadth details.

POTENTIAL SOLUTIONS

The results of this analysis will render the following possible solutions:

- Recommend implementation of stormwater harvesting system
- Consider alternative approach to additional system
- Do not recommend implementation of stormwater harvesting system

METHODOLOGY

The following steps will be utilized to properly complete this analysis:

- Evaluate annual rainfall for hotel location
- Evaluate roof area available to recover stormwater
- Evaluate amount of stormwater available to hotel
- Size equipment required for stormwater harvesting system
- Complete cost and schedule estimate for additional equipment
- Evaluate initial system costs and long-term cost savings

EXPECTED OUTCOME

It is expected that the amount of stormwater that the roof area can collect will not be able to support all of the water utilities within the hotel. However, the stormwater harvesting system will generate a substantial amount of greywater to be utilized for some of the hotel facilities. This will still amount to substantial cost savings from the water utilities from the city.

CONCLUSION

The owner for Sunnyvale Plaza was not necessarily concerned about a forecasted opening date due to the primary focus being a convention center headquarters. Due to this, the expected opening was forecasted for just one month after a national festival. This month is the target for several schedule acceleration analyses being conducted. Analysis 1 will consider the benefits of forecasting an opening just before the national festival, while also considering the benefits of opening even earlier than that date. Analyses 2 & 3 will focus on the consideration of the existing building and the alternatives in the excavation process available due to the change in the existing building. Both of these analyses are expected to decrease the project schedule substantially. Analysis 4 will consider the extensive water utility costs for the area and evaluate an alternative method of decreasing the amount of water needed from the city. This analysis will greatly decrease the long-term costs and increase the value of the hotel.

Appendix A:

Breadth Topics

BREADTH TOPICS

STRUCTURAL BREADTH

The structural breadth will consist of an analysis and design of a new structural system for the southeast corner of the building in conjunction with Analysis 2 & 3. This corner of the project site was originally an existing brick building that was stripped and renovated to tie into the new construction. The structural breadth will complement the analysis of destroying the original structure and implementing the area into the new construction. This will include the design of the foundation, footings, floor slabs, beams, and columns for the area. The structural breadth will also include analysis of the shoring utilized during excavation.

MECHANICAL BREADTH

The mechanical breadth will consist of an analysis of the plumbing elements throughout the hotel. In conjunction with Analysis 4, a greywater capacity analysis will be conducted for the fixtures throughout the building. The annual rainfall will be measured and evaluated to determine the amount of city water that can be saved by recycling stormwater. The sizing of equipment and piping necessary for the system will also be determined utilizing estimating resources.

Appendix B:

Sample Interview Questions

SAMPLE INTERVIEW QUESTIONS

FOR HOTEL MANAGER

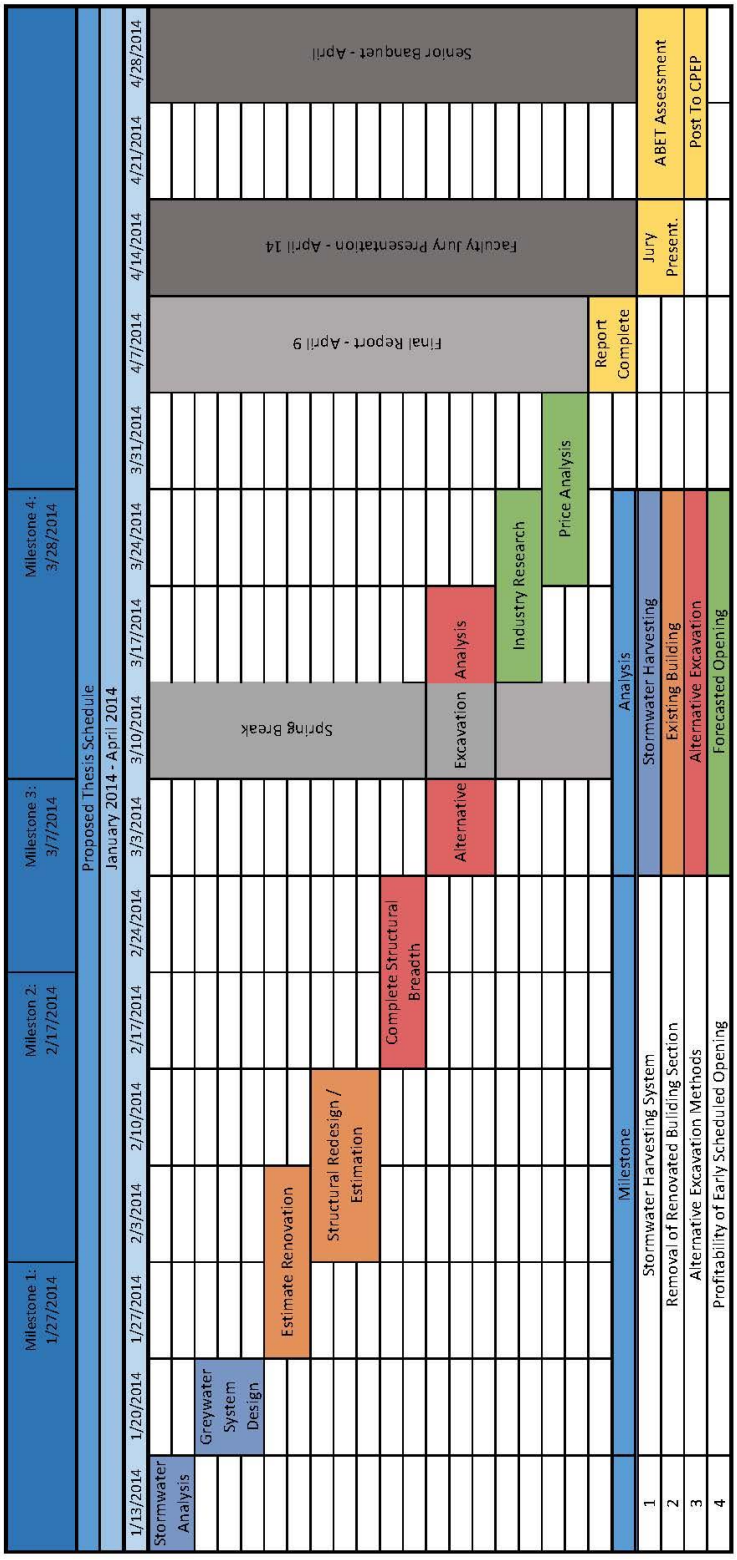
1. What hotels have you been involved with?
2. What are you responsible for on a daily basis?
3. What are some of the most important daily procedures within a hotel?
4. Have you ever been involved in a hotel during a large festival?
    a. Which festival took place?
5. What logistics are involved in a hotel during a national event?
6. How important would it be to forecast an opening just before a national festival?
7. How would a hotel manage the risks involved in a delayed opening concerning guest reservations?
    a. Have you ever experienced this?

FOR INDUSTRY MEMBER – NON HOTEL MANAGER

1. What is your role within the hotel industry?
2. What are you responsible for on a daily basis?
3. What are some of the most important daily procedures within a hotel?
4. Have you ever been involved in a hotel during a large festival?
    a. Which festival took place?
5. What logistics are involved in a hotel during a national event?
    a. How difficult is it to manage this?
6. How important would it be to handle an opening just before a national festival?

Appendix C:

Senior Thesis Timetable


Milestone 1: 1/27/2014
Mileston 2: 2/17/2014
Milestone 3: 3/7/2014
Milestone 4: 3/28/2014
Proposed Thesis Schedule
January 2014 - April 2014
1/13/2014
1/20/2014
1/27/2014
2/3/2014
2/10/2014
2/17/2014
2/24/2014
3/3/2014
3/10/2014
3/17/2014
3/24/2014
3/31/2014
4/7/2014
4/14/2014
4/21/2014
4/28/2014
Stormwater Analysis
Greywater System Design
Estimate Renovation
Structural Redesign / Estimation
Complete Structural Breadth
Spring Break
Alternative
Excavation
Analysis
Industry Research
Price Analysis
Final Report - April 9
Report Complete
Faculty Jury Presentation - April 14
Jury Present.
Senior Banquet - April
ABET Assessment
Post To CPEP
Milestone
Analysis
1
Stormwater Harvesting System
Stormwater Harvesting
2
Removal of Renovated Building Section
Existing Building
3
Alternative Excavation Methods
Alternative Excavation
4
Profitability of Early Scheduled Opening
Forecasted Opening

	Milestone 1: 1/27/2014			Milestone 2: 2/17/2014			Milestone 3: 3/7/2014	Milestone 4: 3/28/2014							
Proposed Thesis Schedule															
January 2014 - April 2014															
1/13/2014	1/20/2014	1/27/2014	2/3/2014	2/10/2014	2/17/2014	2/24/2014	3/3/2014	3/10/2014	3/17/2014	3/24/2014	3/31/2014	4/7/2014	4/14/2014	4/21/2014	4/28/2014
Stormwater Analysis								Spring Break				Final Report - April 9	Faculty Jury Presentations - April 14		Senior Banquet - April
	Greywater System Design														
		Estimate Renovation													
			Structural Redesign / Estimation												
					Complete Structural Breadth										
							Alternative	Excavation	Analysis						
									Industry Research						
										Price Analysis					
												Report Complete			

	Milestone	Analysis				
1	Stormwater Harvesting System	Stormwater Harvesting			Jury Present.	ABET Assessment
2	Removal of Renovated Building Section	Existing Building				
3	Alternative Excavation Methods	Alternative Excavation				Post To CPEP
4	Profitability of Early Scheduled Opening	Forecasted Opening				