Thesis Proposal

January 14
2010

The Salamander Resort and Spa

Paul Roberts

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This document proposes several different topics for my research next semester. The four analyses that I chose include schedule deceleration, guest room energy conservation, efficient landscaping, and the impact of the current economic status on my project. The majority of my topics focus on energy use and ways to reduce overall lifecycle costs.

Analysis I: Schedule Deceleration
This analysis focuses on the choice by the owner to decelerate the schedule and overall project finish date by one year. An investigation into the cost implications of completing the project on time and letting it sit empty for the additional year is performed. Research is done to determine the overall lost income the owner will incur by not opening in March 2009.

Analysis II: Guest Room Energy Conservation
A significant amount of energy use in hotels is wasted due to occupants not turning off lights and turning the heat down when not in the room. This analysis investigates ways to reduce energy use in each of the guest rooms by altering lighting and mechanical fixtures and controls.

Analysis III: Efficient Landscaping
This analysis topic deals with the landscaping plan and irrigation system in place. I investigate alternative plants and their organization on site in order to reduce redundant watering. A redesign of the irrigation system is also proposed.

Analysis IV: Economic Impact
This final analysis explores the impact the current economic situation has had on the project. Value engineering has changed a large portion of the systems in the building and this analysis looks into which of those topics impact the overall image the owner wants for the building.

Breadth Analysis 1: Lighting/Electrical
Analysis II incorporates a lighting redesign in the guest rooms for reduce overall energy use when the guests are and are not in the room. The lighting breadth will be used to find before and after energy costs and payback period for the added fixtures and systems.

Breadth Analysis 2: Mechanical
Analysis III incorporates an irrigation system redesign. I propose to add a rainwater collection tank and reorient the planting and piping system to provide better water efficiency.

INTRODUCTION

Building Name: Salamander Resort and Spa
Location and Site: Middleburg, Virginia. 340 acres
Building Occupant Name: Salamander Hospitality
Occupancy: Mixed use. Hotel, spa, equestrian center
Size (total square feet): 230,000 sf
Building Cost: $93 million
Dates of Construction: March 2007 – March 2011

Building Enclosure:
Building Facades: There are two major exterior wall facades on the Salamander Resort and Spa. Stone and stone veneer is used on the main entrance building, front and rear. The stone is used on the lower portion of the wall and the stone veneer is used on the middle and upper portion to reduce overall weight. The remainder of the main building and guest wing is stucco.

Roofing:
The roof consists of three different types. Composite slate shingle roofing is used on all slanted roofs. EPDM single ply - fully adhered (TPO) or Modified Bituminous Irma Roofing Systems are used for all flat roofs, usually found in the mechanical spaces.

Structural:
The structural system for The Salamander Resort is primarily concrete framing. The basement floor is 5-inch slab on grade with concrete columns ranging from 18x18 to 24x24. The main building uses steel framing on the first floor. The spa area utilizes post-tensioned concrete beams with typical size of 18x22. Two inch 18 gage Lok-Floor composite metal decking with 9 inch concrete with continuous welded wire fabric reinforcing is used for the guesthouse. Typical column size in the guesthouse is 16x28 on all four floors. 1.5 inch deep, wide rib, 20

gage galvanized roof decking is used along with lightgage steel roof trusses with 8" purlin at 48" on center.

Mechanical:
The main mechanical room is located on the basement floor in the northeast corner, directly below the kitchen and restaurant. There are also 15 AHU's located on the roof, 9 Variable Frequency Drive (VFD) and 6 Constant Volume (CV). Constant Volume AHU's control the exhaust air from the kitchen on both the basement and first floors. An additional 6 heat recovery AHU's are distributed between the main lodge, spa and laundry room. A 1950 gpm cooling tower located on the roof serves chillers 1 through 3.

Lighting/Electrical:
The main electrical rooms are located on the basement floor in the northeast and southeast corners. Main power from the utility comes through the onsite transformer and is converted to 3200A 480/277V – 3 phase 4W. Secondary power is 120/208V – 3 phase. On the basement floor, adjacent to the truck delivery area, is an indoor emergency generator with 650kW 480/277V – 3 phase 4W power. Also located in the basement is an Uninterrupted Power Supply (UPS) that supplies power to the 4th floor guesthouse and 1st floor main building. A majority of the lighting fixtures in the restaurant, spa, and lobby area are custom designed by a lighting contractor.

ANALYSIS I: SCHEDULE DECELERATION and COST IMPACT

Problem Statement:
The initial design and schedule for The Salamander Resort and Spa was for completion to be in March 2009. Per owner's request, the project was delayed 12 months to March 2010. This was done because the owner did not want to open a high-end resort in the current economic climate. The name of the company is on the building, and they did not want the public to see them as unsuccessful in renting out rooms. This intentional slowdown of the schedule creates more work for the contractor, specifically the scheduler. The cost impact is significant in part from the added 12 months of general conditions and from the lost revenue from the guest rooms that could have been rented, had it opened in 2009.

Proposed Solution:
I believe that the added cost of schedule deceleration makes it very unappealing to the owner. I will investigate other projects that slowed their schedule down and compare it to this project to see whether another method could have been used. A possible solution could be to keep the original schedule but not open it upon completion. This will eliminate the added construction costs but add building upkeep costs. The goal of this analysis is to determine the lost revenue and added construction costs of the decelerated schedule in relation to the original.

Steps:

- Contact the Turner Construction scheduler and inquirer about other similar projects
- Research other deceleration projects and compare
- Look at other ways the project could have been slowed
- Determine costs for extra year of construction
- Determine lost monthly revenue from renting rooms
- Determine monthly energy costs for maintaining an empty building

Expected Outcome:
The total cost, lost revenue plus construction costs will be a significant portion of the overall project cost.

ANALYSIS II: GUEST ROOM ENERGY CONSERVATION

Problem Statement:
As with most hotels and resorts, a large amount of energy is wasted due to occupants leaving the lights on when they are out of the room. The Salamander Resort and Spa has 165 guest rooms and the likelihood of everyone turning off unneeded lights is very low. When in the room, occupants also tend to use more light than is necessary, having multiple light fixtures on at once.

Proposed Solution:
By installing energy efficient lighting fixtures and automated controls, the energy use can be drastically reduced. Many hotels in Asia utilize a slot right inside the door to place your key, that when placed there, the electricity is turned on for the room. Upon leaving, you take your key, and all the lights and electronics turn off. There are also more automated systems that could be used like motion sensors to detect whether the room is occupied. With a new system, the schedule and constructability will be impacted

Steps:

- Research current fixtures
- Determine current energy use for two different typical rooms
- Research alternate fixtures and control systems
- Choose appropriate fixtures and control system
- Determine new energy use per room
- Calculate monetary savings per month
- Explore schedule impact for new system
- Explore construction impact

Expected Outcomes:
The lighting redesign will yield large energy savings when the system is applied to all 165 rooms. Each room will require a little less energy than before, but when each piece is added up, the total can be significant.

ANALYSIS III: EFFICIENT LANDSCAPING

Problem:
The Salamander Resort and Spa is trying to achieve a LEED Certified rating. The current plan includes an irrigation plan for the extensive set of trees, shrubs, and flowers around the building. There are roughly 40 different types of trees and 30 different shrubs that will be planted around the building. Some of the trees are used extensively at over 100 locations, while others are only used 2 or 3 times. It is inefficient and expensive to ship in such low quantities. Due to the large number of plantings, an efficient network of irrigation pipes is needed to reduce water use.

Proposed Solution:
The most important aspect will be an analysis of the current systems water use and the research of new, more efficient equipment. I will also explore the use of native trees and plants that will survive with little to no added irrigation. Plants that need little or no irrigation can be grouped together and placed away from ones that need water. In order to reduce the water utility bill, a large rainwater collection tank will be installed to provide additional water for irrigation. Placement of the collection tank is critical to maximize the use of gravity distribution. The landscaping does not fall on the critical path so a schedule analysis will not be needed.

Steps:

- Determine water usage of current system
- Research water efficient irrigation systems
- Make a scale that shows water need for each plant type
- Group together plants with similar water needs
- Layout landscaping
- Determine placement and construction of rainwater collection tank
- Design irrigation plan
- Contact landscape architect for constructability review
- Calculate overall water use
- Compare water use to old system

Expected Outcome:
The current irrigation system uses more water than is necessary for adequate watering. A redesign of the landscape layout and irrigation system will reduce water use.

CONCLUSION

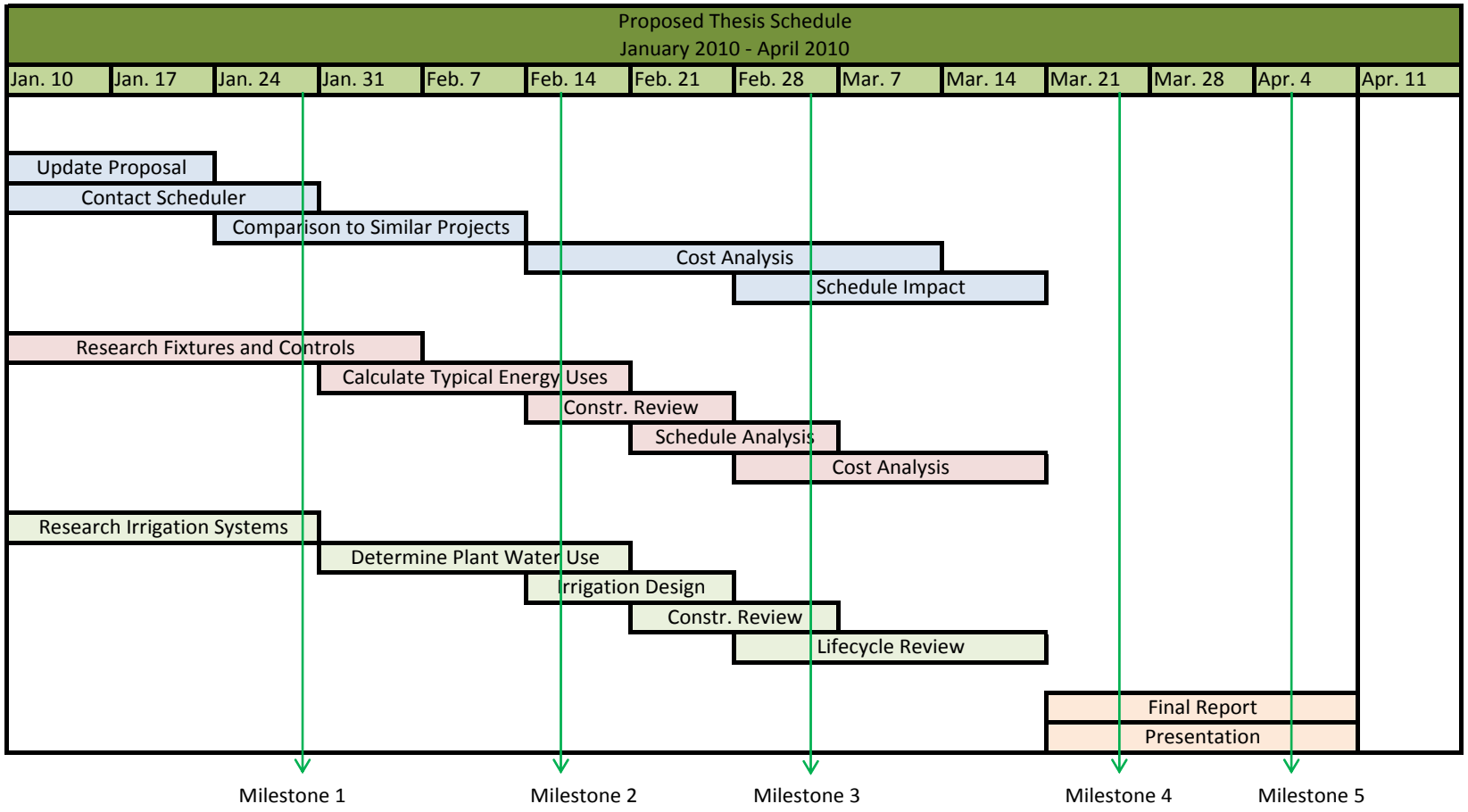
The goal of each of these analyses is to further my understanding in the main construction issues, value engineering, schedule impact, constructability, and research and how they relate to The Salamander Resort and Spa. The topics of interest focus mainly on energy use and ways to reduce lifecycle costs while still maintaining the original image that the owner perceived. The breadth topics will further my knowledge in areas outside of construction management to that of lighting and mechanical systems.

WEIGHT MATRIX and SCHEDULE

The table below shows the emphasis I will place on each topic for my analyses.

Description	Research	Value Engr.	Constr. Rev.	Schedule	Total
Schedule Deceleration and Cost Impact	10	10	-	15	35
Guest Room Energy Conservation	10	10	10	10	40
Efficient Landscaping	15	-	10	-	25
Total	35	20	20	25	100

The table on the following page shows the proposed thesis schedule for the spring semester.



Milestone Activities		
1	Jan. 29	Complete Main Research
2	Feb. 17	Begin Construction Reviews
3	Mar. 5	Begin Final Analyses
4	Mar. 24	Analyses Complete
5	Apr. 7	Report/Presentation Complete

	Analysis I: Schedule Deceleration and Cost Impact
	Analysis II: Guest Room Energy Conservation
	Analysis III: Water Efficient Landscaping

APPENDIX A: BREADTH STUDIES

Lighting/Electrical:
Analysis II utilizes a redesign of the lighting fixtures and control system to save energy in the guest rooms. This will also assist in the LEED certification that the resort is trying to achieve. The incorporation of compact florescent and LED lighting over incandescent lighting will greatly reduce the buildings energy footprint and lifecycle costs.

Mechanical (Plumbing):
Analysis III incorporates an irrigation system redesign. I propose to add a rainwater collection tank and reorient the planting and piping system to provide better water efficiency. By installing water efficient fixtures and automated controls and sensors, the water use for irrigation can be reduced significantly.