

## THESIS PROPOSAL



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## **EXECUTIVE SUMMARY**

In this proposal, the reader will find the three analyses that will be researched and examined for the Health Care Center next semester. Included in this report with each analysis is a problem statement, proposed goal, research methodology, tools used for research, and the expected outcome. First the analysis of value engineering (VE) while maintaining a LEED or sustainable status will be looked at. After researching sustainability and value engineering, the Health Care Center will analyzed in two areas where money can be saved and the sustainability of the building will not be affected. The following are quick previews of the analyses included in the proposal:

### **ANALYSIS 1 – SUSTAINABILITY AND VALUE ENGINEERING**

VE will be researched that when performed on sustainable buildings, green ideas and materials will not be eliminated from the project. Areas that will be examined will be what areas to look at, first cost vs. life cycle cost, and how to communicate these ideas.

### **ANALYSIS 2 – USE OF PEX TUBING FOR DOMESTIC WATER**

This will include the alternative solution to the high price in copper. The copper piping for domestic cold water lines will be replaced by PEX tubing throughout the Health Care Center. Included will be a cost analysis between the two types of systems.

### **ANALYSIS 3 – REDESIGN OF FOUNDATION WALL**

This will include the design of a reinforced CMU wall instead of the existing foundation wall type system. Along with the design and calculations will be a cost analysis for labor and material.

## **ANALYSIS 1**

### ***SUSTAINABILITY AND VALUE ENGINEERING***

#### **PROBLEM STATEMENT**

In today's world there is an increasing interest in making things environmentally friendly. Even the construction industry has gone into green thinking by adopting LEED as one of their criterion to determine whether a building is sustainable. Unfortunately, green buildings tend to be a bit more expensive to design and construct than a non-green building. Green materials or products may be more expensive and the labor costs may be higher because contractors are unfamiliar with that territory.

#### **GOAL**

The goal of the proposed research is to develop a way to effectively and efficiently use value engineering on any construction project with the outcome of maintaining or gaining sustainability.

#### **RESEARCH METHODOLOGY**

- Research Value Engineering and Sustainability
- Talk to industry professionals
- Develop questionnaire and submit to construction industry
- Gather all information and conclude

#### **TOOLS**

- U.S Green Building Council website ([www.usgbc.org](http://www.usgbc.org))
- SAVE International ([www.value-eng.org](http://www.value-eng.org))
- Industry professionals
- Online resources and books

#### **EXPECTED OUTCOME**

The expected outcome is for the construction industry to get a better understanding of how to use value engineering as a tool without reducing a building's sustainability. Another outcome is to reduce the overall cost of the Health Care Center by applying the information gained from the research of sustainability and VE.

## **ANALYSIS 2**

### ***USE OF PEX TUBING FOR DOMESTIC WATER***

#### **PROBLEM STATEMENT**

The price of copper in today's market is exceedingly high, and according to market trends the price will not be decreasing any time soon. In almost all of construction, commercial or residential, copper piping is used for plumbing. With the economic growth in Asia, China is buying up all the copper. This leads to more expensive plumbing systems used in buildings.

#### **GOAL**

The proposed goal is to reduce construction costs, which affect the overall project cost, by replacing the existing copper piping for domestic water with PEX tubing.

#### **RESEARCH METHODOLOGY**

- Contact contractors who have used PEX tubing
- Research online the advantages and disadvantages of PEX tubing
- Develop a cost savings analysis

#### **TOOLS**

- Online resources
- Microsoft Excel
- R.S. Means

#### **EXPECTED OUTCOME**

The expected outcome of this analysis is to show that PEX tubing can be an alternative solution to copper piping. The outcome should also show that the Health Care Center will have reduced project costs by saving in material.

## **ANALYSIS 3**

### ***REDESIGN OF FOUNDATION WALL***

#### **PROBLEM STATEMENT**

Foundation walls that extend up to the first floor roof elevation are designed to be along the perimeter of the lower half of the south addition (see Appendix A). Concrete wall were chosen here for insulation reasons. These concrete foundation walls pose problems for a large amount of material for concrete, wood forms and labor.

#### **GOAL**

The goal of the proposed analysis is to reduce construction cost, which affect the total project cost, by redesigning the foundation wall, by using reinforced CMU with insulation.

#### **RESEARCH METHODOLOGY**

- Design reinforced CMU wall with calculations
- Compare labor and material costs between original design and new design

#### **TOOLS**

- R.S. Means
- Microsoft Excel

#### **EXPECTED OUTCOME**

The expected outcome of this analysis is to show that money can be saved by switching that part of the building's foundation walls from concrete to reinforced CMU.

## WEIGHT MATRIX

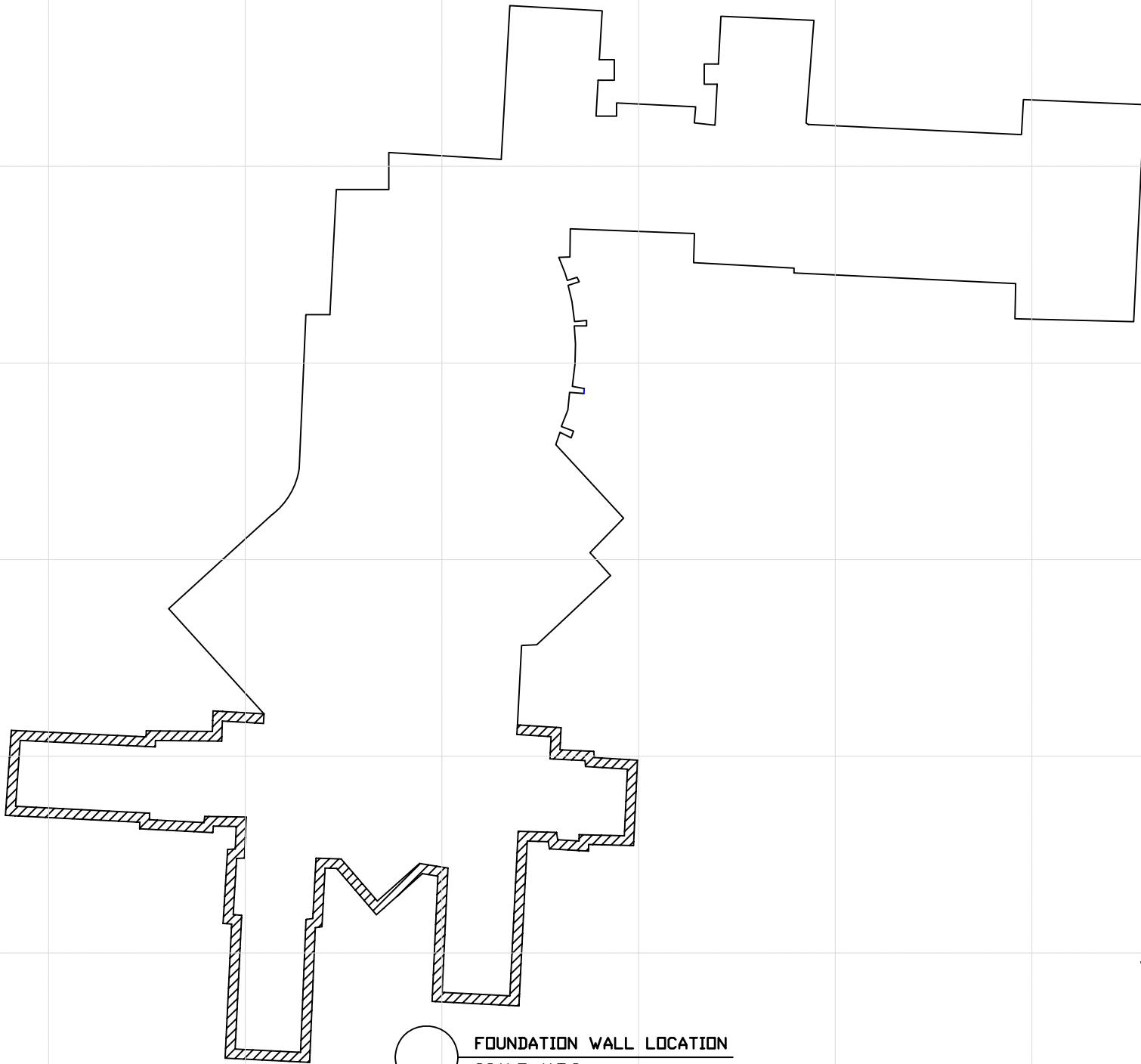
The following table illustrates the distribution between the three analyses.

Description	Research	Value Engr.	Const. Rev.	Sched. Red.	Total
Sustainability and VE	30%				30%
PEX tubing	15%	15%	5%	5%	40%
Foundation wall redesign		15%	10%	5%	30%
<b>Total</b>	<b>45%</b>	<b>30%</b>	<b>15%</b>	<b>10%</b>	<b>100%</b>

*Table – 1 Weight Matrix*

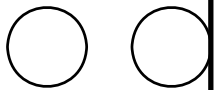
## APPENDIX A

### Foundation Wall Location



CREATED BY:

KEN LORENZ



**HEALTH  
CARE  
CENTER**

OWNER:  
ANONYMOUS  
LOCATION:  
DAUPHIN COUNTY, PA

MARK	DATE	DESCRIPTION

PROJECT NO.	PROJECT
AS-BUILT FILE	FILE
DRAWN	DRAWN
DESIGNED	CHECKED



○ FOUNDATION WALL LOCATION  
SCALE: N.T.S.