## EXECUTIVE SUMMARY

This thesis proposal is intended to outline the topics I plan to research in the Spring 2009 semester. Four separate analyses will be conducted, all focused on possible improvements made to the Redland Tech Center project in areas of sustainability and energy efficiency. Through these analyses, I hope to improve value of the project to the owner through value engineering, constructability review, schedule reduction, and research of topics identified at the PACE Roundtable.

Analysis I – LEED Rating Goal for Project

This analysis will determine the costs associated with achieving a LEED Gold rating for the Redland Tech project rather than the Silver rating currently targeted. I will also determine the added value to the owner for achieving the higher rating. Currently the project has 36 LEED credits that the project is targeting to obtain. A LEED Gold rating requires at least 39 credits.

Analysis II – Alternative Mechanical System

This analysis will determine the feasibility of using a chilled beam HVAC system as an alternative to the split system forced air HVAC system currently used for the project. Chilled beams have been used in Europe and Australia for over a decade and have been proven to be more efficient, save material costs, use less labor to install, and can decrease the plenum space needed for the HVAC system ductwork.

Analysis III – Electrical Energy Efficiency

This analysis will involve research and recommendations of energy efficient electrical components. One method that will be pursued in my analysis will be upsizing the electrical wiring one size larger than the NEC code minimum to achieve less power loss in the wires. This has been proven to have a payback period of less than 3 years. I will look for other electrical components that can have a payback period of less than 5 years.

Analysis IV – Parking Garage Construction Sequence

The parking garage for the Redland Tech project was constructed in two phases with a 60 day gap in the two phases of precast erection. In this analysis I will determine whether a different, more efficient construction sequence could have been used to erect the parking garage.

## BREADTH STUDIES

Breadth One: Mechanical

This breadth study will be performed in my analysis of an alternative mechanical system for the Redland Tech project. For this analysis, I will use the design loads from the mechanical engineer to design a chilled beam system to replace the split system forced air HVAC system currently used on the project. Equipment and ductwork will be sized, efficiency gains calculated, and a lifecycle analysis will be conducted. This new system will be compared to the forced air system to determine whether or not it would have been feasible to use a chilled beam system on the Redland Tech project.

Breadth Two: Electrical

This breadth study will be performed in my analysis of alternative electrical systems that are energy efficient. For this analysis, I will be looking at all of the electrical components used on the project to determine alternate equipment and materials that could be use to save energy. This analysis could include new, more energy efficient transformers or upsizing electrical wires one size larger than the NEC minimum. In the latter case, I would need to calculate resistances of the wiring of the building, determine electrical loads, and calculate power lost due to resistance. It has been shown that just upsizing wires to the next larger size can have a payback period of less than 3 years, maybe even as short as 3 months. I will research electrical components that have a payback period of less than 5 years.