

North Mountain IMS Medical Office Building

Phoenix, Arizona



Michael Hopple

Thesis Proposal Executive Summary

January 17th, 2008

AE 481W-Senior Thesis

The Pennsylvania State University

Faculty Adviser: Dr. Ali Memari, P.E.

Executive Summary

Building Overview: North Mountain IMS Office Building is a 123,400 square feet precast concrete office building located in Phoenix, Arizona. This \$10 million design-build project started construction in June of 2007 and is expected to be completed February 2008. It features a state-of-the-art outpatient diagnostic imaging center and ambulatory surgery center on the ground floor. The remaining floors feature over 92,000 square feet of open, rentable office space. The total building height is 60 feet, with a mechanical parapet wall that reaches 70 feet above ground level.

Structural Depth Problem Statement: North Mountain's precast concrete structure provides adequate resistance to lateral and gravity loads as well as performing well for service criteria. However, the heavy concrete structure raises the required seismic load to more than five times the wind load. Although seismic forces are suspected to control the lateral resisting system design, it is desirable to reduce these loads to a minimum. Reducing the lateral loads will allow for more design flexibility and a more efficient use of materials.

Structural Depth Proposed Solution: To limit weight, steel framing will be substituted for the precast double tees and inverted tee girders. Reducing the weight will reduce the seismic load which may decrease the requirements for the lateral load resisting system. The exterior shear walls will be kept to resist the seismic forces. Changing to light weight concrete and evaluating different materials throughout the building will also reduce weight.

Sustainable Architecture Breadth: Every building in the United States could be more environmentally friendly, and North Mountain is no exception. The sustainable architecture breadth will include the study of green roofing technologies, alternative precast concrete facades and material selection. The goal of reevaluating these aspects of the building is to achieve LEED certification.

Mechanical System Breadth: The mechanical breadth will comprise calculating the change in heating and cooling loads of the building due to the sustainable architecture technologies and designing a solar hot water heating system. Even though the Phoenix climate does not require a high demand for heating, the goal is to eliminate the use of a boiler to provide hot water.