Michael A. Troxell
Structural Option
Advisor: Professor Parfitt
College of Business Administration
Oct. 31, 2005

Structural Technical Report 2
Pro-Con Structural Study of Alternative Floor Systems

Executive Summary

This report is a comparison of various floor systems that could be used in the design of the College of Business Administration building for Northern Arizona University. For the calculations included with this report, a typical framing bay was chosen to model the different floor systems. The loads used are based on the 2003 version of the International Building Code. Some factors that went into the comparison of they systems were ease of construction, costs, depth of system, and weight of system.

Included in this report is an analysis of the floor system of the College of Business Administration. Also included are investigations into other floor systems that could possibly used when doing a redesign of the College of Business Administration. The first system checked was a system made up of precast concrete double tee beams and inverted tee beams as girders. Also looked at was a composite steel and concrete system. Another system explored was open web steel joists which frame into steel W-shaped girders. Two cast in place concrete systems were also examined. First, a one-way pan joist system, which used the CRSI Design Handbook was considered. The last system which was studied was a post-tensioned flat slab which was analyzed using the direct design method. All of these systems included in this report were designed for a typical bay which is seen throughout the College of Business Administration building. These are preliminary ideas used to see which systems deserve a closer look.

It was concluded in this report that the only investigated systems that are worth further investigation are the composite steel and concrete system and the post-tensioned flat slab. With the long spans and high loads that are seen in the College of Business administration, the other systems were concluded to be uneconomical even from a preliminary look.