

## **EXECUTIVE SUMMARY**

This thesis proposal focuses on the North Shore Equitable building, a six story low rise commercial office building located on Pittsburgh's North Shore. The existing structural system of this building consists of composite steel beams and girders to resist gravity loads and a combination of braced frames and moment frames to resist lateral loads. A composite steel system was originally chosen by the designers due to its light weight structure and the ease of design and construction attainable at reasonable costs. A proposed light rail extension line is designed to pass directly below the building, however, and brings different design aspects to the forefront of the project such as noise reduction and vibration damping.

The goal of this project is to redesign the North Shore Equitable Building using an alternative structural system in an attempt to improve noise control as well as maintaining the existing grid layout. From Tech Reports 1 through 3, it was determined that both the existing composite steel frame system and a one way joist and beam system are viable options for the design of the North Shore Equitable building.

The proposed solution for this thesis is to redesign the building using a one way concrete joist and beam system. This alternate structural system has inherent vibration resistance and will potentially decrease vibrations and noise transmission throughout the building. Using a one way joist and beam system will allow for the existing column grid to be maintained as well.

In addition to the structural depth study, two non-structural breadth studies will be conducted as part of this thesis as well. A cost and construction analysis will be necessary to analyze the potential changes in cost and scheduling brought on by the change in building material from steel to concrete. An acoustical study will also be conducted to research the effect a joist and beam system has on noise transmission and vibration as compared the existing composite steel system. In addition to these studies, the lateral resisting system and building foundation may need to be redesigned as well due to the change in structural system.