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## Thesis Proposal

# Structural Study of Alternate Lateral Systems

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### [Executive Summary](#)

This report is intended to be a detailed description and preliminary analysis of the structural design of Whiteland Village in Exton, PA. Whiteland Village is a 1,320,000 sq. ft. sprawling retirement community, which is slated for completion by November 2008. The physical components of the first phase of the complex include three 5 story residence buildings, a commons building, and a healthcare facility. The entire footprint has a basement level, which serves as covered parking and utility spaces. The phase one construction will be on the west side of the campus, including U-1 (renamed R-1), U-2 (renamed R-4), and the J building (renamed R-2). The other buildings will go into planning as soon as Whiteland Village becomes profitable, and will be connected with a pedestrian link.

The analysis for this proposal only examines the most current design of the three residence buildings, which were designed by Dever Architects. The current structural system consists of 8" hollow core precast plank, spanning approximately 30' between 10" CMU bearing walls. Lateral loads are resisted by a combination of concrete and masonry shear walls, steel moment frames, and steel braced frames.

In order to reduce building weight and increase the potential for future renovation, the possibility of changing Whiteland Village to steel frame is being investigated. To determine the feasibility of this proposal, two different lateral systems will be investigated: staggered truss and partially restrained composite connections. A thorough study into the impact these systems would have on the construction management issues of the building is also outlined.

Additionally, the procedure for checking the current building envelopes for potential failures is also detailed. The proposed changes from this would result in a façade and roof that are more durable and economical.