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**STRUCTURAL OPTION**  
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**UNIVERSITY OF CENTRAL FLORIDA'S ACADEMIC VILLAGES**  
**ORLANDO, FL**



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**STRUCTURAL TECHNICAL REPORT 2**  
**PRO-CON STRUCTURAL STUDY OF ALTERNATE FLOOR SYSTEMS**  
**EXECUTIVE SUMMARY**  
**OCTOBER 31, 2005**

The Academic Villages are located in Orlando, Florida. It is a complex of ten separate dormitories built to accommodate 500 new freshman students. The buildings are various sizes ranging from 14,000 square feet to 22,000 square feet. Each building is 4 stories tall and 44'-8" above the ground. Each floor has between eleven and fifteen 24 ft x 28 ft apartment units.

For this technical assignment, the existing floor system and 4 alternative floor systems were evaluated for the University of Central Florida's Academic Villages. The existing system is a composite deck with a 4" slab. Below are the 4 alternative systems that were analyzed:

- 1.** Post-Tensioned Concrete system in East-West Direction
- 2.** Post-Tensioned Concrete system in North-South Direction
- 3.** Precast Hollow Core Planks
- 4.** Two-Way Flat Plate Slab

The Post-Tensioned Concrete system in the E-W direction is a viable option as a possible floor system for this structure. A thinner slab was found when using the post-tensioned system in this direction which would result in less weight due to concrete. This will produce a much lighter building with less load on the foundation, which can be a benefit in high wind areas such as Florida. Also, the existing system needs additional concrete columns and beams on the first floor to provide additional support for the load bearing stud walls which are not adequate to carry the entire weight of the floors above on their own. Using a Post-tensioned system will provide lighter loads and those extra beams and columns may be able to be eliminated completely upon further analyses. The Post-Tensioned system in the N-S direction requires a 14" slab to support the 62'4" clear span, which is much too large. Using Precast Hollow Core Planks is another feasible alternative floor system. It is a very efficient system since construction time is minimal and is non labor intensive. It's slightly deeper than using a slab on grade but weighs about the same. A Two-Way Flat Plate system, while being very efficient in construction time and labor, requires a 10" slab which is much too deep when compared to some of the other alternatives.