
Executive Summary

Building Description

The Centre Court Apartments stand at 67.5' and contain five levels of student housing atop two levels of parking, intermixed with lobby and commercial area on the ground floor. The building is wrapped with load bearing CMU hollow core blocks that also act as the lateral resisting system of the building. The floor slabs are made of 8" pre-cast hollow core planks, which bear on the CMU exterior walls, and a series of wide flange beams that distribute the load to the concrete columns, which lead to the spread footing foundation below.

Proposal

The main problem that will be addressed in the alternative design of the Centre Court Apartments is the environmental impact of the materials and systems in the building. The main areas of focus will be the structural system and the building envelop, with an overall environmental evaluation and adjustments of the building as a whole. From a structural engineering standpoint, materials that are renewable, have low embodied energy, and/or are made with recycled content are the most preferred building elements. The majority of the materials in the Centre Court Apartments do not follow this philosophy, which is the motivation behind the proposed alternative design.

With the growing interest in green building across the industry, distinguishable green projects are in a prime position to gain public attention. The nature of building green offers direct examples to building occupants of how caring for the structure they inhabit will benefit them. Both of the above topics would directly benefit a structure such as the Centre Court Apartments.

Solution

The exterior walls will be designed with pre-cast, non-load bearing straw bale wall assemblies, which will bear on two-way flat plate slab with a concrete lateral resisting frame system, all specified with high fly ash content replacing up to 50% of the Portland cement.

Breadth Topics

A sustainability breadth will be conducted in order to adjust the HVAC system with an under floor air distribution system and also adjust the electrical design with a photovoltaic array on the roof of the structure. This breadth will also cover all architectural adjustments that will take place due to the replacement of all stud and CMU walls with the 12" straw bale wall assemblies. A breadth in construction management will also be conducted in order to model the schedule of the project and conduct a detailed cost comparison of the alternative method against the existing design.