Final Design Solution:

My final design of Lexington II is a composite structural system resting on a cast in place substructure. The superstructure will be composite floor decking connected to steel beams and columns through shear studs. Braced frames will resist the lateral load in both the N-S direction and the E-W direction. The design of the braced frames is controlled by the allowable stress and biaxial bending on each member, increasing the size of the members used in frames. The composite deck system will reduce the amount of concrete and form work needed to build the structure, and hopefully reduce the cost. The floor sandwiches are increased, but the system should still prove to be economical in any area without a height requirement.

The substructure of Lexington II was designed to be one way joist floors poured monolithically with girders framing into concrete columns. Using pans to construct the joist floors should reduce construction costs by eliminating time and labor involved with form work. Shear and lateral loads transferred from the superstructure will be carried to the foundation through shear walls.

Connections will play a large role in this structural system. Costs associated with the composite system include the extra material and labor used while installing shear studs. Bolts and welds to connect steel members will also greatly affect the cost of this building. Additional connections need to be specially designed to transfer loads from the steel superstructure to the concrete substructure.

While this new design should not greatly affect any of Lexington II's other building systems such as mechanical and electrical systems, it is important to note that fire proofing not required with the original design is now necessary.